24TH

AMOS

Advanced Maui Optical and Space Surveillance Technologies Conference

2023 PROGRAM

SEPTEMBER 19-22 | MAUI, HAWAII

PRESENTED BY

maui economic DEVELOPMENT BOARD

WELINA MAI KAKOU | WELCOME

Aloha!

Thank you for joining us for the 24th AMOS Conference and supporting Maui. As the wildfires in West Maui and resulting losses captured the thoughts, hearts, and prayers of the world, the decision to proceed as scheduled carefully considered all factors. The conference brings together a respected (and respectful) global scientific community in Maui to share leading research in space technology and policy, to learn and to connect.

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.

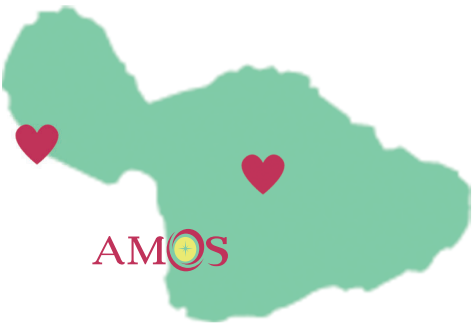
Your conference name badge is required for entry to all events. One (1) guest is invited to join you for the Welcome Reception on Tuesday night and should be indicated on your registration. All other events are for registered conference participants only.

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

We have identified opportunities for those attending the AMOS Conference to support the recovery efforts, whether by donation or through volunteer efforts.



Please visit:
https://www.hawaiicommunityfoundation.org/maui-strong
https://www.mauinuistrong.info/
https://makai.org/ to donate or volunteer.

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. **Easily connect with fellow attendees, download the digital swag bag, customize your agenda; interact on the social feed and ask presenters questions**. You will be able to view livestreams of all sessions on both, as well as replays, plus see all the posters. 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

Visit the the conference virtual platform

https://bit.ly/23AMOScp

Best for Mobile Viewing

Download the AMOS App

Available on the iPhone App Store

ANDROID APP ON Google play

Q&A TIPS

- **Login** using your email address & password used at registration
- Find the **session / presentation**
- **Tag the presenter** you are directing your question to
- Enter your question

CONNECT

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PO'OKELA *striving for the best*

BOEING

KOKUA *to help and support*

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LAULIMA *working together*

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FEATURED EXHIBITORS

Advanced Scientific Concepts
AFRL
Astro Haven Enterprises
Ball Aerospace
Celestron
Charles River Analytics
COMSPOC
Deloitte
Digantara
General Atomics Electro-magnetic Systems
GEOST
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AMOS SPONSORS

LOKAHI *collaboration and unity*

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KUPA'A *loyal and committed*

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MALAMA *to care for*

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SE SEAKR Engineering, LLC
SpaceX
Terran Orbital
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Transastra
USRA

EXHIBIT HOURS

Load-in | Tue, 8:00AM - 5:00PM
Wednesday | 9:30AM - 6:45PM
Thursday | 9:00AM - 6:30PM
Friday | 9:00AM - 2:25PM
Load-out | Fri, 2:30PM - 5:00PM

Explore the Exhibit Venue on-site. Connect with our conference partners to view the latest innovations. Online you can view the map of the venue and visit the digital swag bag for resources.

SEP 18 MONDAY | PO'AKAHI

emer-gen®
ENHANCING YOUR CAREER IN SPACE

A JOINT INITIATIVE OF
AMOS
SPACE GENERATION ADVISORY COUNCIL

SUPPORTED BY

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Ball
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The **6th 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.**

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

VIRTUAL TECHNICAL SHORT COURSES

(Separate registration fee required)

8:00 AM - 12:00 AM (HST)

Virtual Course A

'The Agile Regulator' - Regulation, On-Orbit Tracking, and the Law

Presented by: **Ralph Dinsley,** Space Sustainable Solutions Northumbria (3S Northumbria); **Christopher Newman**, Northumbria University

Virtual Course B

Space Domain Awareness (SDA) Workshop

Presented by: **Wiley Larson,** CEI
Pamela Magee, Space Technology Series

Virtual Course C

Optical Modeling and Simulation for SSA/SDA

Presented by: **Alexander Lam** and **Patrick North,** Ansys Government Initiatives (AGI)

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

SEP 19 TUESDAY | PO'ALUA

IN-PERSON TECHNICAL SHORT COURSES

(Separate registration fee required)

8:00 AM - 12:00 PM

SC 1: Satellite Photometry for Non-resolved Object Characterization | *Mauna Loa*

Presented by: **Tamara Payne,** Altamira Technologies Corp.

SC 2: Joint Task Force Space Defense Commercial Operations (JCO) - Course 100 | *Vanda*

Presented by: **Rishi Patel,** U.S. Air Force, **Joseph Gerber** and **William Zavis,** KBR

SC 3: Telescopes and Optics: An Introduction to Ground-based Optical SDA | *Ilima*

Presented by: **Mark Ackermann,** Sandia National Labs and **Peter Zimmer,** J.T. McGraw and Associates, LLC

SC 4: Introduction to Event-Based Sensors for SDA: A Hands-On Tutorial | *Lokelani III*

Presented by: **Gregory Cohen,** Western Sydney University; **Michael Dexter,** Air Force Institute of Technology; **Brian McReynolds,** U.S. Air Force; **Rachel Oliver,** Cornell University; **Michal Zolnowski,** Remote Observatories for Asteroids and Debris Searching

SC 5: Astrodynamics for xGEO Space Domain Awareness

Lokelani II

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

1:00 PM - 5:00 PM

SC 6: Conjection Assessment Risk

Lokelani III

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

SC 7: CyberRoll Space - A Space Cybersecurity Tabletop Exercise

Lokelani II

Presented by: **Molly Cooper,** Ferris State University and **Peter Dillman,** Dillman's Dungeon

SC 8: Deep Learning Methods for Space Domain Awareness | *Mauna Loa*

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

SC 9: Observing and Characterizing Space Debris | *Vanda*

Presented by: **Thomas Schildknecht,** Astronomisches Institut Universität Bern

SC 10: Hands-on, Interactive Astrodynamics Education in the Metaverse | *Ilima*

Presented by: **Rob Hyland, Susan Latiff,** and **Daniel Stouch**, Charles River Analytics

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

WELCOME RECEPTION

Co-sponsored by BOEING

The conference kicks off with a welcome reception providing participants with a unique networking opportunity. Surrounded by tropical breezes participants and their guests 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.

SEP 20 WEDNESDAY | PO'AKOLU

6:00AM - 7:15AM | 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

WELCOME & INTRODUCTIONS

7:45AM
OPENING KEYNOTE ADDRESS
General B. Chance Saltzman
Chief of Space Operations
United States Space Force

KEYNOTE Q&A
Q&A sponsored by KRATOS

ASK A QUESTION
Login at
https://bit.ly/23AMOScp
click the session name, and
enter your question

8:30AM
SSA POLICY FORUM | Evolution of the Commercial SSA Data Market

Moderated by **Victoria Samson,** Washington Office Director**,** Secure World Foundation

Shreyas Mirji, Vice President, Business and Strategy, Digantara

Mahhad Nayyer, Graduate Research Assistant, Purdue University

Kevin O'Connell, Principal, Space Economy Rising

Melanie Stricklan, Founder & CEO, Slingshot

9:30AM | Exhibit Venue
EXHIBITION AND NETWORKING BREAK | Sponsored by SpaceNav

10:00AM | Aulani Ballroom
FEATURED PRESENTATION
Empowering Defense Space Technology Investment

Dr. Lindsay Millard
Principal Director for Space Technology, Office of the Under Secretary of Defense for Research and Engineering

10:15AM
MACHINE LEARNING FOR SDA APPLICATIONS
Sponsored by ANDURIL
Co-chaired by **Weston Faber**, L3Harris and **Justin Fletcher,** USSF SSC/SZG

Physics-Informed Orbit Determination for Cislunar Space Applications | **Andrea Scorsoglio,** The University of Arizona

Learned Satellite Radiometry Modeling from Linear Pass Observations | **Kimmy Chang,** Odyssey Systems – Space Systems Command (A&AS)

Scalable Multi-Agent Sensor Tasking Using Deep Reinforcement Learning | **Tory Smith,** United States Space Force, Massachusetts Institute of Technology

Optimally Convergent Autonomous and Decentralized Tasking with Empirical Validation | **Samuel Fedeler,** University of Colorado Boulder

AI SSA Challenge Problem: Satellite Pattern-of-Life Characterization Dataset and Benchmark Suite | **Peng Mun Siew,** Massachusetts Institute of Technology

11:30AM | Lokelani Ballroom
LUNCH

12:30PM | Aulani Ballroom
SPACE DEBRIS | Sponsored by NORTHSTAR EARTH & SPACE
Co-chaired by **James Blake,** University of Warwick and **Heather Cowardin**, NASA

A Summary of the DRAGRACER Flight Experiment for Orbital Debris Mitigation and Radiometric Solutions | **Patrick Kelly,** Millennium Space Systems

Space-based Observations of Plasma Waves During Conjunctions Between Host Sensors and Space Objects | **Lauchie Scott,** Defense R&D Canada

Estimating Orbital Debris Mass via Solar Radiation Pressure and Photometric Signatures | **Jim Shell,** Novarum Tech, LLC

Orbital Debris Shape Effect Investigations for Mitigating Risk | **Heather Cowardin,** NASA

1:30PM

ATMOSPHERICS/SPACE WEATHER

Co-chaired by **Mary Ellen Craddock,** Northrop Grumman and **Shaylah Mutschler,** Space Environment Technologies

A Survey of Current Thermospheric Density Models and Recommendations to LEO Satellite Operators | **Shaylah Mutschler,** Space Environment Technologies

Transformer-based Atmospheric Density Forecasting | **Julia Briden,** Massachusetts Institute of Technology

Days to Decades: Forecasting Neutral Densities in Low Earth Orbit | **Matthew Brown,** University of Birmingham

A Novel Approach for Simulating Atmospheric Optical Turbulence Seeing Parameters | **Randall Alliss,** Northrop Grumman

2:30PM | Exhibit Venue

EXHIBITION AND NETWORKING BREAK

Explore the Exhibit Venue on-site. Connect with our conference partners to view the latest innovations. Online you can view the map of the venue and visit the digital swag bag for resources.

2:50PM | Aulani Ballroom

JOINT INVITED TALK | How AI/ML Can Support SDA

Colonel Jeremy A. Raley, Director, Space Vehicles Directorate, Air Force Research Laboratory

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

3:20PM

CISLUNAR SPACE DOMAIN AWARENESS

Sponsored by ExoAnalytic Solutions

Co-chaired by **Mark Bolden,** Trusted Space, Inc. and **C. Channing Chow II,** Cloudstone Innovations

Robust Cislunar Architecture Design Optimization for Cooperative Agents **Naomi Owens Fahrner,** Ball Aerospace

Deep Learning for Cislunar Object Detection | **Luca Ghilardi,** The University of Arizona

Universal Angles-Only Cislunar Orbit Determination Using Sparse Collocation **Casey Heidrich,** University of Colorado Boulder

Strategic Regions for Monitoring Incoming Low-Energy Transfers to Low-Lunar Orbits **Yuri Shimane,** Georgia Institute of Technology

Probabilistic Initial Orbit Determination and Object Tracking in Cislunar Space Using Passive Radio Frequency Sensors **Erin Griggs,** Trusted Space, Inc.

Characterizing Cislunar Fragmentations **Carolin Frueh,** Purdue University

Adaptive Filtering for Multi-Sensor Maneuvering Cislunar Space Object Tracking | **John Iannamorelli,** Purdue University

Multi-Spacecraft Predictive Sensor Tasking for Cislunar Space Situational Awareness **Kento Tomita,** Georgia Institute of Technology

5:20PM | Exhibit Venue

EXHIBITION AND POSTER SESSION

Posters co-chaired by **Darren McKnight,** LeoLabs and **Matthew Stevenson,** LeoLabs

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

Co-sponsored by SAIC

8:00PM | Pacific Terrace Rooftop

WOMEN & ALLIES IN SPACE DOMAIN AWARENESS

Desserts, dancing, and networking under the stars. Separate registration is required.

SEP 21 THURSDAY | PO'AHA

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

7:30AM | Aulani Ballroom
VIRTUAL KEYNOTE ADDRESS
Diane Howard
Director, Commercial Space Policy, National Space Council

ASK A QUESTION
Login at https://bit.ly/23AMOScp click the session name, and enter your question

8:00AM
SSA POLICY FORUM | U.S. Progress on Civil SSA and STM

Moderated by: **Jamie Morin,** Vice President of Defense Systems Operations and Executive Director of the Center for Space Policy and Strategy, The Aerospace Corporation

Travis Blake, Space Traffic Coordination Program Officer, NASA

Richard DalBello, Director, Office of Space Commerce, NOAA, Department of Commerce

Barbara Golf, Strategic Advisor for Space Domain Awareness, U.S. Space Force

Travis Langster, Principal Director, Space and Missile Defense Policy, U.S. Department of Defense *(virtual)*

9:00AM | Exhibit Venue
EXHIBITION AND NETWORKING BREAK
Explore the Exhibit Venue on-site. Connect with our conference partners to view the latest innovations. Online you can visit the digital swag bag for resources.

9:30AM | Aulani Ballroom
CONJUNCTION/RPO | Sponsored by LOCKHEED MARTIN

Co-chaired by **Lauri Newman,** NASA, and **Matthew Hejduk,** The Aerospace Corporation

Conjunction Assessment and Deconfliction Paradigm for Co-Located Satellite Constellations with On-Spacecraft "Autonomous" Flight Dynamics Control
Matthew Hejduk, The Aerospace Corporation

Optimal Risk Mitigation Strategies for Low-Thrust Space Systems | **Pol Mesalles Ripoll,** SpaceNav

Iridium's Subsequent Assessment of The Collision Between Iridium 33 and COSMOS 2251 | **Ryan Shepperd,** Iridium

An Investigation into Transecting Satellites in Future Space Traffic Management Scenarios | **Brian Gunter,** Georgia Institute of Technology

10:30AM
ASTRODYNAMICS
Co-chaired by **Aaron Rosengren,** University of California San Diego, and **Paul Schumacher,** AFRL (Ret.)

Application of Electric Propulsion Maneuver Envelopes to Space Situational Awareness
Prashant Patel, Institute for Defense Analyses

Comparing Traditional and Admissible-Region Schemes for Angles-Only Initial Orbit Determination | **Siamak Hesar,** Kayhan Space

Leveraging Fisher Information to Optimize Observation Scheduling for Orbit Determination | **Sam Wishnek,** Ball Aerospace

A Fast, Robust Genetic Algorithm for Producing Families of Constrained Multi-Burn Orbit Transfers | **Eric George,** The Aerospace Corporation

11:30AM | Lokelani Ballroom
LUNCH

12:30PM | Aulani Ballroom
INVITED TALK | Space Delta 2: Space Domain Awareness for Combat Operations

Colonel Raj Agrawal, Commander, Space Delta 2-Space Domain Awareness

12:50PM

SDA SYSTEMS & INSTRUMENTATION

Sponsored by LinQuest

Co-chaired by **Michael Hart,** HartSCI LLC, and **Michael Nayak,** Defense Advanced Research Projects Agency

Relative Orbit Estimation with Wide Field of View Binary X-ray Sensing | **Andrea Lopez,** University of Colorado Boulder

Improving The Operational Signal Processing Chain for Faster Acquisition of New Objects to The French National Catalogue of Orbital Objects. | **Manuel Pavy,** CNES

Ionospheric Interaction Based Detection of Sub-centimeter Space Debris | **Ian DesJardin,** University of Maryland, College Park

A Photonic Quantum-Inspired Imager for Sub-Diffraction Space Debris Characterization | **Stephen Eikenberry,** CREOL - University of Central Florida

Ground-Based Bistatic Radar for Space Surveillance using a Non-Cooperative Radar Illuminator | **Richard Ferranti,** SRI International

Earthfence: Global Expansion of an Unclassified Deep Space Radar Capability **Brendan Quine,** ThothX, LLC

2:20PM | Exhibit Venue

EXHIBITION AND NETWORKING BREAK

2:40PM

SDA SYSTEMS & INSTRUMENTATION (cont.)

General Purpose, Software Configurable, Intelligent LiDAR Sensor for Space-Based Non-Cooperative Resident Space Object Relative Navigation and Tracking Applications | **Joy Shohdy,** Advanced Scientific Concepts

An End-to-End Signal Processing Chain for Low Earth Orbit Inverse Synthetic Aperture Radar Space Object Imaging | **Tim Jennings-Bramly,** Defense Science Technology Laboratory (Dstl)

Monitoring Satellite Pattern-of-Life Changes with Passive Radio Frequency Data | **Harris Mohamed,** Kratos

SPACEDUST-Laser/RF: Time of Flight Methods for Space Situational Awareness **William Ediger,** University of Manitoba

3:40PM

SATELLITE CHARACTERIZATION

Sponsored by LEOLABS

Co-chaired by **Jeff Houchard,** EO Solutions, and **Tamara Payne,** Altamira Technologies Corporation

Modified BRDF for Solar Cells **Madilynn Compean,** Air Force Institute of Technology

SpectraNet: Simultaneous Detection, Identification, and Tracking at GEO **Zach Gazak,** SSC/SZG

Tracking Merged Objects within Non-Resolved Imagery | **Calum Meredith,** Defence Science Technology Laboratory (Dstl)

RSO Characterization and Attitude Estimation with Data Fusion and Advanced Data Simulation | **Ángel Gallego,** GMV

Hyper-Spectral Speckle Imaging of Resolved Targets | **Fabien Baron,** Georgia State University

5:00PM | Exhibit Venue

EXHIBITION AND POSTER SESSION

Co-sponsored by NORTHROP GRUMMAN

Posters co-chaired by **Darren McKnight,** LeoLabs and **Matthew Stevenson,** LeoLabs

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

SEP 22 FRIDAY | PO'ALIMA

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

7:30AM | Aulani Ballroom
KEYNOTE ADDRESS
Elizabeth Pearce
Director Space Technology Office of the CTO Australian Space Agency

8:00AM
SSA POLICY FORUM | Moving from Industry Best Practices to Space Traffic Management Rules

Moderated by: **Brian Weeden**, Director of Program Planning, Secure World Foundation

Jerome Barbier, Head of Outer Space, Digital, and Economic Issues, Paris Peace Forum

Mariel Borowitz, Associate Professor, Sam Nunn School of International Affairs, Georgia Institute of Technology

David Goldstein, Principal Engineer, SpaceX

Daniel Oltrogge, Founder and Administrator, Space Safety Coalition

9:00AM | Exhibit Venue
EXHIBITION AND NETWORKING BREAK

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

9:00AM - 1:00PM | South Pacific Ballroom + Exhibit Venue
STUDENT SPACE EXPLORATION DAY

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

9:30AM | Aulani Ballroom
SPACE DOMAIN AWARENESS
Co-chaired by **Jerry Krassner,** OSD/R&E, and **Brian Young,** KBR

Lessons Learned on Mega-Constellation Deployments and Impact to Space Domain Awareness | **Diana McKissock**, 18th Space Defense Squadron, and **Christian Ramos,** 18th Space Defense Squadron/Omitron Inc

Indications of Adversary Actions Intended to Disrupt Space Operations: Simulation for Rehearsal of Detection and Response **Steven Paligo,** a.i. solutions

US-EUSST Data Exchange for Improved Orbital Safety | **Matthew Hejduk,** The Aerospace Corporation

Cooperative Tracking Aid for Space Domain Awareness | **Andrew Abraham,** Lockheed Martin

Performance Modeling of Satellite Track Before Detect Algorithms | **James Helferty,** KBR

Presentation of EU SST R&D Plan | **Cassien Jobic,** CNES

Addressing The Debilitating Effects of Maneuvers on SSA Accuracy and Timeliness **Jeff Cornelius,** COMSPOC

Evaluation of Maneuver Detection within an Autonomous, Heterogeneous Sensor Network | **Jonathan Kadan,** SSC/SZGA

11:30AM | Lokelani Ballroom
LUNCH

12:30PM | Aulani Ballroom
INVITED TALK | Space RCO and Dynamic Space Operations

Dr. Kelly Hammett, Director, and Program Executive Officer for the Space Rapid Capabilities Office

12:50PM
SPACE DOMAIN AWARENESS (cont.)

Proliferated Sensor Network (PSN) Performance Study & Architecture Design Optimization | **Matthew Bold,** Lockheed Martin

Optimal Sensor Tasking for Space Domain Awareness via a Beam A*-Search Algorithm
Lorenzo Federici, The University of Arizona

Space Domain Awareness Sensor Scheduling with Optimality Certificates
Neil Dhingra, Orbit Logic

The Right Data to The Right Place at The Right Time: A Marketplace Approach
Geoffrey Carrigan, Bluestaq

Wide Band Passive RF Data Aggregation and Frequency Estimation for Space Domain Awareness Purposes
Edwin G. W. Peters, University of New South Wales Canberra

2:05PM | Exhibit Venue
EXHIBITION AND NETWORKING BREAK

2:25PM | Aulani Ballroom
SPACE BASED ASSETS | Sponsored by RTX

Co-chaired by **Melrose Brown,** UNSW Canberra Space, and **Andrew Nicholas,** Naval Research Laboratory

Hyperspectral Space Domain Awareness with Machine Learning | **Scott Almond,** Northrop Grumman

Space Based Space Surveillance using Passive Radio Frequency Observations – A Feasibility Study | **Melrose Brown,** UNSW Canberra Space

Space Domain Awareness Advanced Radiation Awareness Technology: Hosted Payloads | **George Eberwiner,** Space Systems Command SSC/SZGZ

Sensitivity Improvements for Space Domain Awareness Using Satellite Tracking on a Nanosatellite | **Alexander Pertica,** Terran Orbital

3:25PM
FEATURED PRESENTATION
EMER-GEN® Outcomes

3:40PM
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 sixth annual AMOS Conference Best Paper and Student Awards. Also awarded are a series of Poster Awards.

4:00PM | Kaho'olawe Lawn
PAU HANA RECEPTION
Co-sponsored by L3HARRIS™ FAST. FORWARD.

Commemorate the end of the 24th AMOS Conference with live music, cocktails, and friends as we say *Aloha* and *A Hui Hou*

TELL US WHAT YOU THINK

Please complete Feedback forms by **Friday 2:00pm** to be in the running to win a GoPro Hero 11 Camera Bundle. Winner drawn at the closing ceremony. Must be present to win! Mahalo.

https://bit.ly/AMOS23Feedback

POSTER PRESENTERS

All posters are available in digital format and are accompanied by brief on-demand presentation videos in the virtual conference platform's Poster Hall. Interact with poster presenters on discussion boards and via video chat during optional Office Hours.

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 inaugural poster prizes – *Newcomer, Most Creative, Best Pitch & Golden Ticket!*

Fractal Analysis of The ERCAOS Dataset **Michael Abercrombie**, The Boeing Company

Karman - A Machine Learning Software Package for Benchmarking Thermospheric Density Models | **Giacomo Acciarini,** University of Surrey

Physics-Guided Machine Learning for Satellite Spin Property Estimation from Light Curves | **Gregory Badura,** Georgia Tech Research Institute

Characterization of NaK Coolant Blobs from Soviet RORSAT Reactors | **Adam Battle,** University of Arizona

Exploring SDA Sensor Architectures for The Surveillance of Geosynchronous Spacecraft **James Blake,** University of Warwick

SDA GEO Location in a GPS Denied Environment | **Jason Boyd,** Ball Aerospace

An Edge Computing Algorithm for Onboard Processing of Electro-Optical Imagery | **Matthew Britton,** The Aerospace Corporation

Autonomous Close Proximity Differential Drag Control of Low Earth Orbit Small Satellite Formations Using an Inter-Satellite Radio Frequency Link | **Melrose Brown,** UNSW Canberra Space

Learning Satellite Image Recovery Through Turbulence | **Kimmy Chang,** Odyssey Systems--Space Systems Command (A&AS)

Geostationary Earth Orbit Region Survey with The Optical Tracking Network, OWL-Net | **Jin Choi,** Korea Astronomy and Space Science Institute (KASI) / University of Science and Technology (UST)

Analysis of Age-Related Color Change of GEO Satellites via Spectroscopy **Frances Chun,** USAF Academy

Performance Index of a Network of Ground-Based Optical Sensors for Space Objects Observation and Measurements **Enrico Congiu,** Nurjana Technologies

Limitations of Current Practices in Uncooperative Space Surveillance: Analysis of Mega-Constellation Data Time-Series | **Charles Constant,** University College London

ABACO, An Autonomous Board for Avoiding Collisions | **Giacomo Curzi,** University of Bologna

The Importance of International Information Sharing for Cislunar Space Situational Awareness | **Nathaniel Dailey,** MITRE & Space Force Association

High-Fidelity Simulation of Dynamic Thermal Satellite Signatures with MuSES **Casey Demars,** Tech7

Preliminary Assessment of the Environmental Impact of Space Debris Demise During Atmospheric Reentry **José Pedro Ferreira,** University of Southern California

Seeing Stars: Learned Star Localization for Narrow-Field Astrometry | **Justin Fletcher,** USSF SSC/SZG

Formation Flight Design Near Earth-Moon Lagrange Points for Interferometric Characterization of Cislunar Objects **Erin Fowler,** University of Maryland, College Park

Cislunar Initial Orbit Determination with Optical Tracklets | **John Gaebler,** KBR

High-speed Opto-electronic Pre-processing of Polar Mellin Transform for Shift, Scale and Rotation Invariant Image Recognition at Record-Breaking Speeds **Julian Gamboa,** Northwestern University

RPO Maneuver Detection from Pixel Space using Deep Learning | **Emily Gerber,** Ten One Aerospace

Poster Session | Exhibit Venue
Wed, Sept 20 5:20PM - 6:45PM & Thu, Sept 21 5:00PM - 6:30PM

A Survey of COTS Optical Systems for Space Applications | **Ellen Glad,** Millennium Space Systems, A Boeing Company

Light Curve Forecasting and Anomaly Detection Using Scalable, Anisotropic, and Heteroscedastic Gaussian Process Models **Imene Goumiri,** Lawrence Livermore National Laboratory

Geosynchronous Patrol Orbits for Optimized GEO Space Domain Awareness **Erin Griggs,** Trusted Space, Inc.

Autonomous Information Gathering Guidance for Spacecraft-to-Spacecraft Tracking with Optical Sensors | **Jesse Greaves,** University of Colorado Boulder

A Long-term Neutral Density Database using Commercial Satellite Data for Atmospheric Model Calibration **Siamak Hesar**, Kayhan Space

Optimizing Distributed Space-Based Networks for Cislunar Space Domain Awareness in The Context of Operational Cost Metrics | **Koki Ho,** Georgia Institute of Technology

Comparison of Atmospheric Tomography Basis Functions for PSF Reproduction **Daniel Hopkins,** University of Canterbury

A System-of-Systems Approach Towards Future Space Traffic Management Autonomy and Policy Co-Design | **Neera Jain,** Purdue University

Monte-Carlo Methods for All-vs-all Future LEO Population Evolution Modeling **Daniel Jang,** Massachusetts Institute of Technology

Tomographic Wavefront Sensing Using a Single Scene-Based Shack-Hartmann Wavefront Sensor | **Daniel Johns,** Georgia State University

Passive RF Observations of Cislunar Objects | **Thomas Joyce,** The University of Arizona

UK SDA Requirements for a System of Systems in Support of the UK's SDA Strategy | **Emma Kerr,** Defence Science Technology Laboratory (Dstl)

SPACEMAP: The Prediction and Avoidance of Radio Frequency Interference using Dynamic Voronoi Diagram | **Douglas Deok-Soo Kim,** SPACEMAP Inc.

Novel Tulip-Shaped Three-body Orbits for Cislunar Space Domain Awareness Missions | **Darin Koblick,** Raytheon

Space Environmental Governance and Decision-Support using Source-Sink Evolutionary Environmental Models **Miles Lifson,** Massachusetts Institute of Technology

Adjustable Thresholds for Tracklet-to-Tracklet Correlation of Optical Observations | **Daniel Lück,** OKAPI: Orbits GmbH

Cislunar Tracking and Orbital Projection of Artemis | using Small Telescope **Jody Mandeville,** InTrack Radar Technologies, Inc.

Simultaneous Track and Multi-Spectral Instrument for Satellite Identification **James Mason,** Lockheed Martin Space

Observing Atmospheric Gravity Waves from the Space Station | **Dana McGuffin,** Lawrence Livermore National Laboratory

Analytic Space Domain Awareness **Darren McKnight,** LeoLabs

Predicting Custody of Cislunar Objects **Sean O'Neil**, MITRE

Dragon Army's Technical Approach to Collaborative and Synchronous Global Space Domain Awareness Operations **Rishi Patel**, U.S. Air Force

Constraining The Irradiance of Point Reflectors in Conjugate Geometries: An Elementary Derivation | **Matthew Phelps,** USSF SSC/SZG

Resilient Mesh Networking Keeps Critical Sensors Connected | **TJ Pruden,** Anduril Industries

End-to-End Behavioral Mode Clustering for Geosynchronous Satellites | **Thomas G. Roberts,** Massachusetts Institute of Technology

Optimal Background Removal Using Denoising Diffusion Models | **Marco Rocchetto,** Spaceflux

Analysis of Spacecraft Propellant Plumes in the GEO Plasma Environment | **Adrienne Rudolph,** ExoAnalytic Solutions

NEOSSat Canadian Satellite Tasking List: Maintaining Sovereign Object Orbit Custody with a Single Space Based Sensor **Shane Ryall,** DRDC

POSTER PRESENTERS CONT.

Statistical Analysis of Space Debris Surveys in High-Altitude Orbital Regions | **Thomas Schildknecht,** Astronomisches Institut Universität Bern

The Future Risk of Space Debris and Contested Environments Increases the Intrinsic and Actual Cost of GEO Slots | **Kristin Shahady,** Astroscale

Detection and Characterization of Maneuvers Using a Global Radar Network **Michael Squires,** LeoLabs

A Use Case of Identifying Geosynchronous Satellite With Spectroscopic Signatures **David Strong,** Strong EO Imaging, Inc.

Resilience of LEO Constellations to Accidental and Intentional Fragmentation Events | **Mark Sturza,** 3C Systems Company

High Frequency, High Accuracy Pointing onboard Nanosats using Neuromorphic Event Sensing and Piezoelectric Actuation **Matthew Tetlow,** Inovor Technologies

Space-Based Optical Component (SBOC) for The ESA VISDOMS Mission | **Jens Utzmann,** Airbus Defence and Space

Understanding Spectro-Temporal Signature Variability of Unresolved Resident Space Objects using a Simulation Model | **Miguel Velez-Reyes,** The University of Texas at El Paso

Analysis of Detection Limits in Event-Based Cameras for Space Situational Awareness **Vicente Westerhout,** Pontificia Universidad Católica de Valparaíso

Cislunar Debris from Halo Object Breakups **Charles J. Wetterer,** KBR

Intelligent Sensor Tasking for Minimum-Time Space Object | **Trevor Wolf,** The University of Texas at Austin

Coordinated Space Domain Awareness as an Optimized Commodity Market | **Przemek Wozniak,** Los Alamos National Laboratory

Monitoring and Tracking Accessible Invariant Manifolds in The Cislunar Regime **Raymond Wright,** Ball Aerospace

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Developing a Secure Framework for Space Domain Awareness (SDA) | **William Allington,** Ferris State University

Data Curation Activities for Space Surveillance and Tracking | **Alfredo M. Antón,** GMV

Characterizing A Novel Coordinated Optimal Avoidance Maneuver Framework for Space Traffic Management (STM) **André Antunes de Sá,** Kayhan Space

Uncertainty in Remaining Orbital Lifetime Estimation After Post-Mission Disposal **Lucía Ayala Fernández,** Technische Universität Braunschweig

Object Characteristic Determination using Brightness Measurements | **Pace Balster,** Katalyst Space Technologies

Modeling of Plasma Wave Generation by Orbiting Space Objects for Proximity Detection | **Paul Bernhardt,** University of Alaska Fairbanks

Distribution and Related Dynamics of High-Risk Conjunction Events in LEO **Rachit Bhatia,** LeoLabs

Cislunar Initial Orbit Determination using CAR-MHF | **Paul Billings,** KBR / Pacific Defense Solutions

Dragster: An Ensemble Assimilative Model for Satellite Drag | **Ryan Blay,** Orion Space Solutions

Risks from Spacecraft Breakup Events in Near Rectilinear Halo Orbits | **Nathan Boone,** Air Force Institute of Technology

Fast Light Curve Inversion for Regular and Tumbling Attitude Motion | **Alexander Burton,** Purdue University

Spin Axis and Physical Property Inversion of Moon-Impactor Chang'e 5-T1 Rocket Body | **Tanner Campbell**, University of Arizona

Spectral Calibrations of the USAFA-Meter for GEO Satellite Spectral Signatures **Francis Chun,** USAF Academy

Poster Session | Exhibit Venue
Wed, Sept 20 5:20PM - 6:45PM & Thu, Sept 21 5:00PM - 6:30PM

Adjusting The NASA Standard Breakup Model with The Outer Probability Measure Theory | **KaiQi Cui,** Purple Mountain Observation

Global Space Domain Awareness, "Partnering to Win" with AUKUS | **Nathaniel Dailey,** MITRE & Space Force Association

SSA Data Analysis with a Two-Pronged Approach Including Machine Learning for RSO Detection | **Marcel Debczynski,** Spaceflux

Performance of an Optical COTS Station for the wide-field Detection of Resident Space Objects | **Thomas Delaite,** ONERA

The Use and Calibration of Opportunistic Sensors for In-Space Situational Awareness **Aishling Dignam,** Astroscale

Development and Deployment of SWIR Optical Station for Daytime Space Object Observations | **Marc Drieux,** ArianeGroup

Simulating the Photometric Light Curve of Artificial Satellites in GEO used with a Ray-Tracing | **Takao Endo,** Mitsubishi Electric Corporation

Continuing Progress on a Compact, Extremely Accurate Star Tracker | **Stephen Fox,** IERUS Technologies, Inc

A Practical Technique for Discriminating Manoeuvres and Observational Anomalies from Precision Sequential Estimates of Orbits | **Tommy Fryer,** CGI

Simulated Debris Impact Testing of Additively Manufactured Origami Mirror Structure for Space-Based SSA | **David Garcia,** Air Force Institute of Technology

Reducing Uncertainty in Satellite Conjunction Analysis | **Elizabeth George,** University of Birmingham

Refactoring the Approach to SSA Legacy Application Modernization | **Arne Gerhartd,** Deloitte Consulting

FTN/USAFA One-meter Telescope Systems Limiting Magnitude Research **Timothy Giblin,** i2 Strategic Services LLC

Infrared Sensing for Space-Based Space Domain Awareness | **Michael Gordon**, Ball Aerospace

QuantumNet: A Scalable Cislunar Space Domain Awareness Constellation **Eric Gorman,** Quantum Space

A Machine Learning Method for Object Localization | **Mridul Gupta,** Purdue University

Enabling Resilient and Autonomous Collection of Near-Earth Objects **Cameron Harris,** Virginia Polytechnic Institute and State University

About Some Features of The Distribution of Relative Accelerations in The Vicinity of The Satellite in The Region of GEO Orbits **Alice Horbachova,** Odesa I.I. Mechnikov National University

Attitude Determination of Cylindrical Rocket Bodies by using Simultaneous Bistatic Photometric Measurements **Tomas Hrobar,** Comenius University in Bratislava

Comparison of the Lemur and PSST Image Processing Pipelines for Astrometric Measurements of Resident Space Objects in All Orbital Regimes | **Krzysztof Kaminski,** Adam Mickiewicz University

Validity Evaluation of Anomaly Detection Using LSTM-Autoencoder for Maneuver Detection | **Ryo Kato,** NEC

Probabilistic Space Weather Modeling and its Impact on Space Situational Awareness and Space Traffic Management **Thomas Kelecy,** The Aerospace Corporation

Near-Earth Semi-Analytical Uncertainty Propagation Toolkit for Conjunction Analysis | **Yashica Khatri,** University of Colorado Boulder

Cislunar Rendezvous and Proximity Operations in The Bi-Circular Restricted Four-Body Problem | **Fouad Khoury,** JHU/APL

Multispectral Data for Characterization of Satellites | **John Kielkopf,** University of Louisville

Study on Optimization of Imaging Mission Scheduling for Multiple Satellites and Ground Stations | **Dongjin Kim,** University of Science and Technology

Passive Ranging, TLE, and GNSS Telemetry: A Comparative Study for Conjunction Assessment | **Douglas Deok-Soo Kim,** SPACEMAP Inc.

AI-Assisted Near-Field Monocular Monostatic Pose Estimation of Spacecraft **Daigo Kobayashi,** Purdue University

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Influence of The Atmosphere Model and The Quality of The Ballistic Coefficient (BC) Estimation on The Prediction of The Re-entry Moment | **Mikolaj Kruzynski,** Polish Space Agency

Supplemental General Perturbations (SupGP) Element Sets for Modern Space Operations and Space Flight Safety **Kevin Kuciapinski,** CelesTrak

Linear Spectral Mixing for Spacecraft Characterization | **Rebecca Lersch,** University of Arizona

Statistical Modeling Framework for Kessler Syndrome | **Cameron Liang,** Institute for Defense Analyses

Vantage Point: Lessons from Doing Coordinated Space Imaging **Phillip Loch,** Raytheon Australia

Binocular Telescope for Neuromorphic Space Situational Awareness **Alexandre Marcireau,** International Centre for Neuromorphic Systems, Western Sydney University

Demystifying Event Based Sensor Biasing to Optimize Signal to Noise for Space Domain Awareness | **Brian McReynolds,** U.S. Air Force

Low-Earth Orbit Prediction Accuracy Review of Modern Empirical Atmospheric Models and Space Weather Data Sources **Pol Mesalles Ripoll,** SpaceNav

Characterization of Satellite Mega Constellations using Multi-Aperture Optical Array (MOA) | **Owen Miller,** University of Arizona

Possible Ways Forward for the ISON Initiative and Similar Projects. A Consortium for Decentralized Sharing of SSA Data | **Artem Mokhnatkin,** Keldysh Institute of Applied Mathematics

Enabling Modular and Scalable SDA Data Transforms via the DAF Data Fabric **Edward Morgan,** Raft, LLC

On the Feasibility of Ground-Based Optical Detection of Cislunar-Space RSOs in the Presence of Bright Sky Background **Marc Murison,** U.S. Naval Observatory

Building a Laboratory Spectral Library of Spacecraft Materials in Vacuum at Variable Phase Angle | **Neil Pearson,** University of Arizona / Planetary Science Institute LCLEOSEN-B: Design and Development of a Low-Cost Low Earth Orbit Optical Surveillance Sensor System, a Phase B study | **Elisabeth Petersen,** Deimos Space UK Ltd.

A Case for Resilient Hosted Payloads in Proliferated MEO to Support Space Domain Awareness | **Dan Petrovich,** SEAKR Engineering

Distributed, Disrupted, Disconnected, and Denied (D4) | **Stanislav Ponomarev,** Raytheon BBN

Closely Spaced Object Classification Using MuyGPyS | **Kerianne Pruett,** Lawrence Livermore National Laboratory

RSO Simulations with Anti-Sun Pointing Predictions | **Randa Qashoa,** York University

SPACEDUST-Optical: Wide-FOV Space Situational Awareness from Orbit **Randa Qashoa,** York University

Shake Before Use: Artificial Contrast Generation for Improved Space Imaging using Neuromorphic Event-Based Vision Sensors | **Nicholas Owen Ralph**, Western Sydney University

XGEO Spacecraft Observation Methods Using Ground-Based Optical Telescopes **Kaitlyn Raub,** MITRE

Space Sustainability and Traffic Management Requires Trusted Space Stakeholder Coordination **Harvey Reed,** MITRE

Conceptual Framework for a Rapid Space Launch Capability | **Phillip Reid,** The Boeing Company

Challenges in Space Traffic Management **James Reilly,** Booz Allen Hamilton

Applicability of The Sensor Network Simulator Tool Suite for Proximity Operations | **Manuel Schubert,** Institute of Space Systems, Technische Universität Braunschweig, Germany

Introduction to Radio Frequency Interference Prediction and Mission Planning in KARI | **Jaedong Seong,** Korea Aerospace Research Institute

Estimation of Maneuver Occurrence Time of Non-Cooperative Satellites using Time-to-Event Data Analysis and Other Machine Learning Techniques | **S. Shivshankar,** Indian Institute of Science

Photometric Phase Functions of Resident Space Objects and Space Debris Extracted from Brightness Measurements | **Jiri Silha,** Comenius University, Faculty of Mathematics, Physics and Informatics

Resolving Conflict in Anthropogenic Space Object Data Through Weight Distribution Networks with Embedded Data Curation **Nevan Simone,** The University of Texas at Austin

Probabilistic Initial Orbit Determination from Radio Frequency Measurements using Gaussian Mixture | **Andrew Sinclair,** Air Force Research Laboratory

Development of an Image Processor for Space Situational Awareness Applications **Michael Stewart,** York University | Defence Research and Development Canada

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

LEO Rocket Body Rate of Tumble Analysis **Ty Stromberg,** USAFA

Initial Spectral Polarimetry of Geosynchronous Satellites | **David Strong,** Strong EO Imaging, Inc.

A Holistic Control Center for The Operation of PUS-Based Optical Communication CubeSat Technology Demonstration Missions at the German Aerospace Center **Sacha Tholl,** Deutsches Zentrum für Luft- und Raumfahrt - German Aerospace Center

Beyond GEO with a Space-Based Optical Sensor: Photometry and Orbit Determination of the James Webb Space Telescope and Artemis-1 using NEOSSat **Stefan Thorsteinson,** Defence Research and Development Canada

IARPA's Space Debris Identification and Tracking (SINTRA) Program **Alexis Truitt,** IARPA

Cybersecurity's Role in Supporting Space Situational Awareness | **Nick Tsamis,** MITRE Corporation

Refining Active Debris Removal Strategies **Chris Tuttle,** ClearSpace Today, Inc.

Toward Optimal Conjunction-based Sensor Tasking using Inferential Moments **Kevin Vanslette,** Raytheon BBN

Evaluation of Lunar Brightness Observing Models for SSA Scheduling | **Vincent Vella,** First Light Sciences

EUSST Sensor Calibration Procedure **Francesc Vilardell Sallés,** GMV

State Estimation of Terrestrial and Space Based Passive RF Architectures for Use in Cislunar SSA Utilizing Existing SSN Locations | **Kullen Waggoner,** Air Force Institute of Technology

Partial Image Reconstruction of an Artificial Satellite in Real Time Using Background Natural Stars | **Steve Weddell,** University of Canterbury

A Collaborative Cybersecurity Training Policy for Future Space Endeavors | **Chelsea Wright**, Ferris State University

Unlocking the Value of Space Debris: An Investigation on Multi-Shell Source-Sink Physical-Economical Model and Space Debris Value Definition | **Di Wu,** Massachusetts Institute of Technology

Contrasting Architectures for Cislunar SDA and STM | **Joshua Wysack,** Ball Aerospace

Constraining The Ability of Cislunar Models to Predict Long-Term N-body Stability **Travis Yeager,** Lawrence Livermore National Laboratory

Notable Object Detection from TLE Based on Deep Metric Learning **Jun Yoshida,** NEC

Space Situational Awareness Capabilities and National Security Among Growing Space Actors - Japan Case Study | **Makena Young,** Center for Strategic and International Studies

A Multi-Objective Approach to The Optimal Selection of Assets for The Design of an Optical Sensor Network | **Tomasz Zubowicz,** Polish Space Agency

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