

## ALL-VIRTUAL PROGRAM

*All dates/times listed are Hawaii Standard Time (HST). Agenda is subject to change. Each day of the plenary conference will open with a livestream of keynote addresses and SSA Policy Forum discussions. Technical presentations are released for on-demand viewing 1 day prior to their assigned Live Q&A sessions. Poster presentations are available throughout the conference.*

### Program at a Glance

**SAT Sep 12 –** EMER-GEN® Program (*separate registration fee required*)  
**TUE Sep 15**

**TUE Sep 15** Technical Short Courses (*separate registration fee required*)

**On-Demand Launch |** SSA/SDA, Astrodynamics, and Poster Presentations

**WED Sep 16** Poster Session & Exhibition A  
Conference Opening  
**Opening Keynote Address |** Major General Stephen N. Whiting  
**SSA Policy Forum |** *Extending SSA and Space Activities to Cislunar Space*  
**Live Q&A Session |** *Space Situational Awareness/Space Domain Awareness*  
**Invited Talk |** Kevin O'Connell  
**Live Q&A Session |** *Astrodynamics*  
Poster Session & Exhibition B  
Aloha Reception

**On-Demand Launch |** Machine Learning, Adaptive Optics & Imaging, Non-Resolved Object Characterization, and Atmospheric/Space Weather Presentations

**THU Sep 17** Poster Session & Exhibition A  
**Opening Remarks |** Quentin Verspieren, University of Tokyo  
**SSA Policy Forum |** *Challenges and Opportunities in Developing Norms of Behavior*  
**Featured Presentation |** EMER-GEN™ Briefing  
**Live Q&A Session |** *Machine Learning for SSA Applications*  
**Live Q&A Session |** *Adaptive Optics & Imaging*  
**Live Q&A Session |** *Non-Resolved Object Characterization*  
**Live Q&A Session |** *Atmospherics/Space Weather*  
Poster Session & Exhibition B

**On-Demand Launch |** Optical Systems & Instrumentation, Orbital Debris, Space-Based Assets, Cislunar SSA Presentations

**FRI Sep 18** Opening Remarks  
**SSA Policy Forum |** *Evolution of Industry Best Practices for Space Sustainability*  
**Live Q&A Session |** *Optical Systems & Instrumentation*  
**Live Q&A Session |** *Orbital Debris*  
**Live Q&A Session |** *Space-Based Assets*  
**Featured Presentation |** *The Space S&T Challenges from LEO to Cislunar*  
**Live Q&A Session |** *Cislunar SSA Session*  
Exhibition  
Conference Closing & Awards Ceremony

# AMOS Conference 2020



## ALL-VIRTUAL PROGRAM

Saturday 12 September – Tuesday 15 September



### EMER-GEN®

The annual EMER-GEN®, introduced in 2018, 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 [amostech.com/emer-gen](http://amostech.com/emer-gen) to learn more.

Tuesday 15 September

**AVAILABLE ON-DEMAND:** Presentations from the Space Situational Awareness/Space Domain Awareness, Astrodynamics, and Poster sessions are now viewable.

**TECHNICAL SHORT COURSES:** Separate registration fee required for each course. Technical short courses are “live” with the ability to interact with the instructor and attendees in real-time. Registrants will receive webinar access details the week prior to the event. [Learn more.](#)

06:00 HST    10:00 HST    **TECHNICAL SHORT COURSE 1** | Space Law & The Space Law Games: Legal Liability and Mapping the Future in Orbit

**TECHNICAL SHORT COURSE 2** | The Basics of Domain Awareness in Cislunar Space

**TECHNICAL SHORT COURSE 3** | Collision Avoidance Risk Assessment

**TECHNICAL SHORT COURSE 4** | Demystifying Machine and Deep Learning

**TECHNICAL SHORT COURSE 5** | Observing and Characterizing Space Debris

10:00    11:00    **BREAK** | Explore the AMOS Virtual Venue, visit the Poster Gallery, and view presentations on-demand.

11:00    03:00    **TECHNICAL SHORT COURSE 6** | Space CAMP Intro to DevSecOps

**TECHNICAL SHORT COURSE 7** | Telescopes and Optics for Ground-Based Optical SSA

**TECHNICAL SHORT COURSE 8** | Using Celestrak for SSA

**TECHNICAL SHORT COURSE 9** | Deep Learning Methods for Space Situational Awareness

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**Wednesday 16 September**

**AVAILABLE ON-DEMAND:** Presentations from the Machine Learning of SSA Applications, Adaptive Optics & Imaging, Non-Resolved Object Characterization, Atmospherics/Space Weather, and Poster sessions are now viewable.

05:00 HST 06:00 HST **POSTER AND EXHIBIT SESSION A** | *Poster Gallery and Exhibit Hall*  
Select poster presenters will be available via live chat to answer questions.  
Explore the Exhibit Hall and interact with vendors. Schedule 1:1 virtual meetings, view demos, resources, and more.

06:00 06:15 **CONFERENCE OPENING**  
Leslie Wilkins, President & CEO, Maui Economic Development Board

### **CULTURAL INVOCATION**

### **WELCOME & INTRODUCTIONS**

06:15 06:45 **OPENING KEYNOTE ADDRESS**  
*Introduction by Dr. Kelly Hammett, Director, Directed Energy Directorate, Air Force Research Laboratory*



**Major General Stephen N. Whiting**  
Commander, Space Operations Command  
United States Space Force

06:45 07:00 **KEYNOTE Q&A**

07:00 08:00 **SSA POLICY FORUM | Extending SSA and Space Activities to Cislunar Space**  
*Traditional space situational awareness activities (SSA) as conducted by the U.S. Department of Defense have been limited to Earth-orbiting objects. The growing interest and plans to expand international and commercial space activities into cislunar space suggests SSA should be expanded to include cislunar space as well. This panel will discuss the impetus for this evolution of SSA, current efforts under way, and future areas for collaboration and development.*

### Moderated by:

**Brian Weeden**, Director of Program Planning, Secure World Foundation

### Panelists:

**Brien Flewelling**, Chief Space Situational Awareness Architect,  
ExoAnalytic Solutions

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**Dan Hendrickson**, Vice President of Business Development,  
Astrobotic Technology, Inc.

**Jerry Krassner**, Space Development Agency, Emerging Capabilities Mission Area

**Jessy Kate Schingler**, Director, Policy and Governance, Open Lunar Foundation

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08:00	08:15	EXHIBITS AND NETWORKING BREAK   <i>Exhibit Hall</i>
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08:15	09:15	<b>LIVE Q&amp;A: Space Situational Awareness/Space Domain Awareness</b>
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*Sponsored by*  **L3HARRIS**

Co-chaired by **Moriba Jah**, University of Texas at Austin and **Danielle Wood**,  
Massachusetts Institute of Technology

Join the SSA/SDA technical presenters for a live question & answer session,  
hosted by the Session Co-Chairs. The following presentations can be viewed at  
leisure starting Tuesday 15 Sep:

*Space Command and Control Program - Kobayashi Maru*  
**Jennifer Krolkowski**, SMC/SY

*Update on ESA's Space Safety Programme and its Cornerstone on  
Collision Avoidance*  
**Tim Flohrer**, ESA/ESOC Space Debris Office

*Earthfence, a GEO Capable Deep Space Radar*  
**Brendan Quine**, Thoth Technology, Inc.

*Establishing an Independent Data Quality Analysis Framework for UDL  
Published Datasets*  
**Jeffrey Won**, The Aerospace Corporation

*Developing a Comprehensive Application for Satellite Anomaly Analysis and  
Attribution*  
**Janet Green**, Space Hazards Applications, LLC

*Commercial Sprint Advanced Concept Training (SACT): A Renaissance in  
Collaborative International Space Operations*  
**Joseph Gerber**, Centauri

*Real-time Multi-target Detection & Tracking of Space Objects using  
FiSSt Methods*  
**Shez Virani**, University of Colorado Boulder

*PHANTOM ECHOES: A Five-Eyes SDA Experiment to Examine GEO Rendezvous  
and Proximity*  
**Simon George**, Defence Science and Technology Laboratory

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*The Contributions of Commercial Best Practices to the Global Space*

*Governance Continuum*

**Daniel Oltrogge**, Analytical Graphics, Inc.

*Dempster-Schafer Inspired Association Framework and Tracking Metric for*

*Space Objects*

**Timothy Murphy**, L3Harris

*Australia's Emerging Space Policy - Defense Burden Sharing in Orbit and Space*

*Situational Awareness*

**Malcolm Davis**, The Australian Strategic Policy Institute

*Key Issues and Perspectives on International Space Governance and the*

*Weaponization of Space*

**Todd Harrison**, Center for Strategic and International Studies

*Telescope Tasking for Maneuver Detection and Custody Maintenance using*

*Evidential Reasoning and Reachability Theory*

**Daniel Aguilar Marsillach**, University of Colorado Boulder

*WRC-19: New Space Law Enabling the Use and Sustainability of LEO*

**Audrey Allison**, The Boeing Company

09:15 09:45

**INVITED TALK | Kevin O'Connell**

Director of the Office of Space Commerce, U.S. Department of Commerce

Introduction by **Eric Stallmer**, President, Commercial Spaceflight Federation

09:45 10:15

**LIVE Q&A: Astrodynamics**

Co-chaired by **T.S. Kelso**, ComSpOC Corp and **Marek Ziebart**, University College London

Join the Astrodynamics technical presenters for a live question & answer session, hosted by the Session Co-Chairs. The following presentations can be viewed at leisure starting Tuesday 15 Sep:

*Robust Initial Orbit Determination Using Streaks and Admissible Regions*

**Sam Wishnek**, CU Boulder

*Tracking Maneuvering Targets with Multi-Fidelity Interacting Multiple*

*Model Filters*

**Enrico Zucchelli**, University of Texas at Austin

*Evaluation of Performance Metrics for Fourier Drag Models in Orbit*

*Determination and Prediction*

**Vishal Ray**, CU Boulder

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*Satellite Maneuver Detection with Optical Survey Observations*

**Alejandro Pastor**, GMV

*Passive RF in Support of Closely Spaced Objects Scenarios in GEO*

**Kameron Simon**, Kratos

*Scaling Orbit Propagation Analysis Capabilities with Cloud Computing, Data Analytics and the Unified Data Library*

**Ann Chervenak**, The Aerospace Corporation

*Cislunar Periodic Orbit Families and Expected Observational Features*

**Channing Chow**, Pacific Defense Solutions/ A Centauri Company

10:15      11:15      **POSTER AND EXHIBIT SESSION B** | *Poster Gallery and Exhibit Hall*  
Select poster presenters will be available via live chat to answer questions.

11:15      11:45      **ALOHA RECEPTION**  
Please join us for Hawaiian music and Tahitian dancing as we transport you to paradise in anticipation of your return to Maui in 2021.

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05:00 <sup>HST</sup>      **RE-BROADCAST OF DAY 1**  
Keynote, SSA Policy Forum, and sessions available for viewing

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### Thursday 17 September

**AVAILABLE ON-DEMAND:** Presentations from the Optical Systems & Instrumentation, Orbital Debris, Space-Based Assets, Cislunar SSA, and Poster sessions are now viewable.

05:00 <sup>HST</sup>      06:00 <sup>HST</sup>      **POSTER AND EXHIBIT SESSION A** | *Poster Gallery and Exhibit Hall*  
Select poster presenters will be available via live chat to answer questions.  
Explore the Exhibit Hall and interact with vendors. Schedule 1:1 virtual meetings, view demos, and engage with fellow attendees.

06:00      06:30      **OPENING REMARKS | Quentin Verspieren**  
Researcher, Science, Technology, and Innovation Governance Program,  
Graduate School of Public Policy, The University of Tokyo

06:30      07:30      **SSA POLICY FORUM | Challenges and Opportunities in Developing Norms of Behavior**  
*Developing norms of behavior for space activities is widely viewed as an important step towards increasing the safety, stability, and security of space activities. But there have been challenges in translating the desire for norms in space into concrete proposals and actual changes in behavior. This panel will discuss the value of norms of behavior for national security, civil, and commercial space activities and steps that can be taken, both in the United States and internationally, to create and enforce future norms.*

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Moderated by:

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

Panelists:

**David Edmondson**, Policy Head, Space Security and Advanced Threats, UK  
Foreign and Commonwealth Office

**Bruce McClintock**, Lead, Space Enterprise Initiative, RAND

**Jessica West**, Senior Researcher, Project Ploughshares

**Brigadier General Richard L. Zellmann**, Deputy Director, Strategy, Plans, and  
Policy Directorate, U.S. Space Command

07:30	07:45	EXHIBITS AND NETWORKING BREAK   <i>Exhibit Hall</i>
07:45	08:00	<b>FEATURED PRESENTATION</b>   <b>EMER-GEN® Briefing</b>
08:00	08:30	<b>LIVE Q&amp;A: Machine Learning Applications of SSA</b> Co-chaired by <b>Justin Fletcher</b> , Air Force and <b>Nathan Toner</b> , Centauri
Join the Machine Learning technical presenters for a live question & answer session, hosted by the Session Co-Chairs. The following presentations can be viewed at leisure starting Wednesday 16 Sep:		
<i>Exploiting Spatial Information in Raw Spectroscopic Imagery using Convolutional Neural Networks</i> <b>Jonathan Gazak</b> , Air Force Research Laboratory		
<i>Machine Learning Implementation for In-orbit RSO Orbit Estimation using Star Tracker Cameras</i> <b>Siddharth Dave</b> , York University		
<i>On-board, Autonomous, Hybrid Spacecraft Subsystem Fault and Anomaly Detection, Diagnosis, and Recovery</i> <b>Richard Stottler</b> , Stottler Henke Associates, Inc.		
<i>Star-Galaxy Separation via Gaussian Processes with Model Reduction</i> <b>Imene Goumri</b> , Lawrence Livermore National Laboratory		
<i>Game Theoretic Synthetic Data Generation for Machine Learning Based Satellite Behavior Detection</i> <b>Dan Shen</b> , Intelligent Fusion Technology, Inc		
<i>Satellite Characterization via Restoration-Free Imaging: A Novel Machine Learning Paradigm for SSA</i> <b>Daniel Pimentel-Alarcon</b> , University of Wisconsin-Madison		



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08:30      09:00

### **LIVE Q&A: Adaptive Optics & Imaging**

Co-chaired by **Geoff Andersen**, Air Force Office of Scientific Research and **Michael Hart**, University of Arizona; HartSci LLC

Join the Adaptive Optics & Imaging technical presenters for a live question & answer session, hosted by the Session Co-Chairs. The following presentations can be viewed at leisure starting Wednesday 16 Sep:

*Real Time Deconvolution of Adaptive Optics Ground Based Telescope Imagery*  
**Toby Sanders**, Lickenbrock Technologies, Inc.

*Spatially Separable Blind Deconvolution of Long Exposure Astronomical Imagery*  
**Justin Lee**, Air Force Institute of Technology

*Ultra Broadband High-contrast, High-resolution Speckle Imaging*  
**Ryan Hall**, Georgia State University

*LEO Satellite Imaging with Adaptive Optics and Marginalized Blind Deconvolution*  
**Cyril Petit**, ONERA

*Quality-Weighted Iterative Deconvolution (QWID)*  
**Michael Werth**, The Boeing Company

09:00      09:30

### **LIVE Q&A: Non-Resolved Object Characterization | Sponsored by KRATOS**

Co-chaired by **Emily Lambert**, L3 Harris and **Tamara Payne**, Applied Optimization, Inc.

Join the NROC technical presenters for a live question & answer session, hosted by the Session Co-Chairs. The following presentations can be viewed at leisure starting Wednesday 16 Sep:

*Characterization of Resident Space Object States Using Functional Data Analysis*  
**Tom Kelecny**, L3Harris

*Radar and Optical Study of Defunct GEO Satellites*  
**Conor Benson**, University of Colorado Boulder

*Multicolor and Spectral Characterization of Space Objects in the Near-IR*  
**Harrison Krantz**, University of Arizona Steward Observatory

*Hyperspectral Unmixing for Remote Sensing of Unresolved Objects*  
**Miguel Velez-Reyes**, The University of Texas at El Paso

*Calculating Photometric Uncertainty*  
**Philip Castro**, Applied Optimization Inc.



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*Light Curve Analysis using Kalman Filtering and Small Telescope Capabilities*  
**Kent Rush**, California Polytechnic at San Luis Obispo

09:30	09:45	EXHIBITS & NETWORKING BREAK   <i>Exhibit Hall</i>
9:45	10:15	<p><b>LIVE Q&amp;A: Atmospherics/Space Weather</b>                      Co-chaired by <b>Thomas Berger</b>, University of Colorado at Boulder and <b>Marcus Holzinger</b>, University of Colorado at Boulder</p> <p>Join the Atmospherics/Space Weather technical presenters for a live question &amp; answer session, hosted by the Session Co-Chairs. The following presentations can be viewed at leisure starting Wednesday 16 Sep:</p> <p><i>Impact of Aerosols on Skylight Radiances</i>  <b>Jeannette van den Bosch</b>, Air Force Research Laboratory</p> <p><i>Improved Physics-Based Simulation of the LEO Space Environment</i>  <b>Eric Sutton</b>, University of Colorado / SWx TREC</p> <p><i>Satellite Impacts of Solar Energetic Particles and Galactic Cosmic Rays</i>  <b>Christina Cohen</b>, Caltech</p> <p><i>Earth's Radiation Belts: The Hazards to Satellites and What Can Be Done to Mitigate Risks</i>  <b>Geoffrey Reeves</b>, Los Alamos National Laboratory</p> <p><i>Why You Should Care About the Thermosphere and Space Weather</i>  <b>Aaron Ridley</b>, University of Michigan</p> <p><i>Earth's Ionosphere and its Impact on Global Navigation Satellite Systems</i>  <b>Susan Skone</b>, University of Calgary</p>
10:15	11:15	<p><b>POSTER AND EXHIBIT SESSION B</b>   <i>Poster Gallery and Exhibit Hall</i>                      Select poster presenters will be available via live chat to answer questions.</p>
05:00 <sup>HST</sup>		<p><b>RE-BROADCAST OF DAY 2</b>                      Keynote, SSA Policy Forum, and sessions available for viewing</p>

### Friday 18 September

**AVAILABLE ON-DEMAND: All Oral and Poster Presentations.**

06:00 <sup>HST</sup>	06:30 <sup>HST</sup>	<p><b>OPENING REMARKS</b>   <b>Mark Dankberg</b>                      Chief Executive Officer, Viasat</p>
06:30	07:30	<p><b>SSA POLICY FORUM</b>   <b>Evolution of Industry Best Practices for Space Sustainability</b></p>

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*There are multiple efforts underway within the private sector to develop best practices that will enhance space sustainability. This panel brings together experts leading several of these efforts to discuss what is being developed and how they can be shaped in a complementary fashion.*

Moderated by:

**Ian Christensen**, Director of Private Sector Programs, Secure World Foundation

Panelists:

**Chris Blackerby**, Chief Operating Officer, Astroscale

**Therese Jones**, Senior Director of Policy, Satellite Industry Association

**Dan Oltrogge**, Director, CSSI, Analytical Graphics, Inc.

**Danielle Wood**, Assistant Professor of Media Arts & Sciences and Aeronautics & Astronautics, MIT Media Lab

07:30      07:45      EXHIBITS AND BREAK | *Exhibit Hall*

07:45      08:15      **LIVE Q&A: Optical Systems & Instrumentation**  
Co-chaired by **Sue Lederer**, NASA Johnson Space Center and **Darren McKnight**, Centauri

Join the Optical Systems & Instrumentation technical presenters for a live question & answer session, hosted by the Session Co-Chairs. The following presentations can be viewed at leisure starting Thursday 17 Sep:

*Developments in High Spatial Resolution Imaging of Faint, Complex Objects at Lowell Observatory*

**Gerard van Belle**, Lowell Observatory

*Quantifying Speckle Noise in Shack-Hartmann Wavefront Sensing*

**Gregory Allan**, MIT

*An Automated Indications and Warning System for Enhanced Space Domain Awareness*

**Navraj Singh**, Numerica Corporation

*Quick Radar / Optical Super Observation for Deep Space*

**Josh Minneti**, MITRE

*Optimizing Daylight Performance of Small Visible-NIR Optical Systems*

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

*Kiwi Space Radar: Measurement Precision and Orbit Tracking Performance*

**Matthew Stevenson**, LeoLabs

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08:15

08:45

### LIVE Q&A: Orbital Debris

Co-chaired by **James Blake**, University of Warwick and **Heather Cowardin**, NASA Johnson Space Center

Join the Orbital Debris technical presenters for a live question & answer session, hosted by the Session Co-Chairs. The following presentations can be viewed at leisure starting Thursday 17 Sep:

*Optical Characterization of DebrisSat Fragments in Support of Orbital Debris Environmental Models*

**Heather Cowardin**, NASA

*Large Constellations of LEO Satellites and Astronomy*

**Patrick Seitzer**, University of Michigan, Dept of Astronomy

*Contribution from SSA data to the definition of a Space Sustainability Rating*

**Danielle Wood**, Space Enabled Research Group, MIT Media Lab

*The US Air Force compliance with the Orbital Debris Mitigation Standard Practices*

**Quentin Verspieren**, The University of Tokyo

*Can International Law Provide a Basis for Actively Removing Space Debris?*

**Scott Steele**, The Open University

08:45

09:15

### LIVE Q&A: Space-Based Assets | Sponsored by Peraton

Co-chaired by **Brandon Cesul**, Centauri and **Elizabeth Cunningham**, Air Force

Join the Space-Based Assets technical presenters for a live question & answer session, hosted by the Session Co-Chairs. The following presentations can be viewed at leisure starting Thursday 17 Sep:

*MicroSat Laser Communication Terminals and IR Imaging Payloads for Space-based Applications*

**David Robie**, General Atomics

*Space Object Identification Satellite Mission*

**Houman Hakima**, Space Strategies Consulting Ltd

*SmallSat Solutions for Far-Side Domain Awareness in Cislunar Space*

**Thomas Marshall Eubanks**, Space Initiatives Inc

*SSA Experiments for the Australian M2 Formation Flying CubeSat Mission*

**Melrose Brown**, UNSW Canberra

09:15


09:30

EXHIBITS AND NETWORKING BREAK | *Exhibit Hall*

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09:30      10:00      **FEATURED PRESENTATION | *The Space S&T Challenges from LEO to Cislunar***  
**Col Eric Felt**, Director, Space Vehicles Directorate, Air Force Research Laboratory  
**Col Joseph Roth**, Director, Innovation & Prototyping, Air Force Space & Missile Systems Center

10:00      10:30      **LIVE Q&A: Cislunar SSA | *Sponsored by***   
Co-chaired by **James Frith**, Air Force Research Laboratory and **Jaime Stearns**, Air Force Research Laboratory

Join the Cislunar SSA technical presenters for a live question & answer session, hosted by the Session Co-Chairs. The following presentations can be viewed at leisure starting Thursday 17 Sep:

*An Evaluation of Observing Constellation Orbit Stability, Low Signal-to-Noise, and the Too-Short-Arc Challenges in the Cislunar Domain*

**Mark Bolden**, Trusted Space, Inc.

*Maneuver Detection for Cislunar Vehicles using Optical Measurements*

**Jesse Greaves**, University of Colorado Boulder

*Simulated Photometry of Objects in Cislunar Orbits*

**Phan Dao**, AFRL

*Payload and Constellation Design for a Solar Exclusion-Avoiding Cislunar SSA Fleet*

**Phillip Cunio**, ExoAnalytic Solutions

*Cislunar Night Sky Brightness and Ground-Based Telescopes*

**Eric Pearce**, University of Arizona Steward Observatory

10:30      10:50      **CONFERENCE CLOSING & AWARDS CEREMONY**  
In collaboration with the Space Surveillance Technical Committee of the [American Astronautical Society](https://www.aas.org) (AAS), the AMOS Conference recognizes outstanding efforts in the field of Space Situational Awareness/Space Domain Awareness by presenting the third annual AMOS Conference Best Paper and Student Awards.

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05:00 HST      **RE-BROADCAST OF DAY 3**  
Keynote, SSA Policy Forum, and sessions available for viewing

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## ALL-VIRTUAL PROGRAM

### Digital Poster Presentations

Please visit the [Poster Gallery](#) to access Poster presentations on-demand. Select presenters will be available during the designated poster sessions to answer questions via chat.

### POSTER SESSION A PRESENTATIONS

Wed Sep 16 05:00-06:00 a.m. HST | Thu Sep 17 05:00-06:00 a.m. HST

*Experimental Investigation of Surface Modification of Typical Space Materials Induced by Low Energetic Particle Irradiation*

**Denise Beisecker**

*Space Weather: What is it and How Does it Impact Space Operations?*

**Thomas Berger**, University of Colorado / SWx TREC

*Enhancing a Survey of Faint Geosynchronous Debris with Commercial-off-the-shelf Equipment*

**James Blake**, University of Warwick

*Evaluating CONOPS for GEO Spacecraft Identification and Custody from Non-SSA Architectures in LEO*

**Kevin Brannick**, Raytheon

*Optimality and Application of Tree Search Methods for POMDP-based Sensor Tasking*

**Samuel Fedeler**, University of Colorado at Boulder

*A Constellation of Sensors Optimized for Maneuver Tracking*

**Holly Flinchbaugh**, Lockheed Martin

*An Exploration of Space Situational Awareness (SSA) Needs for Active Debris Removal (ADR) Operators*

**Jason Forshaw**, Astroscale

*Artificial Intelligence and Autonomy in Space: Balancing Risks and Benefits for Deterrence and Escalation Control*

**Nancy Hayden**, Sandia National Laboratories

*Cis-Lunar Autonomous and SSA Navigation via Implementation of Optical Asteroid Angle-Only Measurements*

**Mark Hinga**, AFRL/RDST

*Progress on the ELROI Satellite License Plate*

**Rebecca Holmes**, Los Alamos National Laboratory

*Benefits of Using a Space Based Spooky Radar at the Earth-Moon Lagrange Points for Orbit Determination*

**Darin Koblick**, Raytheon Space and Airborne Systems

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*Ukrainian Optical Sensors for Space Surveillance*

**Oleksandr Kozhukhov**, National Space Facilities Control and Test Center of State Space Agency of Ukraine

*International Collaboration Framework for Space Domain Awareness*

**Sarah Law**, Raytheon

*Laser ranging to space debris in Poland: tracking and orbit determination*

**Pawel Lejba**, Space Research Center of the Polish Academy of Sciences

*European Space Agency Space Weather System*

**Juha-Pekka Luntama**, European Space Agency

*Understanding the Oscillating Pattern in the Rotational Period Evolution of Several GLONASS Satellites*

**Thomas Schildknecht**, Astronomisches Institut Universität Bern

*Onboard Artificial Intelligence for Space Situational Awareness with Low Power GPUs*

**Jelena Sirovljevic**, MDA

*Angles-Only Orbit Determination Accuracies with Limited Observational Arc and Feasibility Analysis on Small Telescope Capabilities*

**Kyle Stoker**, Cal Poly San Luis Obispo

*A Comparison of Candidate Machine Learning Approaches Toward a Near Real-time Auto-maneuver Detection and Classification Capability for Deployment at the Edge*

**Triet Tran**, Cornerstone Consulting LLC

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### POSTER SESSION B PRESENTATIONS

Wed Sep 16 10:15-11:15 a.m. HST | Thu Sep 17 10:15-11:15 a.m. HST

*Convolutional Neural Networks for Inference of Space Object Attitude Status*

**Gregory Badura**, GTRI

*A Sensor-Rich Solution for Lunar/Cislunar Space Domain Awareness*

**Brian Banks**, Leidos

*Utility of Modular Attitude Determination and Control Subsystems for Small Satellites*

**Robert Bettinger**, Air Force Institute of Technology

*Performance of Parameterization Algorithms for RSO Shape and Optical Property Estimates*

**Ryan Clark**, York University

*The Sensor Management Prisoner's Dilemma: A Deep Reinforcement Learning Approach*

**Weston Faber**, L3Harris

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*SatNet: A Benchmark Dataset for Deep Space Object Detection and Low Signal-to-Noise*

*Domain Transfer*

**Justin Fletcher**, SMC/DirSP-G

*SILO-G: A Machine Learning Data Generator for Synthetic Ground-Based Observations of LEO Satellites*

**Nicole Gagnier**, The Boeing Company

*Heuristic Guided Deep Reinforcement Learning for SSA Tasking*

**Ashton Harvey**, George Mason University

*COOP2: A Webserver for Conjunction Management based on Dynamic Voronoi Diagram*

**Deok-Soo Kim**, Hanyang University

*Towards Real-time Image Reconstruction using Deep Neural Networks*

**Trent Kyono**, The Boeing Company

*NASA's Orbital Debris Optical Program: MCAT Reaches Full Operational Capability (FOC)*

**Sue Lederer**, NASA Johnson Space Center Orbital Debris Program Office

*Estimating Satellite Orientation through Turbulence with Deep Learning*

**Jacob Lucas**, The Boeing Company

*Cislunar periodic orbit family classification from astrometric and photometric observations using machine-learning*

**Greg Martin**, Pacific Defense Solutions - a Centauri Company

*Derelict Space Situational Awareness (SSA) Data for Free*

**Darren McKnight**, Centauri

*Calibration and Sensitivity Analysis for a New Polarimeter Instrument at the United States*

*Air Force Academy*

**Marco Pirozzoli**

*Blockchain Enabled Space Traffic Awareness (BESTA): Automated Space Domain Awareness Information Sharing, Comparison to Agreements, and Discovery of Anomalous Behavior*

**Harvey Reed**, MITRE

*Orbit Accuracy Analysis of CDM for KOMPSAT Series Satellites*

**Jaedong Seong**, KARI

*Astrometric and Photometric Measurements of GEO Satellites in Proximity Operations over the Pacific*

**Jovan Skuljan**, Defence Technology Agency



# AMOS Conference 2020



## ALL-VIRTUAL PROGRAM

*Towards Optimally Incorporating Non-Traditional Sensors into the Space Domain*

*Awareness Architecture*

**Albert Vasso**, Air Force Institute of Technology (AFIT)

*Characterization of Unresolved Satellite Imagery Using Near-Simultaneous Polarimetry and*

*Spectroscopy Data*

**Lucy Zimmerman**, US Air Force Academy