



“Facing the Security Challenge”
6th Annual Space Traffic Management Conference
University of Texas at Austin
Engineering and Education Research Center (EER)
James J. and Miriam B. Mulva Conference Center (0.904)
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Conference Biographies

Asha Balakrishnan has expertise in evaluation for research and training programs, space policy, and STEM education. Some of her projects at the Institute for Defense Analysis, Science and Technology Policy Institute include policy research for space situational awareness and small satellites, evaluation of a Federal scholarship program and portfolio analyses for large research facilities and mid-scale facilities. She has worked in the area of metric development and assessment across a number of topics including cyber research, technology transfer, and STEM education/workforce programs. Dr. Balakrishnan holds a BS in mechanical engineering from the University of Illinois – Urbana-Champaign. Both her MS and PhD are in mechanical engineering from the Massachusetts Institute of Technology.

Ulpia Elena Botezatu is a researcher in the field of security and defense and assistant to the project manager of SCIPRO - Space Critical Infrastructure at ROSA, a project that aims to develop research capabilities in the sphere of critical space infrastructure protection. She is also a representative of Romania NATO Science and Technology Organization in working groups and activities that aim at developing the concept of resilience for NATO space operations, as well as in the International Space Academy in Working Group 5.13 - "Space as Critical Infrastructure." In addition, Botezatu is a delegate in both Steering and Security Committees of the EU Space Surveillance and Tracking Consortium and to European Space Agency Space Situational Awareness Programme Board.

Since 2012, she is the security liaison officer responsible with the protection of critical infrastructures at the Romanian Space Agency. At the national level, Botezatu is a delegate in a number of national inter-institutional working groups in the field of security and defense, such as the Research and Innovation in Security group, Space Situational Awareness group, and GNSS working group. Since 2007, Botezatu has been active in research and education as a university assistant and research assistant in Romania, the U.S., Germany and the United Kingdom. She graduated from the Technical University of Iasi, the Faculty of Architecture of Bucharest, the Technical University of Berlin, and attended doctoral courses at Newcastle University in the United Kingdom. Recently, Botezatu graduated from Haut Comité Français pour la Défense Civile in Paris, the National Defence College, the National Intelligence Academy, as well as courses of the European Security Center in Garmisch-Partenkirchen, Germany.

Han Cai received the Ph.D. degree in Geospatial science from the RMIT University, Melbourne, Australia in 2019. Since 2019, he has been a postdoc research fellow at the Institute for Computational Engineering and Sciences, The University of Texas at Austin. His research interests include uncertainty

quantification, multi-target tracking, sensor tasking, data fusion, orbit determination, and tracklet association.

Edward Chan is currently a part-time master's student at the International Space University and a full-time enterprise software specialist in the San Francisco Bay Area. He graduated at Penn State in 2015 with a Bachelor of Science degree in Information Systems. He also has four years of consulting experience in building integrations, enabling operations, and supporting business initiatives for HR, Finance, and IT.

His interest in space begins to grow after his participation in SpaceX Hyperloop Pod Competitions in 2017, and he is actively looking for ways to contribute to the space communities. He sees challenges in integrating various SSA data platforms, and he starts looking into this area hoping to draw upon his experience in cloud ERP systems.

Loic Chappaz obtained a double M.S. degree in aerospace engineering (Dec. 2011) from Purdue University and his original school in France, the Ecole Supérieure de Techniques Aeronautiques et de Construction Automobile (ESTACA) before completing his doctoral degree (Dec. 2015) at Purdue under the guidance of Prof. Kathleen Howell and Prof. Jay Melosh. The focus of this doctoral research was dual, including trajectory analysis and mission design in multi-body regimes, and investigating the interior structure of our Moon through gravity modeling for the GRAIL mission, specifically, to detect and characterize empty lava tubes underneath the Lunar surface.

Since 2016, Loic serves as Principal Engineer at AstroLabs, a commercial space start-up studio, to incubate startup space ventures focused on products and services that will deliver rapid value growth in a broad set of commercial space business sectors. It is a spin-off from NASA's Jet Propulsion Laboratory (JPL), California Institute of Technology (Caltech). Within his role at AstroLabs, Loic is also the lead for one of AstroLabs' seed company, Constellation Tool Kit (CTK), a cloud framework for the design and operations of satellite constellations and Space Traffic Management. In addition, Loic is leading the effort of developing AstroLabs concurrent design center and design tools for space applications.

Dr. Jean Michel Contant is the Secretary General of the International Academy of Astronautics, a society of about 1300 members from 90 countries. He was CEO of ASTS, a group of companies to promote space cooperation, based in Paris, Bangalore and Washington. He began his career as structural engineer at Aerospatiale in charge of ballistic missiles structures including M20 and M4 missiles. He played a key proactive role in the creation of the Arianespace Company and received the Gagarin Medal from the Russian Ministry of Transport, to recognize his key contribution to his role in the creation of Starsem. Contant was later Vice-President of Marketing and Business Planning for the new EADS Launch Vehicles company that became Astrium Space Transportation and now Airbus. He was a Professor in scientific management at Paris XI University for twenty years. He personally pioneered the creation of a European professional aerospace society, now named Council of European Aerospace Societies, where he is a Vice-President. He was also a Vice-President of the French Aerospace Society (AAAF), a Fellow of the American Institute of Aeronautics and Astronautics (AIAA), of French Society of Aeronautics & Astronautics (AAAF), and of the Royal Aeronautical Society. He received the IAA Von Karman Award, the French Aeronautical Medal, and the International Cooperation Award of the AIAA.

Deva Arul Daniel is the Associate Director of the Directorate of Space Situational Awareness and Management at ISRO Headquarters. He joined ISRO in 1998 after completing his Masters in Aeronautical Engineering from Birla Institute of Technology.

For 20 years, he designed & developed software related to orbit, attitude, scheduling of payload operations and control center automation for Indian Remote Sensing (IRS) satellites. For the last 18 months, Deva has been assigned the task of establishing a network of observation facilities to detect, identify, track & catalogue space objects. He is also responsible for collaborating with international space agencies & universities for sharing SSA data.

Yue Deng is a professor of physics at the University of Texas at Arlington. She earned her Ph.D. in space science from the University of Michigan. Dr. Deng is leading the DoD Multidisciplinary University Research Initiative (MURI) project to develop next generation simulation capability in ionosphere/thermosphere coupling at multiple scales for environmental specification and prediction. Her professional experience in space physics has involved developing a new three-dimensional non-hydrostatic ionosphere/thermosphere general circulation model (GCM) and investigating the non-hydrostatic processes in the upper atmosphere. Her research interests include global 3-D modeling of complex system, solar and geomagnetic energy input uncertainty into the upper atmosphere, gravity-acoustic wave propagation, ionosphere-thermosphere coupling in multiple scales, data analysis, and planetary atmospheres.

Dr. Deng is a recipient of NSF Faculty Early Career Development (CAREER) Award and of Robert S. Hyer Research Award from the Texas Section of the American Physical Society. She has served on the NSF sponsored CEDAR Science Steering Committee (CSSC), the National Academy of Sciences (NAS) of Committee on Solar and Space Physics (CSSP), and NSF-NASA Space Weather Benchmarks Committee.

Devin D. Dickens has spent the last sixteen years in the aerospace industry, and currently works for Millennium Engineering and Integration Company in Melbourne, Florida. For Millennium, Devin has led programs to demonstrate the use of compact modernized telemetry processing systems, development of new telemetry systems for the NASA Space Launch System, and the development of the Space Data Integrator for the integration of space vehicles into the National Airspace System for the FAA. Prior to working at Millennium, Devin served on the Eastern Range Launch Team at Cape Canaveral Air Force Station, launching NASA's Space Shuttles as well as Atlas, Delta, and Space X rockets.

He is a former member of the Range Commander's Council, developing Telemetry Standards. Devin also spent time at Rockwell Collins, Inc., working as the software lead for the DO-260A ADS-B upgrade for the Boeing 747-8 and 777-F airframes. Devin formerly attended Florida State University, and holds a Bachelor of Science in Management Information Systems from the University of Central Florida, and a Master of Science in Computer Science from Webster University.

Chuck Dickey is the owner of TCTB, LLC, a limited liability company organized under Texas law in Houston, Texas, the home of America's manned space program. Chuck is the former Deputy General Counsel for Lockheed Martin Space, where he retired in December 2018. Before joining Lockheed Martin, he was an attorney for the United States Army Missile Command in Huntsville, Alabama, specializing in government contract litigation.

Chuck is a member of the Texas Bar Association, and has been licensed to practice law in Georgia, Alabama and California. He is a member of the American Bar Association's Section on Public Contract Law, the Forum for Air and Space Law, and the International Institute of Space Law.

Chuck graduated from Emory University with a BA degree and received a JD degree from Cumberland School of Law. Chuck and his wife Barbara live in Houston, Texas. Chuck's oldest son, Charlie, is a sixth year MD-PhD student at the University of California, San Diego, and his youngest son, John, is a college freshman at Texas A&M planning a career in international politics and space law.

Ralph "Dinz" Dinsley is a retired RAF Officer with more than 32 years of service. An "Air Defender" by choice and "Space Surveillance and Tracking Practitioner" by chance. His distinguished military career culminated in leading the UK MOD contribution to global Space Situational Awareness (SSA) in two significant programmes; the Combined Space Operations Initiative and the EU Space Surveillance and Tracking Framework. His unique military space experience was underpinned as a Chief of the Air Staff Fellow, with an MA in Peace and Development from Leeds Beckett University. His dissertation

titled “Critical Perspectives on UK Space Security” explored the vulnerabilities and threats of space operations against past, present and future UK aspirations.

Dinz is the Founder and Executive Director of Northern Space & Security Ltd (NORSS), a rapidly expanding SSA company based in Northumberland, England. He is an associate and founding member of the think tank Reflecting Space, an observer to the Hague Space Resource Governance Working Group and is currently exploring, in partnership with Northumbria University, the influence of law on developments for Space Traffic Management through the concept of the Space Law Games.

Dr. Doug Engelhardt is currently serving as Satellite Navigation Systems Architect at Maxar Technologies (formerly DigitalGlobe). Doug joined DigitalGlobe over 20 years ago when it was starting up as one of the first commercial satellite imaging companies. Prior to joining DigitalGlobe, Doug worked at the Jet Propulsion Laboratory, navigating the Magellan spacecraft to Venus and around Venus for its radar mapping mission.

Doug is actively involved in the Commercial Integration Cell at the Combined Space Operations Center (CSpOC) at Vandenberg. In 2019, Doug spent nine months of the year on-site at the CSpOC, sharing commercial best practices with the 18th Space Control Squadron, specifically for automation, sensor tasking, and improved maneuver modeling. Doug earned his B.S. in Aeronautical and Astronautical Engineering from Purdue University, and his Ph.D. in Aerospace Engineering Sciences from the University of Colorado Boulder under the direction of Professor George Born.

Dr. Diane Howard is Chief Counsel for Space Commerce at the U.S. Department of Commerce. In addition to providing space law expertise to the Office of Space Commerce (OSC) and the Department of Commerce as a whole, she also participates in interagency work and is actively involved in the Office of Space Commerce’s SPD-3 implementation. In addition, Diane is a non-resident scholar at UT Austin’s Strauss Center for International and Security Studies and an adjunct professor in its School of Law. Prior to joining UT Austin, Dr. Howard was one of the original architects of a similar multi-disciplinary program at the undergraduate level in Daytona Beach, FL at Embry-Riddle Aeronautical University.

Diane first became involved in space endeavors in 2004, on both the domestic and international levels. She was a citizen advocate for the passing of the Commercial Space Law Amendments Act of 2004, a critical piece of U.S. legislation that made possible the development of innovative technologies and a burgeoning commercial space transportation industry and participated in United Nations Committee on the Peaceful Uses of Outer Space capacity building initiatives in Rio de Janeiro, Brazil and Kiev, Ukraine. After working as a staff attorney in the Florida Appellate courts for some years, she took the decision to specialize in space law and attended McGill University’s Institute of Air and Space Law. Her LL.M. thesis centered upon private space law issues and her doctoral work focused upon effective spaceport regulation. Dr. Howard was chair of the annual Space Traffic Management (STM) conference while at Embry-Riddle, ongoing since 2013 and hosted at UT Austin in 2019 and has been active in the STM community since 2011. She serves as Executive Secretary of the International Institute of Space Law (IISL) and has worked with COMSTAC Working Groups. The U.S. Department of State named her a subject matter expert to work in an Expert Group of the UN COPUOS STSC Long Term Sustainability of Space Activities Working Group. Dr. Howard was legal lead for the International Association for the Advancement of Space Safety Suborbital Safety (IAASS) Technical Committee. In addition to the IISL and the IAASS, Diane is a member of the AIAA and the Florida Bar.

Dr. Islam I. Hussein is Vice President - Space Systems at Thornton Tomasetti. With more than fifteen years of experience in satellite guidance, navigation and control (GN&C), satellite autonomy, and space situational awareness, his group at Thornton Tomasetti provides both engineering, and research and development solutions focusing on On-Orbit Satellite Servicing (OOS), Rendezvous and Proximity Operations (RPO), and single- and multiple-satellite swarm, formation and constellation control and management. Dr. Hussein received his PhD in Aerospace Engineering from the University of Michigan in Ann Arbor in 2005. From 2005 to 2006, he was a Postdoctoral Associate at the University of Illinois’ Coordinated Science Laboratory. From 2005 to 2011, Dr. Hussein was an Assistant Professor of

Aerospace Engineering at Worcester Polytechnic Institute, in Worcester, MA. In 2011, he received a Senior Faculty Fellowship from the National Academy of Sciences to conduct research on Space Situational Awareness at Space Vehicles Directorate at the Kirtland Air Force Research Laboratories in Albuquerque, NM. Dr. Hussein is a member of the American Astronautical Society, the American Institute of Aeronautics and Astronautics and the Institute of Electric and Electronics Engineers. Dr. Hussein is Associate Editor of the Journal of Spacecraft and Rockets.

Shiva Iyer is a Ph.D. student in the Department of Aerospace Engineering and Engineering Mechanics at the University of Austin, Texas, under the direction of Dr. Moriba Jah. His current research includes orbit determination, software engineering, and data fusion for problems in Space Situational Awareness. He received his B.S. in Aerospace Engineering from the University of Michigan at Ann Arbor, and his M.S. in Aerospace Engineering from the University of California at Los Angeles specializing in dynamics and controls.

Dr. Moriba Jah is the Program Lead of the Space Security and Safety Program at the Strauss Center, Director of the Advanced Sciences and Technology Research in Astronautics (ASTRIA) program, and Associate Professor of Aerospace engineering and Engineering Mechanics in the Cockrell School of Engineering at The University of Texas at Austin. Dr. Jah has served as a member of the U.S. delegation to the United Nations Committee on the Peaceful Uses of Outer Space (UN-COPUOS) and is the chair of the NATO SCI-279-TG activity on defining a Common NATO Space Domain Awareness Operating Picture.

Prior to being at UT Austin, Dr. Jah was the Director of the University of Arizona's Space Object Behavioral Sciences, lead for the Air Force Research Laboratory's (AFRL) Advanced Sciences and Technology Research Institute for Astronautics (ASTRIA), and a Principal Investigator for Detect/Track/Id/Characterize Program at AFRL's Space Vehicles Directorate. He received his B.S. in Aerospace Engineering from Embry-Riddle Aeronautical University, Prescott, Arizona, and his M.S. and Ph.D. in Aerospace Engineering Sciences from the University of Colorado at Boulder specializing in astrodynamics and statistical orbit determination. Before joining AFRL in 2007, he was a spacecraft navigator for NASA's Jet Propulsion Laboratory (JPL) in Pasadena, CA, serving on Mars Global Surveyor, Mars Odyssey, Mars Express (joint mission with ESA), Mars Exploration Rovers, Hayabusa (joint mission with JAXA), and the Mars Reconnaissance Orbiter. Dr. Jah founded the American Astronautical Society's (AAS) Space Surveillance Technical Committee and is the Chair of the AIAA Astrodynamics Technical Committee.

Dan Jang is a Ph.D candidate in the Department of Aeronautics and Astronautics at the Massachusetts Institute of Technology, and is advised by Professor Richard Linares in the ARCLab. Prior to starting school this past fall, Dan worked at the MIT Lincoln Laboratory in the Space System Analysis and Test group for the past 7 years, leading government space system projects and in Space Situational Awareness, sensor modeling and multi-modal sensor fusion techniques. Dan is has a B.S. and M.Eng in Electrical Engineering and Computer Science from MIT.

Therese Jones joined the Satellite Industry Association as its Senior Director of Policy in January 2018. In this role, Jones supports SIA's work on government services, regulatory, legislative, defense, export-control and trade issues of critical importance to the Association's members. Prior to joining SIA, Jones was an assistant policy researcher at the RAND Corporation, where she focused on space policy. In this role, she supported the Department of Defense, Department of Homeland Security, National Geospatial Intelligence Agency, U.S. Air Force, and Army in assessing new space technologies, increasing the resilience of the national space architecture, and determining commercial acquisition strategies for communications and remote sensing services. Before transitioning into space policy, she worked as an astrophysics researcher focusing on galaxy formation and evolution. Jones is currently a Ph.D. candidate in Policy Analysis at the Pardee RAND Graduate School. She holds a master's in astrophysics from the University of California, Berkeley, and bachelor's degrees in astronomy and astrophysics, physics, German, and international studies from The Pennsylvania State University.

Sven Kaltenhaeuser graduated in Mechanical Engineering / Aeronautical Engineering at the Technical University of Braunschweig, Germany and joined the DLR Institute of Flight Guidance in 1999 as scientist within the domain of Air Traffic Management (ATM) validation and real time simulation. He has been involved as a validation expert and project manager within multiple national and international research campaigns and became head of the ATM Simulation Department of the DLR Institute of Flight Guidance in 2006. Sven Kaltenhaeuser is in charge of the DLR Air Traffic Validation Center, which has been initiated in 2012, and is representing DLR at the FAA Center of Excellence for Commercial Space Transportation (FAA COE CST), the European Commercial Spaceport Forum and the European Group on Suborbital Flight Regulation. His current fields of work include the development of concepts for higher airspace operations and the integration of space vehicle operations into Air Traffic Management.

Dr. T.S. Kelso serves as a senior research astrodynamicist for CSSI, bringing over thirty-five years' experience in space education, research, analysis, acquisition, development, operations, and consulting with organizations such as: Air Force Space Command Space Analysis Center (ASAC); NASA's Near-Earth Object Science Definition Team; Air Force Chief of Staff's SPACECAST 2020 and Air Force 2025 future studies; and the Air Force Satellite Control Network. He has taught on the faculty at Air War College; Air Command and Staff College; the Airpower Research Institute; the College of Aerospace Doctrine, Research, and Education; and the Air Force Institute of Technology. Dr. Kelso has supported the space surveillance community since 1985 by operating electronic data dissemination systems to provide NORAD two-line orbital element sets, associated orbital models, documentation, software, and educational materials to users around the world.

Dr. Kelso is the Operations Manager for the Space Data Center, which is responsible for providing safety-of-flight support for 30 operators and almost 800 satellites, including civil agencies like NASA, NOAA, and EUMETSAT and commercial operators like Intelsat, SES, and Planet.

Dr. Daniel Kucharski is a Research Fellow at the University of Texas at Austin (UT) – The Oden Institute for Computational Engineering and Sciences. His work is focused on the satellite attitude dynamics measurement, analysis and modeling as well as the hardware and software development for the satellite photometric observation and data post-processing.

Daniel's research on the spin analysis started in 2004 when he was introduced to the first high-rate Satellite Laser Ranging system developed at Graz SLR Observatory, Austria. He developed methods for the spin determination of the spherical geodetic satellites from the highly accurate laser ranging data collected with the 2 kHz repetition rate laser. The determined long-term spin trends allowed him to conduct the physical studies of the satellite attitude evolution under the impact of the environmental forces and torques. Since 2015, Daniel is developing methods that utilize both the laser ranging and photometric light curves for the accurate attitude determination of defunct satellites (space debris objects). The long-term focus of Daniel's research is the development of the high-fidelity physical models for the full attitude prediction of the operational satellites and the passive space debris objects that would improve accuracy of orbit determination for geoscience applications and conjunction analyses.

Stijn Lemmens is a senior space debris mitigation analyst for the European Space Agency. In this capacity, he is leading various activities with a focus on regulation, the development of mitigation technologies, and standardized verification methodologies dedicated to stopping the proliferation of space debris and its consequences. He is active in various international study groups and standardization bodies on the subject, and currently chairs the Inter-Agency Space Debris Coordination Committee's working group on space debris mitigation. Identifying, promoting, and implementing steps towards space sustainability are his current goals.

Miles Lifson is a third-year graduate student at the Massachusetts Institute of Technology, pursuing degrees in Aeronautics and Astronautics & Technology and Policy. He is a member of the Astrodynamics, space Robotics, and Controls Laboratory (ARCLab), part of the Space Systems Laboratory. He is interested in space systems and research questions that involve both technical and

policy considerations, with a focus on space traffic coordination/management and space situational awareness.

Prior to attending MIT, Lifson spent several years in the Washington, D.C. space policy community, including with the Aerospace Industries Association, Congresswoman Donna Edwards, and the Space Studies Board of the National Academies. He graduated from Claremont McKenna College with a double major in Physics and Government.

Paul Liias is the expert of space technology and policy at the Ministry of Economic Affairs and Communication for Estonia. Paul has created the Estonian Space Policy and Program 2020-2027. Today he is working on national space legislation and starting new activities for space cyber security. Paul joined the ministry in 2016. As part of the Estonian delegation to the European Space Agency (ESA) Paul is a delegate to Council, Administrative and Finance Committee (AFC) and Joint Board on Communication Satellite Programmes (JCB). Paul is also Estonian delegate to the European Council space working party and to the European GNSS Agency.

He has been engaged in various roles in the space sector for past 12 years. In 2008, Paul joined the first Estonian satellite project ESTCube-1 and lead the development of mechanical systems. After the successful launch of ESTCube-1 in 2013, Paul worked on several small satellite projects and continued as entrepreneur in the space sector. Paul graduated from Tallinn University of Technology with a Master of Engineering (MEng), Dipl.-Ing. Product Development in 2015, and studied Aeronautical and Astronautical Engineering at RWTH Aachen University.

Dr. J.-C. Liou is the NASA Chief Scientist for Orbital Debris. He also serves as the Program Manager of the NASA Orbital Debris Program Office. He is responsible for overseeing orbital debris measurement, modeling, and risk assessment efforts to support NASA missions. Dr. Liou has more than 20 years of experience leading various orbital debris research projects, including environment modeling, in-situ measurements, laboratory impact experiments, and orbital debris mitigation policy development. He is a member of the U.S. government delegation to the United Nations' Committee on the Peaceful Uses of Outer Space (COPUOS). He also serves as the head of the NASA delegation to the Inter-Agency Space Debris Coordination Committee (IADC).

George Anthony Long is a seasoned civil and criminal defense litigator who possesses an LL.M in space law. He is the founder and managing member of Legal Parallax, LLC, a legal consultancy firm and is a past co-chair of the Space Law Interest Group of the American Society of International Law. George Anthony has written and presented numerous papers on various space law issues.

Jose Miguel Lozano is the Vice President of Space for the US market in GMV, a privately-owned technology business group founded in 1984 and trading worldwide in the Aerospace, Defense and Security, Cybersecurity, Intelligent Transportation Systems, Automotive, Telecommunications and IT for government authorities and major corporations. Lozano began his career at GMV more than 20 years ago. During this period, he has served in different technical and managerial positions supporting ground segment projects, with a special focus on flight dynamics and operations, for commercial and institutional organizations, covering GEO, LEO and Human Space flight missions. In these positions, he has contributed to the development of Focussuite, GMV's flight dynamics family of products, which support the operations of more than 150 satellites.

In 2013, Lozano joined the GMV team in the US, where his main role is the development of the US market, applying GMV's capabilities and technology, and providing support to American customers and operators. Lozano holds a bachelor's and master's degree in Aeronautical Engineering from the Polytechnic University of Madrid, and a Bachelor's and Master's degree in Physics Science from National Distance Education University of Spain.

Maria Lucas-Rhimbassen is a PhD candidate in space law, focusing on commercial, transnational, competition laws and ethics compliance at the University of Toulouse, where she previously worked as a

graduate space law researcher and provided legal counsel to both public and private entities such as CNES, Thales Alenia Space and Airbus.

She earned a JD at the Moncton University (NB, Canada), where she worked as an academic assistant in the law of the sea; a Master in creative management at HEC Montréal (QC, Canada); and a Certificate in Strategic Space Law from the IASL at McGill University (QC, Canada). She has also both participated and taught as a teaching assistant in space management at the International Space University' summer programme.

The Honorable John McClellan Marshall is Senior Judge of the Fourteenth Judicial District of Texas, and has served as Judge Presiding of the Municipal Court of Muenster, Texas, from 1976-1980; Judge Presiding of the Fourteenth Judicial District of Texas from 1981-2000; and Judge for the Dallas County Emergency Medical-Legal Project from 1986-2000. He has also served as an arbitrator, mediator, and Special Judge.

Judge Marshall is a prize-winning author specializing in procedural law (co-author of *West's Texas Rules of Civil Procedure Annotated*) and ethics. He earned his B.A. from Virginia Military Institute in 1965, his M.A. from Vanderbilt University in 1966; his J.D. from Southern Methodist University in 1975; and an LL.D. (Honorary) from Academia Mexicana de Derecho Internacional in 1985. Judge Marshall also served as an historian on the Apollo Program and a technical instructor on the Skylab Program at the Kennedy Space Center from 1970 to 1973.

Bulbul Mukherjee completed her B. Sc. (Physics) from Presidency College, Calcutta (Kolkata) followed by B. Tech (Radiophysics and Electronics) from Institute of Radiophysics and Electronics, University of Calcutta. She joined ISRO as a spacecraft controller of Indian Remote Sensing Satellites in the Bengaluru unit of ISRO Telemetry Tracking and Command Network (ISTRAC) in 1999. She completed M. Tech in Satellite Technology and Applications from Indian Institute of Science, Bengaluru, as an ISRO sponsored candidate in 2006.

Mukherjee was part of the core operations team for India's maiden mission to Moon, Chandrayaan-1, and executed many of the mission critical operations. Apart from handling routine operations, she led a team of developers to build a suite of automation software for augmenting human monitoring capabilities and thereby, facilitating operations in multi-mission scenario in ISTRAC. In addition to operations management of normal phase spacecraft operations of several satellites, she also headed Flight Dynamics Group of ISTRAC in 2017-2018.

In 2018, she joined ISRO Headquarters in Directorate of Space Situational Awareness and Management as Associate Director of Data Systems and Analysis. She is responsible for executing strategies for enhancement of SSA capabilities and protection of Indian Space assets through necessary policy interventions, and coordination between various work centers of ISRO.

Dr. George C. Nield is the President of Commercial Space Technologies, LLC, which was established to encourage, facilitate, and promote commercial space activities. He served as the Associate Administrator for Commercial Space Transportation at the Federal Aviation Administration (FAA) from 2008-2018. Dr. Nield has over 30 years of aerospace experience with the Air Force, at NASA, and in private industry. Prior to joining the FAA, Dr. Nield served as Senior Scientist for the Advanced Programs Group at the Orbital Sciences Corporation. His previous assignments include working as an Astronautical Engineer at the Space and Missile Systems Organization, a Flight Test Engineer at the Air Force Flight Test Center, and an Assistant Professor and Research Director at the USAF Academy. He was the Manager of the Flight Integration Office for the Space Shuttle Program at the NASA Johnson Space Center, and later worked on both the Shuttle/Mir Program and the International Space Station Program.

Dr. Nield is currently a member of the Aerospace Safety Advisory Panel, which provides support and advice to the NASA Administrator. A graduate of the United States Air Force Academy, he holds an M.S.

and Ph.D. in Aeronautics and Astronautics from Stanford University, and an MBA from George Washington University. He is also a Flight Test Engineering graduate of the USAF Test Pilot School. Dr. Nield is a registered Professional Engineer and a Fellow of the American Institute of Aeronautics and Astronautics.

Kevin M. O’Connell is the Director of the Office of Space Commerce at the U.S. Department of Commerce. Within this position, he leads an office with responsibility as a space industry advocate within the Executive Branch of the U.S. government. O’Connell brings over 35 years of experience in the U.S. government, in research organizations, and as an entrepreneur and business leader to this position.

O’Connell has researched and written extensively on the policy, security, and global market issues related to commercialization of remote sensing. Aside from numerous articles and op-eds, he was co-author of *Commercial Observation Satellites: at the Leading Edge of Global Transparency* (2000). He served as the Executive Secretary and Staff Director of the NIMA Commission (1999-2000). He was a member, and later Chair, of NOAA’s federal advisory committee on remote sensing from 2002-2016.

Previously, O’Connell served as the CEO of Innovative Analytics and Training, a Washington, D.C. professional services firm focused on analysis and decision support for U.S. government and commercial clients. During this time, he also served as a senior consultant to the Office of the Director of National Intelligence and as an independent advisor to the Director, National Geospatial Intelligence Agency. O’Connell’s background also includes extensive experience in national security and intelligence matters, including assignments in the Department of Defense, Department of State, National Security Council, and the Office of the Vice President. He spent a decade conducting and managing research in these areas at the RAND Corporation, including as the first director of RAND’s Intelligence Policy Center.

Dan Oltrogge is the director of AGI’s Center for Space Standards and Innovation (CSSI) and is the lead policy and analysis expert for its Commercial Space Operations Center (ComSpOC). He also serves as the program manager of the Space Data Center, now in its tenth year of global flight safety operations for 29 operators flying approximately 275 GEO and 470 LEO spacecraft. He is a globally recognized expert in space debris, launch and orbital operations, collision avoidance, RF interference mitigation, space situational awareness, and space traffic coordination and management. Oltrogge holds three patents for astrodynamics and risk assessment methods associated with collision risk, probability of collision and safety of flight. He has developed numerous international standards and best practices for space operations and debris mitigation under the auspices of ISO, CCSDS, CONFERS, AIAA, ANSI, and IAA.

Oltrogge led the development of the nation’s first probability-based launch Collision avoidance (LCOLA) system in 1996, and 23 years later, that system still provides mission assurance launch flight safety product largely unchanged from the original capability. As the founder and administrator of the Space Safety Coalition (SSC), Oltrogge leads a commercial industry “Best Practices for Sustainability of Space Operations” initiative to collect and endorse a living set of space sustainability best practices. Oltrogge has a Bachelor of Science degree in Aerospace, Aeronautical, and Astronautical Engineering from Iowa State University and a Master of Science degree in Aerospace Engineering and Astrodynamics from the University of Southern California.

Malgorzata Polkowska is an Associate Professor of International Law, specializing in Aviation and Space law and Security and Defense. From 2003-2017, she was an expert in the Civil Aviation Authority, and since 2002, she has been a lecturer at the University of War Studies University and visiting Professor of the University of Gdańsk and Rzeszów University of Technology. In 2013-2016, she was the first permanent Council Representative of the International Civil Aviation Organization for Poland at the Central European Rotation Group (CERG).

Polkowska is a Lecturer at Polish and foreign universities (including McGill University in Montreal, Canada; de Paul in Chicago, US; ENAC Toulouse, France; and University, City of London, UK), and a speaker and moderator of a number of Aviation and Space conferences. She is an author of over 100

publications in Polish and English on International law, including Air and Space. Currently she is leading a project under the Ministry of Defense about space security.

Daniel Porras is a Space Security Fellow at UNIDIR. He focuses on political and legal issues surrounding space security, in particular the progressive development of sustainable norms of behavior for space. He conducts research on the emergence of new technologies and approaches to strategic stability in outer space. Daniel was the resident technical expert for multiple UN bodies working on space security issues, including the Group of Governmental Experts on the Prevention of an Arms Race in Outer Space. Daniel's areas of expertise include international space law and policy, emerging technology threats, international law, and political science. He holds an LL.M in International Economic Law from Georgetown University Law Center (Washington, DC). He speaks English, French, Italian, and Spanish.

Nathan Reiland is a graduate student at the University of Arizona pursuing a Master's degree in Aerospace Engineering with an emphasis on astrodynamics and control systems. He also holds a Bachelor's degree in Aerospace Engineering from the same institution. Additionally, Reiland is a researcher at the University of Arizona Spaceflight, Applied Mechanics and Orbital Systems (SAMOS) lab, working under the direction of Dr. Aaron J. Rosengren. His research is focused on orbit determination and close approach prediction.

Michael Reinhold is a graduate student at the University of Texas at Austin pursuing a Master's degree in Aerospace Engineering, and holds a Bachelor's Degree in Aeronautical and Astronautical Engineering from Purdue University. Michael currently works under the direction of Dr. Moriba Jah, and has research interests including orbit determination, multi target tracking, and uncertainty quantification.

Corissa Robinson is a Principle Analyst and System Engineer who supports the Federal Aviation Administration (FAA), National Aeronautical and Space Administration (NASA), and Department of Defense (DoD) in air traffic management, human space exploration, and satellite technology projects. Currently, Corissa works for Mosaic ATM, a small company that supports both NASA and the FAA with their NextGen objectives to increase air traffic volume without affecting safety, the environment, or the flying public's expectation of on-time arrivals. Previously, Corissa worked for Raytheon where she both lead and supported a variety of projects ranging from investigating the impact of wind turbines on radar performance to deploying an advanced automation system for UK Border Control in London, England. Her first job was arguably her most interesting as she was responsible for training both astronauts and cosmonauts bound for the International Space Station as well as the flight controllers that supported them at Johnson Space Center in Houston, Texas.

A Colorado native, Corissa graduated with a Bachelor of Science degree in Aerospace Engineering from the University of Colorado at Boulder in December 2000 and is currently pursuing her Master's in System Engineering from Colorado State University.

Victoria Samson is the Washington Office Director for Secure World Foundation and has over twenty years of experience in military space and security issues. Before joining SWF, Samson served as a Senior Analyst for the Center for Defense Information (CDI), where she leveraged her expertise in missile defense, nuclear reductions, and space security issues to conduct in-depth analysis and media commentary. Prior to her time at CDI, Samson was the Senior Policy Associate at the Coalition to Reduce Nuclear Dangers, a consortium of arms control groups in the Washington, D.C. area, where she worked with Congressional staffers, members of the media, embassy officials, citizens, and think-tanks on issues surrounding dealing with national missile defense and nuclear weapons reductions. Before that, she was a researcher at Riverside Research Institute, where she worked on war-gaming scenarios for the Missile Defense Agency's Directorate of Intelligence.

Known throughout the space and security arena as a thought leader on policy and budgetary issues, Samson is often interviewed by multinational media outlets, including the New York Times, Space News, and NPR. She is also a prolific author of numerous op-eds, analytical pieces, journal articles, and updates on missile defense and space security matters. Samson holds a Bachelor of Arts (B.A.) degree in political

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Matthew Shoupe is the Director of Commercial Space at LeoLabs, where he leads business development and go-to-market strategy for the company's orbital tracking and collision prevention services for satellite operators. Matthew specializes in commercial software and web services for space mission analysis and operations, with an emphasis on flight dynamics and SSA applications supporting safety of flight. He has a master's degree in Engineering Physics from Embry-Riddle Aeronautical University, and is a graduate of the Space Studies Program at the International Space University.

Dr. Mark Skinner is internationally recognized as a researcher in space object characterization and commercial space situational awareness. He is currently leading The Aerospace Corporation's effort to support the transition of space traffic management (STM) from the Defense realm to the Civil. For almost two decades he supported research efforts at the AMOS facility on Maui, Hawaii, and now supports STM in Washington, DC.

For eight years, he supported the US delegation to the UN COPUOS Working Group on the Long Term Sustainable use of outer space in the development of guidelines and best practices, as an expert on space debris and SSA.

Jason Stauch is an expert in astrodynamics, spacecraft navigation, modeling and simulation, and space situational awareness (SSA). He spent the past 7 years performing research and development in SSA and his research has led to advancements and delivery of a novel, end to-end detect, track, identification and characterization capability on a large catalog of GEO objects.

As the astrodynamics team lead, Jason is responsible for delivering cutting edge astrodynamics capabilities into the company's products, taking data from a variety of sources and transforming it into actionable information. This includes multi-phenomenology, multisource data curation, provenance, validation and fusion, orbit determination, characterization, conjunction assessment, maneuver detection, indications and warnings, TT&C analysis, failure/anomaly detection and forensics, behavior assessment and prediction, and knowledge graph representation.

Jason is passionate about space endeavors. He has worked on the navigation team of Jet Propulsion Laboratory's Mars Odyssey mission and Cassini mission to Saturn and the guidance, navigation, and control (GNC) efforts for commercial International Space Station (ISS) supply vehicles. He earned a Bachelor of Science from the Georgia Institute of Technology and a Master of Aerospace Engineering Sciences from the University of Colorado.

Stijn Lemmens is a senior space debris mitigation analyst for the European Space Agency. In this capacity he is leading various activities with a focus on regulation, the development of mitigation technologies, and standardised verification methodologies dedicated to stopping the proliferation of space debris and its consequences. He is active in various international study groups and standardisation bodies on the subject, and currently chairs the Inter-Agency Space Debris Coordination Committee's working group on space debris mitigation. Identifying, promoting, and implementing steps towards space sustainability are his current goals.

Dr. Ruth Stilwell is the Executive Director of Aerospace Policy Solutions LLC, an adjunct professor at Norwich University, and Senior Nonresident Scholar at the Space Policy Institute of George Washington University. She is one of the world's leading authorities on integrated space and aviation policy and governance. A 25-year air traffic controller, experienced labor leader and policy expert, Dr. Stilwell is also an accomplished researcher and lecturer. She's had numerous publications and presentations, which cover a wide range of space and aviation, public safety, human factors, administration, financing, and industry reform topics. In addition to her publications, she is a contributing author to McGill University's Global Space Governance: An International Study. Dr. Stilwell's specific areas of expertise include:

integrating commercial space operations in civil airspace; projecting air traffic controller retirement and staffing requirements; FAA funding and financing structures; workers' rights and more.

Dr. Stilwell served from 2010-2015 as the industry expert representing air traffic controllers on the International Civil Aviation Organization (ICAO) Air Navigation Commission in Montreal. Her air traffic control experience includes 25 years of operational duty at the Miami Air Route Traffic Control Center, two years as liaison to the FAA Requirements Service, and six years as Executive Vice President of the National Air Traffic Controllers Association. The founding chairperson of the Air Traffic Services Committee of the International Transport Workers Federation, a position she held for four years, Dr. Stilwell currently serves on the Technical Committee on Human Spaceflight Safety of the International Association for the Advancement of Space Safety, which is working to develop safety guidelines for human commercial spaceflight.

Yu Takeuchi has been working with JAXA since 2007 and is currently an Associate Senior Administrator at the Management and Integration Department of Human Spaceflight Technology Directorate. He is also a Researcher at the Institute of Space Law of Keio University. He received his LL.M. degree from the Institute of Air and Space Law of McGill University in 2015. His main interest is in international space law *inter alia*, the legal aspects of space traffic management, and sustainable space development. He is a member of the Air Law Institute of Japan, Japanese Society of International Law, and the International Institute of Space Law (IISL).

Charity Weeden is Vice President, Global Space Policy at Astroscale U.S., coordinating and synchronizing Astroscale's global policy efforts towards spaceflight safety and long-term space sustainability. Charity brings a rich experience in aerospace operations, advocacy, and diplomacy. She is a 23-year veteran of the Royal Canadian Air Force, was previously Senior Director of Policy at the Satellite Industry Association, and formed a consulting business to support the space industry.

Charity serves on the Commercial Space Transportation Advisory Committee, is a fellow of the Canadian Global Affairs Institute, volunteers as President of the Mid-Atlantic Chapter of Space and Satellite Professionals International, and is a mentor for the Brooke Owens Fellowship. Charity received her undergraduate degree in Mechanical Engineering from the Royal Military College of Canada and a Master's Degree in Space Science from the University of North Dakota. She is an alumnus of the International Space University Summer Session Program.

Danielle Wood serves as an Assistant Professor in Media Arts & Sciences and holds a joint appointment in the Department of Aeronautics & Astronautics at the Massachusetts Institute of Technology. Within the MIT Media Lab, Prof. Wood leads the Space Enabled Research Group which seeks to advance justice in Earth's complex systems using designs enabled by space. Prof. Wood is a scholar of societal development with a background that includes satellite design, earth science applications, systems engineering, and technology policy. In her research, Prof. Wood applies these skills to design innovative systems that harness space technology to address development challenges around the world. Prior to serving as faculty at MIT, Professor Wood held positions at NASA Headquarters, NASA Goddard Space Flight Center, Aerospace Corporation, Johns Hopkins University, and the United Nations Office of Outer Space Affairs. Prof. Wood studied at the Massachusetts Institute of Technology, where she earned a PhD in engineering systems, SM in aeronautics and astronautics, SM in technology policy, and SB in aerospace engineering.

Di Wu is a PhD candidate of Aerospace Engineering at the University of Arizona. His research interests involve astrodynamics, space mission design, Bayesian statistics and inference, machine learning in the general field of space situation awareness and space traffic management.