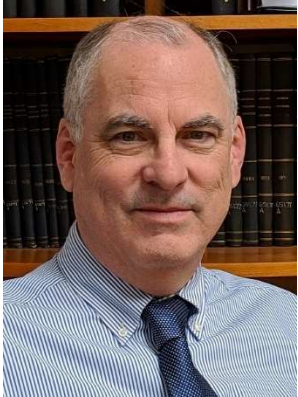




ANSI Meeting, Dec. 7, 2020: Standardization and the Commercial Space Industry – Space Situational and Domain Awareness, Space Traffic Coordination and Management, and Orbital Debris Mitigation
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 <p>Jim McCabe Senior Director, Standards Facilitation American National Standards Institute</p>	<p>Opening</p> <p>Jim McCabe serves as senior director, standards facilitation, at the American National Standards Institute (ANSI), where he directs collaborative standardization activities for emerging technologies. Recent projects have included:</p> <ul style="list-style-type: none"> • spearheading the development of a standardization roadmap for unmanned aircraft systems (drones) to facilitate their safe integration into the U.S. national airspace • partnering with America Makes to develop a standardization roadmap for additive manufacturing (3D printing) <p>A member of the ANSI staff since 1995, Mr. McCabe has been recognized by America Makes with its Distinguished Collaborator Award, and by SES, the Society of Standards Professionals, with its Honorary Life Member award.</p>
 <p>Joe Bhatia President and CEO American National Standards Institute</p>	<p>Welcome</p> <p>Joe Bhatia has been president and CEO of the American National Standards Institute (ANSI) since January 2006. He previously served as executive vice president and COO of the international group at Underwriters Laboratories (UL).</p> <p>Among his numerous leadership positions in domestic and global forums, Mr. Bhatia serves as vice chairman of the Industry Trade Advisory Committee on Standards and Technical Trade Barriers (ITAC 16), a joint program of the U.S. Department of Commerce and U.S. Trade Representative. He is a member of the International Organization for Standardization (ISO) Council and its Council Standing Committee on Finance. And in 2017 he concluded his term as president of the Pan American Standards Commission (COPANT), where he also served as vice president for four years.</p> <p>Mr. Bhatia holds a bachelor of science in electrical engineering and a master of science in business management. He and his wife, Punita, have two sons and two grandchildren.</p>



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	Keynote
 <p data-bbox="203 682 609 819">Col. Curtis L. Hernandez Director, National Security Space Policy National Space Council</p>	<p data-bbox="665 279 1437 598">Colonel Curtis L. Hernandez is the Director National Security Space Policy, National Space Council, Executive Office of the President, The White House Washington D.C. In this capacity, Colonel Hernandez advises the Vice President and the Executive Secretary of the National Space Council on national security policy implications to military space capabilities. Further, he directs interagency representatives to modify or create National Policy as it relates to the United States’ military and commercial use of and access to space.</p> <p data-bbox="665 636 1437 772">Prior to this assignment, Colonel Hernandez served as Commander, 30th Operations Group, Vandenberg Air Force Base California. Colonel Hernandez has served in positions on the Joint Staff, the Air Staff and at the Wing and Group levels.</p> <p data-bbox="665 814 1437 1092">Colonel Hernandez received his commission through the Reserve Officers Training Corps upon his graduation from New Mexico State University in 1995. He is a graduate and former instructor of the United States Air Force Weapons School, has served in a variety of operational assignments as a Space and Missile operations officer, and commanded an expeditionary squadron during combat operations in support of operation Enduring Freedom.</p> <p data-bbox="665 1134 828 1165">EDUCATION:</p> <p data-bbox="665 1171 1437 1234">2015 Master of Military Strategic Arts and Sciences, Air War College, Air University, Maxwell AFB, AL</p> <p data-bbox="665 1241 1437 1304">2008 Master of Military Operational Arts and Sciences, Air Command and Staff College, Maxwell AFB, AL</p> <p data-bbox="665 1310 1437 1373">2001 Graduate, United States Air Force Weapons School, Space Weapons Instructor Course, Nellis AFB, NV</p> <p data-bbox="665 1379 1437 1411">2001 Squadron Officers School, Air University, Maxwell AFB, AL</p> <p data-bbox="665 1417 1437 1480">2000 Master of Administration, Information Resource Management, Central Michigan University</p> <p data-bbox="665 1486 1437 1549">1995 Bachelor of Arts, Journalism, Public Relations, New Mexico State University</p> <p data-bbox="665 1591 860 1623">ASSIGNMENTS:</p> <ol data-bbox="665 1629 1437 1906" style="list-style-type: none"> 1. Sep 1995 – May 1996, Student, Undergraduate Space and Missile Training, Vandenberg AFB, CA 2. May 1996 – Jun 2001, Missile Launch Officer, 91st Space Wing, Minot AFB, ND 3. Jun 2001 – Jun 2004, Chief, Weapons & Tactics, 76th Space Control Squadron, Peterson AFB, CO 4. Jun 2004 – Jun 2007, Instructor, USAF Weapons School, Nellis AFB, NV

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	<p>5. Jun 2007 – Jun 2008, Student, Air Command and Staff College, Maxwell AFB, AL</p> <p>6. Jun 2008 – Jun 2010, Chief, Space Control-Negation Branch, HQ USAF, Pentagon, Washington D.C.</p> <p>7. Jun 2010 – Mar 2011, Operations Officer, 76th Space Control Squadron, Peterson AFB, CO</p> <p>8. Mar 2011 – Feb 2013, Commander, 76th Space Control Squadron, Peterson AFB, CO</p> <p>9. Apr 2012 – Oct 2012, Commander, 1st Expeditionary Space Control Squadron, Bagram AF, Afghanistan</p> <p>10. Feb 2013 – Jul 2014, Deputy Commander, 21st Operations Group, Peterson AFB, CO</p> <p>11. Aug 2014 – May 2015, Student, Air War College, Maxwell AFB, AL</p> <p>12. Jun 2015 – May 2017, Chief, Program Support Branch, Joint Staff J3, Pentagon, Washington D.C.</p> <p>13. Jun 2017 – Jan 2019, Commander, 30th Operations Group, Vandenberg AFB, CA</p> <p>14. Jan 2019 – Present, Director National Security Space Policy, National Space Council, White House Washington D.C.</p> <p>MAJOR AWARDS AND DECORATIONS: Legion of Merit Defense Meritorious Service Medal Meritorious Service Medal (with 3 devices) Air Force Commendation Medal (with 2 devices) Air Force Achievement Medal Combat Readiness Medal (with 1 device) National Defense Service Medal (with 1 device) Afghanistan Campaign Medal Global War on Terrorism (GWOT) Expeditionary Medal Global War on Terrorism Service Medal Nuclear Deterrence Operations Service Medal with ‘N’ device NATO International Assistance Force Medal</p> <p>EFFECTIVE DATES OF PROMOTION:</p> <table> <tr> <td>Second Lieutenant</td> <td>9 Sep 95</td> </tr> <tr> <td>First Lieutenant</td> <td>27 Aug 97</td> </tr> <tr> <td>Captain</td> <td>24 Aug 99</td> </tr> <tr> <td>Major</td> <td>1 Jan 06</td> </tr> <tr> <td>Lieutenant Colonel</td> <td>1 Nov 10</td> </tr> <tr> <td>Colonel</td> <td>1 Feb 17</td> </tr> </table>	Second Lieutenant	9 Sep 95	First Lieutenant	27 Aug 97	Captain	24 Aug 99	Major	1 Jan 06	Lieutenant Colonel	1 Nov 10	Colonel	1 Feb 17
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	Panel 1: Government Perspectives
 <p>Dr. George C. Nield President Commercial Space Technologies LLC Moderator</p>	<p>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, where he developed a technical plan and policy rationale to implement a Civil Space Traffic Management System. Dr. Nield has over 30 years of aerospace experience with the Air Force, at NASA, and in private industry. He 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.</p>
 <p>Kevin O'Connell Director, Office of Space Commerce U.S. Department of Commerce</p>	<p>Kevin M. O'Connell is the Director of the Office of Space Commerce at the U.S. Department of Commerce. Within this position, Mr. O'Connell leads an office with responsibility as a space industry advocate within the Executive Branch of the U.S. government. Mr. 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.</p> <p>Mr. 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 <i>Commercial Observation Satellites: at the Leading Edge of Global Transparency</i> (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.</p> <p>Previously, Mr. 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. Among other issues, the firm focused on market trends and anticipatory/futures analysis for high-technology industries such as cyber, cloud computing, and geospatial technologies. 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.</p>



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	<p>Mr. 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.</p> <p>Finally, Mr. O’Connell has taught a long-running course on comparative intelligence in Georgetown University’s School of Foreign Service, Security Studies Program.</p>
 <p>Karl Kensinger Acting Division Chief, International Bureau Satellite Division Federal Communications Commission</p>	<p>Karl A. Kensinger is currently the Acting Chief of the Satellite Division of the Federal Communications Commission’s International Bureau. Mr. Kensinger’s experience and expertise covers a broad range of satellite policy and licensing matters, including licensing of small satellites and satellite constellations, international coordination of satellite networks, radio spectrum policy, and transfers of FCC licenses. He has been a primary FCC point of contact on orbital debris matters since 1995. Mr. Kensinger is a graduate of the University of Michigan Law School and the University of Chicago.</p>
 <p>Steph Earle Acting Deputy Division Chief, Policy and Innovation Division Office of Commercial Space Transportation Federal Aviation Administration</p>	<p>Steph Earle is currently the Acting Deputy Division Chief for the Policy and Innovation Division within the Office of Commercial Space Transportation. He is responsible for outreach to industry, international, and interagency stakeholders; space policy, including space traffic management orbital debris; integrating commercial space operations into the National Airspace; enhancing launch collision avoidance effectiveness; and updating and developing commercial space transportation regulation, policies, and advisory circulars. Steph has been the subject expert and lead for the FAA Office of Commercial Space Transportation in numerous national space policy initiatives including space traffic management, orbital safety for launch and reentry vehicles, orbital debris mitigation practices, and national space cyberspace practices.</p> <p>Steph holds degrees from the Air Force Academy, the University of North Dakota, and the Air Force Institute of Technology. During his Air Force career, he worked as a Missile Combat Crew Commander for the Minuteman ICBM, performed space</p>



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	<p>surveillance and tracked ballistic missiles, space launches, and all low and mid Earth-orbiting satellites at a space surveillance radar facility, and at Cape Canaveral Air Station he served as the lead Air Force launch controller for numerous rocket launches to include missions to Mars and a Global Positioning Satellite. In addition to a number of headquarter assignments, Steph’s last active duty assignment was as Chief of the Space Policy Branch on the Joint Staff where he worked countless national level space issues including national strategies, policies, and issues. Steph has engaged in the same national forums as the advocate for commercial space launch activities since joining the FAA in 2011.</p>
 <p>Dr. Jer Chyi “J.-C.” Liou Chief Scientist for Orbital Debris National Aeronautics and Space Administration</p>	<p>Dr. J.-C. Liou is the NASA Chief Scientist for Orbital Debris. He also serves as the Program Manager for the NASA Orbital Debris Program Office. He is responsible for overseeing orbital debris measurement, modeling, and risk assessment efforts to support NASA missions. He also leads the interactions with other U.S. and international agencies and organizations on technical and policy development aspects of orbital debris mitigation. He is the Head of the NASA Delegation to the Inter-Agency Space Debris Coordination Committee (IADC) and is a member of the U.S. Delegation to the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and the COPUOS Scientific and Technical Subcommittee (STSC).</p>
 <p>Jeffrey Braxton Chief Analyst for Intradepartmental & Interagency Engagement U.S. Space Command</p>	<p>Jeff is a graduate of the Maxwell School of Citizenship & Public Affairs at Syracuse University, and a Strategic Leadership Fellow affiliated with the University of Nebraska’s National Strategic Research Institute. He currently works at Headquarters, U.S. Space Command (USSPACECOM), in the Strategy, Plans, and Policy Directorate’s Strategic Engagement Division: spearheading engagement within the U.S. Department of Defense (DoD), across the broader U.S. Interagency, as well as with allies and other partners.</p> <p>Over the past several years, Jeff’s work has been twofold: first, he contributes to the formulation of space-related policy: working to amend existing policy and crafting new policy, wherever appropriate; second, he develops strategy to implement both amended and new policy, largely through the DoD’s Advanced Planning and Execution enterprise.</p> <p>Jeff’s particular focus areas at USSPACECOM include sharing awareness of what is happening within the space domain, as well as space traffic coordination and management.</p>



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	<p>Prior to his current assignment, Jeff performed chief analyst duties at the Joint—now Combined—Space Operations Center, located in California.</p> <p>Jeff has extensive experience in-and-out of uniform in the space situational awareness, space control, space launch, and range operations mission areas, as well in intercontinental ballistic missile (ICBM) operations and ICBM flight testing.</p>
 <p>Therese Jones Senior Director of Policy Satellite Industry Association <i>Moderator</i></p>	<p>Panel 2: Industry Perspectives</p> <p>Therese Jones is the Senior Director of Policy at the Satellite Industry Association, a U.S.-based trade association representing over 50 satellite operators, manufacturers, ground equipment suppliers, and launch companies. In this position, Therese manages SIA working groups on regulatory, legislative, defense, space safety, cybersecurity, remote sensing, and export control-related issues. Prior to SIA, Therese was an assistant policy researcher at the RAND Corporation, supporting the Department of Defense, Department of Homeland Security, National Geospatial-Intelligence Agency, U.S. Air Force, and U.S. 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. Therese 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.</p>
 <p>Charity Weeden Vice President, Global Space Policy Astroscale U.S. Inc.</p>	<p>Charity joined Astroscale U.S. in July 2019. She coordinates and synchronizes Astroscale’s global policy efforts towards spaceflight safety and long-term space sustainability. She 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.</p> <p>Charity serves as the Chair of the Commercial Space Transportation Advisory Committee, is a fellow of the Canadian Global Affairs Institute, and is a mentor for the Brooke Owens Fellowship. She received her Bachelor of Engineering in mechanical engineering from the Royal Military College of Canada and a Master of Science in space science from the</p>

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	<p>University of North Dakota. She is an alumna of the International Space University Summer Session Program.</p>
 <p>Dr. Brien Flewelling Chief Space Situational Awareness Architect ExoAnalytic Solutions</p>	<p>Dr. Brien Flewelling is the Chief SSA Architect at ExoAnalytic Solutions. Focused keenly on optimizing the provision of real-time data and services to commercial and government customers worldwide, Dr. Flewelling works closely with innovative engineers and scientists to establish, develop, communicate, and deliver technical solutions that maintain ExoAnalytics technical edge in providing highest quality of service per dollar observation support to spacecraft operators above 10,000 km. Dr. Flewelling is an aerospace professional with government, academia, and industry experience and has been recognized in each of those sectors as a thought leader including receiving a Rotary National Award for Space Achievement (RNASAs). Today Dr. Flewelling leads engagement focused on the developing SDA and STM markets including opportunities to provide flight safety support services, enabling increasingly ambitious space operations, identifying and developing advanced value added services for space traffic management, and pioneering extensions of SDA capabilities into the Cislunar Regime.</p>
 <p>Dr. Daniel Ceperley CEO and Co-Founder LeoLabs, Inc.</p>	<p>Dan Ceperley is the CEO and cofounder of LeoLabs. He, and the founding team, created LeoLabs to drive advances in space traffic safety, space situational awareness (SSA), and preservation of the space environment through actionable, real-time information.</p> <p>Collisions with debris are the number one risk to safe operations in space and new data sources are required to measure and reduce that risk. LeoLabs is the leading provider of commercial collision warning services and real-time Space Domain Awareness (SDA) for low Earth orbit (LEO). These services are powered by LeoLabs' worldwide network of radars and its cloud-based software system.</p> <p>Prior to LeoLabs, he worked at SRI International, a not-for-profit research laboratory, where he was the Program Director for Space Debris Tracking, the Deputy Director of the Oceans and Space Systems Center, and the supervisor for the Allen Telescope Array (a radio astronomy facility in northern California). Dr. Ceperley led numerous SSA research and development efforts aimed at developing technologies for tracking the large constellations of low-cost satellites created by the recent wave of innovation in the space industry. Dan got his start in the space industry working on the design of the Terrestrial Planet Finder Coronagraph (TPF-C) as part of a research program supporting the Jet Propulsion Laboratory</p>

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	<p>(JPL). His work investigated the optical performance of advanced concepts for imaging Earth-like planets orbiting other stars.</p> <p>Dan is a Technical Advisor to Space for Humanity. This non-profit seeks to greatly increase the number of people who have experienced space flight, and thus promote the greater use of space. He was featured in Via Satellite’s 2018 Young People to Watch List. In addition to satellite tracking, Dr. Ceperley has technical expertise in synthetic aperture radar imaging, precision timing and navigation systems, electromagnetic modeling, and ultrasound imaging. He holds a PhD and MS in Electrical Engineering from U. C. Berkeley and a BS in Electrical Engineering from the University of Virginia.</p>
 <p>Mike Safyan Vice President of Launch Planet</p>	<p>In 2011, Mike Safyan joined the eight-person founding team at Planet where the company was building the first iterations of its Dove satellite in a Cupertino garage. Mike is responsible for Planet's Launch strategy and has overseen the launch of over 395 Planet satellites across 32 launch attempts. Mike received his B.S. of Aerospace Engineering at UCLA, and an M.Sc. of Space Studies at the International Space University in Strasbourg, France. He started his career working on lunar rover designs for the Barcelona Moon Team competing for the Google Lunar X-Prize and then joined the PhoneSat team at NASA Ames where he worked as a Systems Engineer developing ultra-low-cost CubeSats utilizing smartphone technologies. In 2018, Mike received the SSPI Promise Award, which recognizes outstanding achievement by satellite industry professionals under the age of 35.</p>
 <p>Maj. Gen. Jim Armor USAF (ret.) and Founder/CEO The Armor Group, LLC Moderator</p>	<p>Panel 3: NGO/Academic/Other Perspectives</p> <p>Maj. Gen. Jim Armor, USAF (Ret.) was Director, Government Relations for Northrop Grumman Corp. in Falls Church, VA, where he coordinated government interactions for the company’s Commercial Space and Launch business areas. Additionally, he was the Vice President for Government Services of Space Logistics LLC, a wholly owned subsidiary of NGC developing the on-orbit satellite servicing (OOS) industry. In that role he led the company’s successful advocacy and licensing of the world’s first commercial OOS spacecraft, the Mission Extension Vehicle (MEV-1). Gen Armor is the Founder and CEO of the Armor Group, LLC, which provides advisory services to government and commercial space organizations. He also now serves on the Board of Directors of NAVSYS Corp, a small, woman-owned GNSS & IGS navigation R&D Company in Colorado Springs, CO. While with NGC, he was the Vice Chairman of the Space Council of the Aerospace Industry Association (AIA), and the first ever industry Chairman of the</p>

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	<p>Consortium for Execution of Rendezvous and Servicing (CONFERS) and OOS industry association. He is currently a member of the FAA’s Commercial Space Technical Advisory Council (COMSTAC), a member of the Regulatory Working Group of the NASA Advisory Council (NAC), and on the Public Policy Committee, as an active Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA). Prior to his positions with NGC he was the Staff VP for Government Relations with Orbital ATK; and before that, he was the VP for Strategy and Business Development at Alliant Techsystems (ATK), Space Systems Division where he did business development for small, responsive satellites, satellite components, and related engineering services. He also helped to establish an entirely new commercial space market in on-orbit satellite servicing. Prior to joining ATK, he was on several National Research Council Studies for NASA and the USAF, on the Board of Advisors to the Secure World Foundation (SWF) advocating international sustainable space policies, and on the Board of Directors, Integral Systems, Inc., Lanham, MD. He served 34 years in the U.S. Air Force in a variety of space related command and staff positions including Director of the NAVSTAR GPS Joint Program Office, Director of Acquisition and Operations for Signals Intelligence at the National Reconnaissance Office (NRO), and as a military payload specialist on the Space Shuttle. He served as the Director of the National Security Space Office (NSSO) at the Pentagon before retiring from the USAF in January 2008.</p>
 <p>Dan Oltrogge Director, Center for Space Standards and Innovation (CSSI) and Integrated Operations COMSPOC Corporation</p>	<p>Dan Oltrogge is the Director of the Center for Space Standards and Innovation, Director of Integrated Operations and space policy expert at the Commercial Space Operations Center, program manager of the Space Data Center, founder and administrator of the Space Safety Coalition, U.S. Head of Delegation to ISO TC20/SC14, academician of the International Academy of Astronautics, technical author, and the author of numerous international space standards and best practices.</p>

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Prof. Danielle R. Wood
Director, Space Enabled Research Group
MIT Media Lab

Professor 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.



Dr. Ruth E. Stilwell
Executive Director
Aerospace Policy Solutions LLC

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 leading authorities on integrated space and aviation policy and governance.

Her current work focuses on the policy and regulatory frameworks for Space Traffic Management, the integration of commercial space launch in civil airspace, and the development of cooperative traffic management for aviation and space operation in airspace above 60,000 ft. Among her publications, she is a contributing author in reference books including *Global Space Governance: An International Study* (2017) and *An Introduction to the Spaceport Industry: Runways to Space* (2020).




Marlon Sorge

Marlon Sorge is a principal engineer for the Space Innovation Directorate of The Aerospace Corporation. Working out of the corporation's Albuquerque, NM-based office, Sorge supports a wide variety of space debris and space situational awareness-related projects as well as strategic planning, conceptual design, technology development programs, and astrodynamics analysis.

For more than 30 years, Sorge has conducted space debris research and analysis in a broad range of fields including debris risk assessment, fragmentation analysis, operations support, debris mitigation technique implementation, debris event reconstruction, satellite design for debris survivability, orbital

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<p>Principal Engineer, Space Innovation Directorate The Aerospace Corporation</p>	<p>and suborbital range and space safety, ballistic debris management, debris environment projection, collision avoidance, orbital reentry prediction, and national and international mitigation guideline and standards development. He developed the Aerospace fragmentation model and conducted some of the first work in realtime fragmentation event risk assessment. He organizes Aerospace’s debris research program, is a DOD representative on the NASA delegation to the IADC, and developed the Aerospace fragmentation model. Sorge joined The Aerospace Corporation in 1989.</p> <p>EDUCATION Sorge received his bachelor’s degree in physics and a master’s degree in aeronautical and astronautical engineering from Purdue University.</p>
 <p>Frederick A. Slane Executive Director Space Infrastructure Foundation</p>	<p>Mr. Fred Slane is a leader in the development and proliferation of space standards in the U.S. and abroad. His current work includes the development of a standards-based reference architecture for the global space industry as a basis for future space expansions. At a national level, in the AIAA he serves on the Standards Executive Council and as the Chair of the Committee on Standards for Space Plug and Play. He is a member of the ASTM standardization effort on space flight safety qualification. Internationally, he works within the ISO Subcommittee for Space Systems and Operations where he is the former U.S. Head of Delegation, and today serves as lead architect and Chair of the Interfaces, Integration and Test working group. He is the Project Lead for standards on Spacecraft Initialization, Lunar Simulants, CubeSats, On-Orbit Servicing, and Verification. He has supported NRO Launch, and NEO studies.</p> <p>Mr. Slane first retired from the U.S. Air Force after serving in Space Shuttle Cargo Operations, in R&D for multiple space technologies, multiple space test and evaluation efforts, and as the operations engineering officer at US Space Command. Later, as a reserve officer he served as the Chief Architect and Engineer for the Operationally Responsive Space office. In 2003, Mr. Slane founded and currently serves as the Executive Director of the Space Infrastructure Foundation. He has been the Project Lead on fourteen ISO and AIAA space standards, has published over 15 papers and reports, and has presented numerous classes and presentations on space architecture and standardization in the US and abroad. Mr. Slane is an Associate</p>

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	<p>Fellow of the American Institute of Aeronautics and Astronautics (AIAA).</p> <p>Married to Dr Jean Slane for 35 years, they have three sons, two cats and a dog. They live in Woodland Park, Colorado and travel extensively.</p>
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