

State of the Space Industrial Base 2020 Virtual Solutions Workshop

4 - 7 MAY 2020

Critical Actions to Sustain US Economic & Military Leadership in Space

State of the Space Industrial Base 2020
Virtual Solutions Workshop
4 - 7 May 2020

Hosted by NewSpace New Mexico

NEW SPACE
NEW MEXICO

Key Participants:

US Space Force



Defense Innovation Unit Air Force Research Laboratory



Welcome to the State of the Space Industrial Base 2020 Virtual Solutions Workshop!

Specific Objectives

Establish implementable recommendations for defense policy and actions to ensure the maintenance and expansion of the US space industrial base to meet national defense needs. Establish these defense policies and actions in the context of the larger set of implementable whole-of-government policies and actions required to guarantee the US space industrial base needed to ensure a space future supporting US national power.

Provide focus on short-term recommendations and actions to preserve and expand the US space industrial base in light of the disruption to the overall US economy and particular to the Space Industrial base by the COVID 19 virus pandemic.

Working Groups:

Space Information Services
Space transportation & Logistics
Human presence in space
Space manufacturing & Resource Extraction
Space power
Space Policy & Finance

Agenda at a Glance

Day	Date	Start Time (Meeting room will open 30 min earlier than start time)	End Time (Meeting room will be open 30 min after end time)	Session Type: Plenary or Breakout	Participants	Events
1	4 May	7:45	12:45	Plenary	All	Intro/Welcome; Workshop Overviews; Keynote; 3 Panels
1	4 May	13:30	17:00	Breakout Sessions A&B	WG 1 - Space Info	Working Groups for Day 1 Panels
1	4 May	13:30	17:00	Breakout Sessions A&B	WG 2 - Space Transportation & Logistics	Working Groups for Day 1 Panels
1	4 May	13:30	17:00	Breakout Sessions A&B	WG 3 - Space Power	Working Groups for Day 1 Panels
2	5 May	8:15	11:45	Plenary	All	Discussion from Remaining 3 Panels
2	5 May	12:30	16:00	Breakout Sessions A&B	WG 4 - Human Presence in Space	Working Groups for Day 2 Panels
2	5 May	12:30	16:00	Breakout Sessions A&B	WG 5 - Space Manufacturing & Resource Extraction	Working Groups for Day 2 Panels
2	5 May	12:30	16:00	Breakout Sessions A&B	WG 6 - Space Policy & Finance	Working Groups for Day 2 Panels
3	6 May	7:45	9:00	Plenary	All	Status Reports from WG Chairs
3	6 May	9:00	14:30	Breakout Sessions C, D, & E	WG 1 - Space Info	6 WG Breakouts (Near-Term, Long-Term, Key Findings)
3	6 May	9:00	14:30	Breakout Sessions C, D, & E	WG 2 - Space Transportation & Logistics	6 WG Breakouts (Near-Term, Long-Term, Key Findings)
3	6 May	9:00	14:30	Breakout Sessions C, D, & E	WG 3 - Space Power	6 WG Breakouts (Near-Term, Long-Term, Key Findings)
3	6 May	9:00	14:30	Breakout Sessions C, D, & E	WG 4 - Human Presence in Space	6 WG Breakouts (Near-Term, Long-Term, Key Findings)
3	6 May	9:00	14:30	Breakout Sessions C, D, & E	WG 5 - Space Manufacturing & Resource Extraction	6 WG Breakouts (Near-Term, Long-Term, Key Findings)
3	6 May	9:00	14:30	Breakout Sessions C, D, & E	WG 6 - Space Policy & Finance	6 WG Breakouts (Near-Term, Long-Term, Key Findings)
4	7 May	7:45	13:00	Plenary	All	Results Consolidation, Key Findings, Recommendations

Agenda Detail:

NewSpace New Mexico Agenda and Information – this is not a public facing page – information for invitees

<https://newspacenm.org/state-of-space-agenda>

State of the Space Industrial Base 2020 Virtual Solutions Workshop Speaker Bios:

Alexander, Brett



Bretton (Brett) Alexander is VP, Government Sales for Blue Origin, a developer of rocket engines and space transportation capabilities. He is a recipient of the NASA Exceptional Public Service Medal and a former member of the NASA Advisory Council and the FAA's Commercial Space Transportation Advisory Committee. He served as a senior policy analyst for space issues in the White House Office of Science and Technology Policy, playing a central role in development of President Bush's Vision for Space Exploration in 2004. Prior to the White House, he held positions in the FAA's Office of Commercial Space Transportation, The Aerospace Corporation, and ANSER Corporation. Mr. Alexander holds MS and BS degrees in aerospace engineering from the Univ of Virginia.

Banazadeh, Payam



Payam Banazadeh is CEO & Founder of Capella Space, a Silicon Valley company building the largest constellation of commercial Synthetic Aperture Radar satellites to provide hourly monitoring services of anywhere in the globe. Payam holds a business/management degree from Stanford University and graduated Magna Cum Laude with a BS in Aerospace Engineering from The Univ of Texas. Prior to starting Capella Space Payam was a PM and flight systems engineer at NASA Jet Propulsion Laboratory (JPL) and has been awarded NASA's Mariner, Discovery, and Formulation Awards. Payam was selected to be on the prestigious "Forbes 30 under 30" list in 2017, and Capella has been recognized by New York Times, Bloomberg, and recently Inc magazine as one of the top 25 disruptive companies in the world.

Banik, Dr. Jeremy



Jeremy Banik serves as the technology manager for deployable structures at the AFRL Space Vehicles Directorate. During his 11 years at AFRL, he has invented 5 new deployable platforms and has led over a dozen successful technology development teams in the areas of foldable solar arrays, reflector antennas, phased array antennas, solar sails, optics, booms, and high strain composite mechanisms, many of which have flown in space at his direction. He received the 69th Annual Arthur S. Flemming Air Force-level award for his outstanding contributions in the area of deployable spacecraft structures. Jeremy graduated with BS and MS degrees in Mechanical Engineering from the South Dakota School of Mines and Technology and a PhD in Engineering from the UNM.

Blevins, Dr. Dan



(unable to attend)

Defense Innovation Unit Senior Scientist for Space Systems & Architectures - Dr Dan Blevins supports the Tactical Geospatial Intelligence, Multi-Domain Tactical Communications, and Orbital Outpost efforts. He has more than 20 years of program management and system acquisition leadership experience in the Air Force and Intelligence Community, primarily focused on geospatial intelligence (GEOINT) satellite and ground processing systems, global positioning system (GPS) and space control architectures. Dr Blevins has a PhD in Imaging Sciences from Rochester Institute of Technology and a Masters of Electrical Engineering from University of Michigan. He was Deputy Director of the Radar System and Integrated Intelligence SPOs at the National Reconnaissance Office.

Butow, Brig Gen Steven
(Bucky)



Defense Innovation Unit Director - Brig Gen Butow is former Commander of the 129th Rescue Wing, Air Combat Command, with 3,500 flying hours in H/MC-130P, T-38 and T-37 aircraft. As a researcher with the SETI Institute, he worked on instrument concepts for Mars surface soil analysis at NASA Ames Research Center, and was Co-PI on two NASA/USAF airborne science campaigns. He was recognized for outstanding achievement by the Space Science Division in 1999, and received an Ames Honor Award as a member of the first astrobiology mission in 2000. He holds a B.A. in Physics & Astronomy from San Jose State University, M.S. in Air & Space Strategic Studies from the University of Maryland, and is an invited member of the Honor Society of Phi Kappa Phi.

Cahan, Bruce



Bruce Cahan is a Lecturer in Stanford University's Mgmt Science and Engineering Department, a Distinguished Scholar at Stanford's Human-Sciences and Technologies Advanced Research Institute's mediaX Program, and an active member of CodeX Fellow at Stanford's Center for Legal Informatics. Bruce co-founded the Sustainable Banking Initiative at Stanford, and teaches Redesigning Finance, Ethics of Finance, Buy-Side Investing and Sustainable Banking at Stanford. As an Ashoka Fellow and as CEO of Urban Logic, Inc., a NY nonprofit, Bruce researched and leads the effort to create the Space Commodities Exchange as essential "financial engineering" for the New Space Economy. Bruce is licensed as a lawyer in CA, NY and PA, and practiced as a Wall Street lawyer in NYC with the international law firm of Weil Gotshal & Manges. Bruce graduated The Wharton School at the Univ of Pennsylvania (BS Econ & Int'l Business) and Temple Law School (J.D.),

Carol, Elliot



Mr. Elliot Carol is Co-Founder and CEO of Lunar Resources, Inc., a space industrial company pioneering in-space manufacturing and space mining technologies. In his role, Carol oversees the strategic direction and operational management of the industry-leading space industrial company focusing on developing an in-situ manufacturing architecture for the Cislunar domain. Prior to joining the space industry, Carol was a distinguished hedge fund manager responsible for managing both international equity and debt investment portfolios. His funds received numerous awards including Acquisition International's "Recognized Leader: Quantitative Investment Modeling" and "Best Global Tactical Asset Allocation Fund". Carol received his Bachelor degree from the University of North Carolina Wilmington.

Clevenger, Dr. Brad



Dr. Brad Clevenger joined SolAero Technologies Corp. in June 2001 and held various leadership positions within Engineering, Operations and Business Development on his way to becoming President and CEO. Prior to joining SolAero, he was a Member of the Technical Staff at Bettis Atomic Power Laboratory. Dr. Clevenger holds a PhD in Chemistry from the University of Texas at Austin and a Bachelor of Science degree from the University of Florida. He has published over 50 journal articles and holds four U.S. patents.

Cooley, Dr. Tom



Dr. Thomas Cooley, a member of the scientific and technical cadre of senior executives, is the Chief Scientist, Space Vehicles Directorate, Air Force Research Laboratory, Air Force Materiel Command, Kirtland Air Force Base, New Mexico. As Chief Scientist, Dr. Cooley is responsible for the technical quality of a \$200 million annual Air Force space science-and-technology investment. Additionally, Dr. Cooley coordinates these space investments with other government agencies and industry internal research and development to avoid duplication of effort and/or gaps. Dr. Cooley has published over 70 papers in national and international journals or conferences. He has also served as an adviser on space and airborne sensors technology to the AFSPC, the Space and Missile Systems Center and other organizations.

DeRaad, Casey



Casey Anglada DeRaad is Founder and Director of NewSpace New Mexico, a non-profit established to grow the commercial space industry in New Mexico and to create a bigger voice to NM's space industry stakeholders from industry, Air Force, the national labs, and local, state and federal organizations. Casey is an energetic builder of partnerships and growth strategies to help all stakeholders succeed. She has over 30 years of leadership experience in space technology, business development, investment leveraging, technology engagement/transfer, strategic planning, workforce development, and portfolio investment for Air Force, NASA and private industry. Casey has promoted opportunities for New Mexico students and industries for her entire career. Casey has her Master's in EE from UNM.

Edeen, Marybeth



Ms. Edeen is the Manager of the Research Integration Office in the International Space Station (ISS) Program which is responsible for enabling all research and technology development on the ISS. This includes research sponsored by NASA and other government agencies as well as commercial and non-profit use which takes advantage of the ISS being a National Lab. After joining NASA in 1989, she worked on Advanced Life Support System development and ISS Environmental Control and Life Support Systems. Ms. Edeen holds a BS in Chemical Engineering from the University of Texas and a Masters in Chemical Engineering from Rice University.

Felt, Col Eric



Colonel Eric Felt is the Commander of the Phillips Research Site and Director of the Air Force Research Laboratory Space Vehicles Directorate at Kirtland Air Force Base, New Mexico. He leads a team of 1,080 military, civilian and on-site contractors who comprise the nation's center of excellence for military space science and technology, research and development, as well as advanced technologies integration and demonstration. His organization focuses on enduring Air Force space missions: communications; position navigation and timing, missile warning, space situational awareness, and defensive counter space. Col Felt has a BS in electrical engineering, computer science, and history from Duke University and an MS and PhD degrees in electrical engineering and computer sciences from UC Berkeley.

Garretson, Peter



Peter Garretson is an independent strategy consultant who focuses on space and defense and a senior fellow in Defense Studies with the American Foreign Policy Council. He was previously the director of Air University's Space Horizons Task Force, America's think tank for space, and was deputy director of America's premier space strategy program, the Schriever Scholars. Peter conducts research and analysis to inform US national decision makers on strategy and policy related to space, defense technology, military innovation, and foreign affairs. He is the author of a forthcoming book on great power competition for space resources. Peter has a BS in Humanities/Philosophy from the USAF Academy, a Masters in Aviation/Human Factors from Embry-Riddle, and is pursuing a PhD in Public Policy from Auburn.

Gaudreault, Dr. Michele



Dr. Michele Gaudreault is the USSF Deputy Chief Scientist. She conducts scientific analysis and facilitates basic, applied, and advanced research and development needed for future systems. She supports the Chief Scientist in his role as science and technology advisor for the command and maintains technical interfaces with space, ISR, and cyber agencies and the scientific community. Dr. Gaudreault has 35 years of government service which included assignments as a NASA Space Shuttle Test Director and Controls Engineer, Director of Research for the US Air Force Academy's Mathematics Department, and the first Chief Scientist of the Asian Office of Aerospace Research and Development. She is an Adjunct Professor for Embry-Riddle Aeronautical University, where she primarily teaches aerospace courses.

Hardy, Dr. David



Dr Hardy has more than 40 years' experience working space science and technology. Dr. Hardy graduated from Duke University with a BS in physics and did his graduate work at Rice University. In his 40 plus year career within the government he held the positions of Air Force Chief Space Experimentalist, Chief Scientist of the Air Force Research Laboratory, Space Vehicles Directorate, Associate Director, Space Vehicles Directorate, Director of the AFRL Directed Energy Directorate, and Associates Deputy under Secretary of the Air Force for Space. Dr. Hardy is presently consulting on Space issues and supporting AFRL with Apogee Engineering LLC.

Hernandez, Col Curtis



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.

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.

Hoffman, Lars



Lars Hoffman is Rocket Lab's Senior VP of Global Launch Services. He leads the business development and customer experience strategy for the Electron program. With 30+ years of experience in national security and aerospace, Lars has deep knowledge of the launch industry and the ever-evolving needs of satellite owners and operators. Previously Lars was the Senior Director of Government Sales at SpaceX, where he was responsible for National Security Space (NSS) strategy and business development. Lars also led a distinguished USAF career. He holds advanced engineering degrees from the Air Force Academy, AFIT and the USAF Test Pilot School. He also earned national security degrees from MIT, Air University and National Defense University and an M.B.A. from UCLA.

Jaffe, Dr. Paul



Dr. Paul Jaffe is an electronics engineer and researcher with over 25 years of experience at the U.S. Naval Research Laboratory (NRL). He has led or held major roles on dozens of space missions and on breakthrough technology development projects for civilian, defense, and intelligence community sponsors. He is widely recognized as one of the world's leading experts on space solar and power beaming. He has over 50 research and patent publications, frequent international speaking and media appearances, and is the recipient of numerous awards. He has received a BS in Electrical Engineering (EE) from the University of Maryland, College Park and an MS in EE at the Johns Hopkins University, graduating with honors. He earned a PhD in EE at the University of Maryland, College Park.

Kemp, Chris



Chris is a Founder and the CEO of Astra. Previously, Chris founded several tech start-ups and served as the Chief Technology Officer of NASA, where he introduced new technologies into America's space program and founded OpenStack, the largest and fastest growing open source project in history. While at NASA, Chris worked at the White House to develop the cloud strategy for the United States.

Chris has been recognized in the Silicon Valley Business Journal "40 under 40," the CNBC Disruptor 50 list, and received the prestigious "Federal 100" award for his service at NASA.

Kitay, Stephen



Mr. Stephen L. Kitay, a member of the Senior Executive Service, is the Deputy Assistant Secretary of Defense for Space Policy. He is responsible for establishing policy and guidance to assure U.S. and allied warfighters the benefits of space capabilities and to help guide DoD's strategy for addressing space-related issues. He also leads DoD activities in international space cooperation. Mr. Kitay most recently served as a Professional Staff Member on the Strategic Forces Subcommittee of the House Armed Service Committee, advising on oversight of national security space programs, policy, and budget within the DoD. Mr. Kitay holds a Masters of Business Administration from University of West Florida and a Bachelor of Science in Electrical Engineering from Syracuse University.

Kittle, Lt Col Joshua



Lieutenant Colonel Joshua D. Kittle is the USSF Deputy Chief Scientist, supporting the Chief as the principal adviser to the commander on all S&T matters. He evaluates and makes recommendations on all S&T concerning space research and development programs for the space enterprise vision, launch, ground systems, and multi-domain areas. He provides analysis to support decision-makers for all USSF scientific and technical matters and guides the substantive scientific and technical program activities within the command, interacting with other principals, operational commanders, combatant commands, acquisition, S&T, and international communities to address cross-organizational S&T issues and solutions. Lt Col Kittle has a doctorate in physical chemistry from Virginia Tech.

Kutter, Bernard



Bernard Kutter is United Launch Alliance's (ULA) Chief Scientist and Advanced Programs manager. He is responsible for developing technologies and capabilities to support ULA's long-term strategic needs, including developing the Cislunar economy. In 2003, he initiated and led development of Atlas evolution including in-space applications. Kutter managed the Atlas thermodynamics group, where he was involved in 67 successful missions. Kutter received a Bachelor of Science degree in aerospace engineering from the University of Washington. He is an AIAA Associate Fellow, a member of AIAA's Space Transportation Technical Committee, the Space Frontier Foundation, and the National Space Society, and has written on a range of issues related to space transportation and the Cislunar economy.

Loverro, Doug



Douglas Loverro is NASA's associate administrator for the Human Exploration and Operations Mission Directorate. He served 30+ years in the DoD developing, managing, and establishing national policy for the full range of national security space activities. From 2013 to 2017, Loverro served as the Deputy Assistant Secretary of Defense for Space Policy. In this role, he was responsible for establishing policy for the United States allies to the benefits of space capabilities and to help guide the DoD's strategy for addressing space-related issues. Loverro holds an MS Physics from the University of New Mexico, a Master's of Political Science from Auburn University, and an MBA from the University of West Florida, in addition to his BS in Chemistry from the USAF Academy.

Mankins, John



John C. Mankins is President of Artemis Innovation Management Solutions LLC, the Founder & President of Mankins Space Technology, Inc., a Director of Solar Space Technologies, Inc., and a Professor at the online Kepler Space Institute. He is also VP of the Board for the Moon Village Association and a member of the Board for the National Space Society and SPACE Canada. Mankins was formerly Chief Technologist for Human Exploration and Development of Space at NASA HQ. His 25-year career at NASA and the JPL ranged from flight projects and space mission operations, to systems-level innovation and technology management. Mankins holds BS & MS degrees in Physics and an MBA in Public Policy Analysis. He is a member of IEEE, IAA, AAAS, & Sigma Xi Research Society.

McClure, Patrick

Patrick McClure is a senior researcher and advisor on very small nuclear reactor projects at LANL. Recently, he was the LANL lead for the



development, construction and testing of a small space reactor for NASA called Kilopower, the first space reactor to be built and tested in the U.S. in over 50 years. Currently, McClure is advising LANL and NASA management on technical and policy decisions for space nuclear power, including lunar surface reactors and thermal nuclear rockets.

McClure is a former line manager for the Nuclear System Design and Analysis Group. He has been at LANL for 25 years performing nuclear design for very small reactor systems and safety analysis for a variety of reactor concepts. McClure has a BS from the University of Oklahoma and an MS from the University of New Mexico.

Moses, Mike



Mike is the President of Virgin Galactic, a publicly-traded human spaceflight company that was formed by the vision of Sir Richard Branson with a goal to open up access to spaceflight experiences for everyone. Mike is responsible for overseeing the commercial suborbital spaceflight program for Virgin Galactic. He leads the team in all aspects of safe and successful spaceline operations, including program development, vehicle readiness, astronaut training, flight crew, and mission operations. Mike came to Virgin Galactic in 2011 following a distinguished career with NASA's Space Shuttle Program. Mike attended Purdue University, earning a bachelor's in physics and a master's degree in aerospace engineering. He also earned a master's degree in astrophysics from Florida Institute of Technology. Mike's service to NASA was recognized on two separate occasions by receiving the NASA Outstanding Leadership Medal.

Mozer, Dr. Joel



Dr. Joel B. Mozer is the USSF Chief Scientist & serves as the principal scientific advisor to the Chief of Space Operations and the service's senior authority for all S&T matters. He is delegated the authority to guide all substantive S&T program activities within the USSF. In this role, he interacts with other principals, operational commanders, combatant commands, acquisition, and international communities to address cross-organizational S&T issues and solutions. Dr. Mozer represents USSF S&T on decisions, high-level planning, and policy, building coalitions and alliances throughout the US government, industry, academia, the international community, and other S&T organizations. Dr. Mozer has a BS in Physics from NM State and an MS in Atmospheric Science and PhD in Physics from the University of Arizona.

Nixon, Steve



Mr. Steven Nixon is President of the SmallSat Alliance (a 45+ company advocacy group), CEO of a security start-up, a technology strategy consultant, and Board Member and advisor for several companies. Most recently, he was an executive at Microsoft co-founder Paul Allen's Vulcan Aerospace. Before his current roles, Mr. Nixon was the Director of Science and Technology/Chief Technology Officer of the US Intelligence Community overseeing the science and technology activities of 16 US intelligence agencies. He was the founder and first acting director of IARPA, the intelligence community's version of DARPA. Before that he was a long-time professional staff member on the House Appropriations Defense Subcommittee with oversight over both the DoD and IC space programs. In 2008, he was awarded the National Intelligence Medal of Achievement. In 2005, Space News recognized him in its global top ten list of people making a difference in space. He was also recognized that year by the National Journal's "Hill 100" as a top congressional staffer in the category of "Defense Transformation." Before working for Congress, he was an analyst at the Pentagon. He has degrees in Electrical Engineering, Mathematics, and National Security Studies.

O'Connell, Kevin



Kevin M. O'Connell is the Director of the Office of Space Commerce at the U.S. Department of Commerce. He 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. Mr. O'Connell has researched and written extensively on the policy, security, and global market issues related to commercialization of remote sensing. 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.

Penn, Jay



Jay is an Aerospace Corporation Tech Fellow with 40 years of Aerospace Industry experience, now heading the Reusable launch Systems Office. Jay supported virtually all DoD, NASA, and US/foreign commercial space launch customers as an expert in space systems, technologies, planning, and program mgmt. Jay has worked on a large variety of projects related to Solar Electric Propulsion, Space Power Generation, Expendable and Reusable Launch Systems, and On-orbit servicing and assembly, and Launch, Maneuver and Transport (LM&T). In addition to supporting High Power SEP at SMC and Space Solar Power development for the Pentagon and AFRL, he supports space system architecture planning efforts for the National Security Launch Architecture (NSLA) and Launch Maneuver and Transport (LM&T) studies.

Pittman, Bruce



Bruce Pittman is Senior Vice President and Senior Operating Officer of the National Space Society and Chair of the AIAA Commercial Space Group. Pittman was a member of the startup team for the SpaceHab Space Research Laboratory, the first commercial endeavor on a manned space vehicle. SpaceHab flew on 17 Space Shuttle missions, realized over \$1B in contracted sales, and opened the door for a wide range of research in basic science, life sciences, materials sciences, educational projects, and commercial applications. Mr. Pittman has a BS in Mechanical Engineering from UC Davis and a MS in Engineering Management from Santa Clara University. He is an Associate Fellow of the AIAA and founder and first chairman of the AIAA System Engineering Technical Committee.

Rasky, Dr. Daniel



Dr. Daniel Rasky, a NASA Senior scientist, was a co-founder of the Space Portal in 2005 and is the current Chief of the Space Portal Office. Dan was the primary inventor or significant contributor to flight hardware for ten NASA and US flights systems, which includes the Space Shuttle, the DC-XA, SHARP-B1&B2, Mars/Pathfinder, DS-II, Mars Exploration Rovers, Stardust Mission, the Re-entry Breakup Recorder, the Mars Science Laboratory, and the X-37. Dan is an internationally recognized expert for space thermal protection and entry systems. Rasky is the recipient of the Senior Professional Meritorious Presidential Rank Award & multiple other NASA individual/group awards. He has six patents, 64 publications, and is an AIAA associate Fellow and a senior member of the American Society of Mechanical Engineers.

Robinson, Dr. Stephen



Before joining the faculty at the University of California, Davis in 2012, Stephen Robinson spent 37 years at NASA, where he worked as a machinist, lab technician, engineer, research scientist, branch chief, safety representative, and astronaut. Robinson is now a tenured professor in the UC Davis Mechanical and Aerospace Engineering Department. He has recently been appointed Director of the new UC Davis Center for Spaceflight Research. Dr. Robinson also directs the UC Davis Human/Robotic/Vehicle Integration and Performance Lab, where graduate and undergraduate students pursue research in human spaceflight, spacecraft design for human health and safety, aviation safety, human/automation/robotic integration, human performance, automation and control, and CubeSat and UAV design.

Roesler, Dr. Gordon



Dr. Gordon Roesler is a nationally recognized authority in the application of robotics technologies to space missions. At DARPA, he created and led the Robotic Servicing of Geosynchronous Satellites (RSGS) program, which will result in the first operational, multi-mission robotics server when it launches in 2022. During his previous term at DARPA, 2002-2006, he originated the Spacecraft for the Universal Modification of Orbits (SUMO) and Front-End Robotics Enabling Near-term Demonstration (FREND) programs. Gordon provides advisory services in space infrastructure and business concepts to industry, government and academia and is a consultant to the Defense Innovation Unit. Gordon received the PhD in Physics from MIT in 1992 and is a 1975 graduate of the US Naval Academy.

Sadat, Dr. Mir



Mir Sadat, Ph.D., recently departed the U.S. National Security Council at the White House, where he led the interagency on defense and space policy issues. In this role, Mir prepared the President, National Security Advisor, and White House Senior Officials on significant civil, commercial and national security space topics. Mir is also a naval officer with intelligence and space qualifications and in his preceding two naval assignments, he served as a Space Policy Strategist with Chief of Naval Operations and a Space Operations Officer with U.S. Tenth Fleet. Mir has a PhD from Claremont Graduate University and has taught at various universities in California and in Washington, DC. Prior to joining the government, Mir spent 10 years in various capacities at Lockheed Martin, Northrop Grumman, and Raytheon.

Schingler, Robbie



Robbie Schingler is the Co-Founder & Chief Strategy Officer at Planet. In the eight years since founding Planet, Robbie has led the company's long term strategy, including three acquisitions and business growth that serves 30,000+ users and 500+ customers in 40+ countries. Robbie spent nine years at NASA, where he helped build the Small Spacecraft Office at NASA Ames and was Capture Manager for the Transiting Exoplanet Survey Satellite (TESS). Robbie later served as NASA's Open Government Representative to the White House and Chief of Staff for the NASA Office of the Chief Technologist. He received an MBA from Georgetown, an MS in Space Studies from the International Space University, and a BS in Physics from Santa Clara University. Robbie was a 2005 Presidential Management Fellow.

Sercel, Dr. Joel



Dr. Joel Sercel is the CTO and CEO of Trans Astronautica Corporation. TransAstra is a NewSpace company dedicated to accelerating the process of human exploration and industrialization of cislunar space and near Earth asteroids. Sercel presently has patents pending in the area of space resources technology and is known as the inventor of Optical Mining™, a practical method for extracting the ingredients in rocket propellant from asteroids. Dr. Sercel received his PhD and master's degrees in Mechanical Engineering from the California Institute of Technology with a doctoral dissertation in plasma physics as applied to space propulsion. His bachelor's degree was in Engineering Physics from the University of Arizona.

Serafini, John



John Serafini has over a decade of experience investing in and leading national security oriented technology companies, having founded and scaled ten such high growth start-ups in his career. John is presently the CEO of HawkEye 360, the leading developer of space-based radio frequency (RF) collection, mapping, and analytic capabilities. He previously served as Senior VP of Allied Minds where he led the formation, financing, and management of HawkEye 360, along with other Allied Minds companies such as BridgeSat, Federated Wireless, and Percipient Networks (WatchGuard acquired). A former Airborne Ranger-qualified US Army infantry officer, John is a distinguished graduate of the US Military Academy and a graduate of the Harvard Business School and the Harvard Kennedy School of Government.

Signh, Pav



Pav leads DIU's policy efforts, highlighting the technology and economic competition the US faces from strategic competitors and adversaries. DIU plays a critical role in elevating the national security importance of dual-use technologies among technologists and policy makers. Pav is the co-author of a Pentagon study on China's participation in the U.S. venture ecosystem, and he co-led the initiative for a new DoD- sponsored investment vehicle, National Security Innovation Capital (NSIC) to fund dual-use hardware technology companies. Prior to DIU, Pav served on the National Security Council and National Economic Council at the White House. Pav earned his BS in Business Administration and BA in Political Economy from UC Berkeley and his MS with distinction from Georgetown's School of Foreign Service.

Sowers, Dr. George



Dr. George Sowers has 30 years of experience in the space transportation field working for Martin Marietta, Lockheed Martin and the United Launch Alliance (ULA). He recently retired from his position as Vice President and Chief Scientist at ULA where his team developed an architecture for fully reusable in-space stages fueled by propellant mined, refined and distributed in space. Dr. Sowers has now joined the faculty of the Colorado School of Mines as part of a newly created graduate program in space resources. He holds a BS in Physics from Georgia Tech and a PhD in Physics from the University of Colorado. Dr. Sowers is a fellow of the American Institute of Aeronautics and Astronautics (AIAA).

Suffredini, Mike



Michael T. Suffredini is the President and Co-founder of Axiom Space, a private company that is creating the world's first international commercial space station. He had recently served as President of the Commercial Space Division at Stinger Ghaffarian Technologies, Inc. (SGT) since October 2015, a division that focuses on space-related commercial opportunities, utilizing SGT's spaceflight engineering, operations and hardware development capabilities. Prior to joining SGT, Suffredini served as NASA's manager of the International Space Station (ISS) program for 10 years. He holds a bachelor's degree in aerospace engineering from the University of Texas at Austin and is honored as a distinguished graduate at the University College of Engineering.

Trimble, Kathy



Ms. Kathy Trimble is Vice President, Council on Competitiveness, focused on numerous innovation initiatives. She brings over 20 years of government and private sector experience at the intersections of technology, innovation, policy and industry. Prior to joining the Council, Ms. Trimble served in multiple DoD offices and most recently at the Joint Chiefs of Staff. She concentrated on advanced and emerging capabilities, research and development and acquisition cycles, industrial base trends and competitive strategies. She is a Distinguished Graduate from the Eisenhower School at National Defense University where she received an MS in National Resource Strategy. Ms. Trimble was also a Seminar XXI Fellow with MIT. She received her BS in Foreign Service from Georgetown University.

Tumlinson, Rick



Rick Tumlinson, Founder - Space Fund, New Worlds Institute. The EarthLight Foundation, New Worlds Institute, Space Frontier Foundation and several other cutting-edge organizations. Rick is one of the planet's leading space revolutionaries, and has been called one of the world's top space "Visionaries" - credited with helping create the NewSpace commercial space industry. In 2015, he won the World Technology Award along with Craig Venter of the Human Genome project. Rick led the team that took over the Mir Space Station for a year as the world's first commercial space facility, signed up the first "space tourist" Dennis Tito, and has spoken as a space-policy expert witness before the US Congress 6 times. He has considered one of the best speakers in the space field, and his new book "A Space Manifesto" will be available in the fall.

Vaughn, Mandy



Mandy is the President of VOX Space. Mandy originally joined Virgin Orbit, VOX Space's parent company, in 2015. As Senior Director of Business Development and Mission Management, she supported business development on the LauncherOne program for both government and commercial customers and served as mission manager for customers including OneWeb and NASA, in addition to spearheading the creation and registration of VOX Space. In 2018, Mandy was also selected to serve on the National Space Council's Users Advisory Group. Prior to Virgin Orbit, Mandy was with General Dynamics where she was responsible for the space control & space protection investment portfolios. Mandy has a BS in Mechanical Engineering and an MS in Aeronautics and Astronautics, both from MIT.

Wegner, Dr. Peter



Dr. Peter Wegner is the chief strategy officer at Spaceflight Industries. Prior to this role, he was the Director of Advanced Concepts at Utah State University's Space Dynamics Laboratory where he directed investments in new technologies to solve some of the nation's most critical emerging problems. Peter also served as Director of the DoD's Operationally Responsive Space Office at Kirtland AFB, NM where he directed a \$120M/year budget and 60+ person staff chartered with creating a national strategy to develop new and innovative techniques to design, build, test, and operate space systems to support DoD missions.

Peter has held positions as the Technical Advisor to AFSPC Directorate of Requirements and a Research Engineer with the AFRL Space Vehicles Directorate.

Welsch, Carol



Carol Welsch is Senior Director of Business Development at Northrop Grumman's Tactical Space Systems Division. In this role, she leads business development efforts for National Security Space programs with a focus on innovative small satellite programs and rideshare platforms. Ms Welsch joined the heritage Orbital Sciences Corporation in 2013 after retiring from the USAF at the rank of Colonel, a career that included a diverse set of positions in space acquisition, space operations, flight test, and strategic intelligence. She earned a BS in Aeronautical Engineering at Rensselaer Polytechnic Institute, followed by earning an MS in Aerospace Management from Embry Riddle Aeronautical University. She also attended the Defense Acquisition University and earned a Masters of Strategic Studies at the Air War College.

Whitesides, George



George T. Whitesides is the CEO of Virgin Galactic Holdings, a vertically integrated aerospace company that is working to become the world's first commercial spaceline. George leads both Virgin Galactic and its manufacturer of advanced air and space vehicles, The Spaceship Company. George was appointed in 2010 by Sir Richard Branson and led the transition from a private entity to its position today as a publicly-traded human spaceflight company. Prior to Virgin Galactic, George was Chief of Staff for NASA and received the Distinguished Service Medal, the highest award the agency confers. An honors graduate of Princeton's Woodrow Wilson School, George later earned an MS in geographic information systems and remote sensing from the University of Cambridge and a Fulbright Scholarship to Tunisia.

(unable to attend)

Wingo, Dennis



Dennis has 4+ decades of experience in the computer, academic and aerospace industries. He is the Founder & CEO of Skycorp Inc, and Greentrail Energy Inc., Co-Founder & CTO of Orbital Recovery Inc. His key areas of expertise are solar electric propulsion, satellite and spacecraft systems design with a focus on in space assembly, advanced mission planning, and lunar surface operational scenario development. Dennis led the development, construction, and testing of microgravity payloads for sounding rockets and the Space Shuttle at the University of Alabama in Huntsville, including the first MacIntosh flown on the Space Shuttle and SEDSAT-1/OSCAR-33, the first non-NASA spacecraft built in Alabama. He led the design and development of the world's first commercial satellite servicing system at Orbital Recovery. Led the Lunar Orbiter Image Recovery Project (LOIRP) that restored and digitized the images of NASA's Lunar Orbiter Program. He was the first in history to rescue and operate a spacecraft (ISEE-3) in interplanetary space in 2014, and he currently has multiple space flight projects in development. Dennis has been a Keynote Speaker at Apple World-Wide Developer Conference and at Google Tech Talk. He is the author of the book "Moonrush," about developing lunar resources of dozens of scientific articles and has been featured on many documentaries, programs, and news articles on advanced space activities.

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