

NATIONAL SPACE COUNCIL



USERS' ADVISORY GROUP

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Admiral James Ellis, Jr., USN, Retired
User Advisory Group Chairman

James O. Ellis, Jr. retired as President and Chief Executive Officer of the Institute of Nuclear Power Operations (INPO), located in Atlanta, Georgia, on May 18, 2012. INPO, sponsored by the commercial nuclear industry, is an independent, nonprofit organization whose mission is to promote the highest levels of safety and reliability -- to promote excellence -- in the operation of nuclear electric generating plants.

In 2004, Admiral Ellis completed a distinguished 39-year Navy career. His final assignment was Commander of the United States Strategic Command during a time of challenge and change. In this role, he was responsible for the global command and control of United States strategic and space forces, reporting directly to the Secretary of Defense.

A 1969 graduate of the U.S. Naval Academy, Admiral Ellis was designated a Naval aviator in 1971. His service as a Navy fighter pilot included tours with two carrier-based fighter squadrons, and assignment as Commanding Officer of an F/A-18 strike/fighter squadron. In 1991, he assumed command of the USS Abraham Lincoln, a nuclear-powered aircraft carrier. After selection to Rear Admiral, in 1996 he served as a carrier battle group commander leading contingency response operations in the Taiwan Straits.

His shore assignments included numerous senior military staff tours; senior command positions included Commander in Chief, U.S. Naval Forces, Europe and Commander in Chief, Allied Forces, Southern Europe during a time of historic NATO expansion. He led United States and NATO forces in combat and humanitarian operations during the 1999 Kosovo crisis.

Mr. Ellis holds a master's degree in aerospace engineering from the Georgia Institute of Technology and, in 2005, was inducted into the school's Engineering Hall of Fame. He completed United States Navy Nuclear Power Training and was qualified in the operation and maintenance of naval nuclear propulsion plants. He is a graduate of the Navy Test Pilot School and the Navy Fighter Weapons School (Top Gun). In 2013, Mr. Ellis was elected to the National Academy of Engineering.

In 2009 he completed three years of service as a Presidential Appointee on the President's Intelligence Advisory Board and, in 2006, he was a member of the Military Advisory Panel to the Iraq Study Group.

Mr. Ellis currently serves as an Annenberg Distinguished Fellow at the Hoover Institution at Stanford University. A former Chairman of the Board of the Space Foundation, in 2018 he was appointed Chairman of the User's Advisory Group to the Vice President's National Space Council. He is the former Chairman of the Board of Level 3 Communications and serves on the board of directors of the Lockheed Martin Corporation and Dominion Resources, Inc.

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Dr. Buzz Aldrin, USAF, Retired
Former NASA Astronaut

Dr. Aldrin grew up in Montclair, New Jersey. Buzz graduated one year early from Montclair High School and he attended the US Military Academy at West Point, graduating third in his class with a BS in mechanical engineering. He then joined the Air Force where he flew F86 Sabre Jets in 66 combat missions in Korea, shot down two MIG15's, and was decorated with the Distinguished Flying Cross. After a tour of duty in Germany flying F100's, he earned his Doctorate of Science in Astronautics at MIT and wrote his thesis on Manned Orbital Rendezvous. Selected by NASA in 1963 into the third group of astronauts, Aldrin was the first with a doctorate and became known as "Dr. Rendezvous."

The docking and rendezvous techniques he devised for spacecraft in Earth and lunar orbit became critical to the success of the Gemini and Apollo programs, and are still used today. He pioneered underwater training techniques to simulate spacewalking. In 1966 on the Gemini 12 orbital mission, Buzz performed the world's first successful spacewalk – extra-vehicular activity (EVA), and set a new EVA record of 5 1/2 hours. During that mission he also took the first 'selfie' in space. On July 20, 1969, Buzz and Neil Armstrong made their historic Apollo 11 moonwalk, becoming the first two humans to set foot on another world. An estimated 600 million people – at that time, the world's largest television audience in history – witnessed this unprecedented heroic endeavor.

Since retiring from NASA and the U.S. Air Force, Col. Aldrin calls himself a Global Statesman for Space and has remained a tireless advocate for human space exploration.

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Mr. Salvatore T. "Tory" Bruno

President and CEO, United Launch Alliance

Salvatore T. "Tory" Bruno is the president and CEO for United Launch Alliance (ULA). In this role, Bruno serves as the principal strategic leader of the organization and oversees all business management and operations. Prior to joining ULA, he served as the vice president and general manager of Lockheed Martin Strategic and Missile Defense Systems. He is a former member of the board of directors of Lockheed

Martin U.K. Ltd.

Bruno joined Lockheed Martin in 1984. He previously served as vice president and general manager of FBM and ICBM. He holds a bachelor's degree in mechanical engineering from the California Polytechnic State University, in San Luis Obispo, California, and has completed graduate courses and management programs at Harvard University, Santa Clara University, the Wye River Institute, San Jose State University and the Defense Acquisition University. Bruno is an American Institute of Aeronautics

and Astronautics (AIAA) Fellow, a companion of the Naval Order of the United States, a member of the Navy League and a former member of the Board of Directors of the Silicon Valley Leadership Group. He served on the National Blue Ribbon Panel for Bettering Engineering & Science Education and as Chairman of the Diversity Council of Lockheed Martin Space Systems. He is the author of two books that explore the organization of the medieval Knights Templar from the perspective of modern business management: "Templar Organization: The Management of Warrior Monasticism" and "Templar Incorporated." He is a recipient of the Order of Merit of the Sovereign Military Order of the Temple of Jerusalem.

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Mr. David L. Calhoun

President and CEO, The Boeing Company

David Calhoun is president and chief executive officer of The Boeing Company. He oversees the strategic direction of the Chicago-based aerospace company. With roughly 150,000 employees across the United States and in more than 65 countries, Boeing is the world's largest aerospace company and one of the largest U.S. exporters. It is the leading manufacturer of commercial airplanes, military aircraft, and space and security systems, and a provider of global services; it supports airlines and U.S. and allied government customers in more than 150 nations.

Calhoun, 62, became Boeing president and chief executive in January 2020. He has served as a member of Boeing's board of directors since 2009 and served as chairman of the company's board of directors from October to December 2019.

Calhoun has extensive expertise in a wide array of strategic, business, safety and regulatory matters across several industries as a result of his executive, management and operational experience.

Prior to leading Boeing, Calhoun served as senior managing director and head of portfolio operations at The Blackstone Group from January 2014. During his time with the investment firm, he focused on creating and driving added-value initiatives with Blackstone's portfolio company CEOs.

Previously, he also served as executive chairman of the board for Nielsen Holdings from January 2014 to January 2016. He joined Nielsen in 2006 as chief executive officer shortly after it was acquired through a consortium of private equity investors, including Blackstone. Throughout his seven-year Nielsen tenure, Calhoun led the company's transformation into a leading global information and measurement firm listed on the New York Stock Exchange and Standard & Poor's 500 Index.

Calhoun began his career at The General Electric Company (GE), where he rose to vice chairman of the company and president and chief executive officer of GE Infrastructure, its largest business unit. During his 26 years at GE, he held a number of operating, finance and marketing roles, and led multiple business units, including GE Transportation and GE Aircraft Engines.

Calhoun is a member of the board of directors of Caterpillar Inc. He is a member of Virginia Tech's Pamplin Advisory Council.

A native of Pennsylvania, Calhoun holds a bachelor's degree in accounting from Virginia Tech. He is co-author of the book "How Companies Win" and is an avid golfer and skier. He is married with four children.

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Mr. Dean Cheng

Senior Research Fellow, Heritage Foundation

Dean Cheng is currently the Research Fellow for Chinese Political and Military Affairs at the Heritage Foundation. He is fluent in Chinese, and uses Chinese language materials regularly in his work.

Prior to joining the Heritage Foundation, he was a senior analyst with the China Studies Division (previously, Project Asia) at CNA from 2001-2009. He specialized on Chinese military issues, and authored

studies on Chinese military doctrine, Chinese mobilization concepts, and Chinese space capabilities.

Before joining CNA, he was a senior analyst with Science Applications International Corporation (SAIC) from 1996-2001. From 1993-1995, he was an analyst with the US Congress' Office of Technology Assessment in the International Security and Space Division, where he studied the Chinese defense industrial complex.

He is the author of the book ***Cyber Dragon: Inside China's Information Warfare and Cyber Operations*** (NY: Praeger Publishing, 2016), as well as a number of papers and book chapters examining various aspects of Chinese security affairs. Recent publications include:

- "Space Deterrence, the US-Japan Alliance, and Asian Security: A US Perspective," in ***The US-Japan Alliance and Deterring Gray Zone Coercion in the Maritime, Cyber, and Space Domains***, with Scott Harold, Yoshiaki Nakagawa, Junichi Fukuda (Santa Monica, CA: RAND Corporation, 2017)
- "Space and the Evolving Chinese Military," in ***Crisis Stability in Space***, with Bruce MacDonald, Admiral Dennis Blair, Karl Mueller, and Victoria Samson (Washington, DC: Foreign Policy Institute, 2016).
- "The PLA's Wartime Structure," in ***The PLA as Organization v. 2.0***, ed. by Kevin Pollpeter and Kenneth Allen (Merrifield, VA: DGI, 2015).
- "Chinese Concepts of Space Security," in ***Springer Handbook of Space Security***, ed. by K.U. Schrogl (NY: Springer Publishing, 2015).
- "Chinese Lessons from the Gulf Wars," in ***Chinese Lessons from Other People's Wars***, ed. by Andrew Scobell, Roy Kamphausen, and David Lai (Carlisle, PA: Strategic Studies Institute, 2011)..
- "Chinese Views on Deterrence," ***Joint Force Quarterly*** (#60, January 2011)

He has spoken at the USSTRATCOM Deterrence Symposium, the USSTRATCOM Space and Cyber Symposium, and the National Space Symposium. He has also lectured at the US National Defense University, George Washington University, and MIT. He has testified before Congress on various Chinese security issues.

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Colonel Eileen Collins, USAF, Retired
Former NASA Astronaut

Collins graduated in 1979 from Air Force Undergraduate Pilot Training at Vance AFB, Oklahoma, where she was a T-38 instructor pilot until 1982. She was a C-141 aircraft commander and instructor pilot and was assigned to the U.S. Air Force Academy as an assistant professor in mathematics and a T-41 instructor pilot. She was selected for the astronaut program while attending the Air Force Test Pilot School at

Edwards AFB, California, from which she graduated in 1990.

Selected by NASA in January 1990, Collins became an astronaut in July 1991. Initially assigned to Orbiter engineering support, Collins has also served on the astronaut support team responsible for Orbiter prelaunch checkout, final launch configuration, crew ingress/egress, landing/recovery, worked in Mission Control as a spacecraft communicator (CAPCOM), served as the Astronaut Office Spacecraft Systems Branch Chief, Chief Information Officer, Shuttle Branch Chief, and Astronaut Safety Branch Chief. Collins served as pilot on STS-63 (February 3-11, 1995) and STS-84 (May 15-24, 1997), and was the commander on STS-93 (July 22-27, 1999) and STS-114 (July 26 to August 9, 2005). A veteran of four space flights, Collins has logged over 872 hours in space. Collins retired from NASA in May 2006.

Collins received an associate in science degree in mathematics/science from Corning Community College in 1976; a bachelor of arts degree in mathematics and economics from Syracuse University in 1978; a master of science degree in operations research from Stanford University in 1986; and a master of arts degree in space systems management from Webster University in 1989. Collins is currently retired, and serves on several boards and advisory panels, including the National Academies' Aerospace Science and Engineering Board and the Astronaut Memorial Foundation.

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The Honorable Steve Crisafulli

Former Speaker, Florida House of Representatives

Speaker Crisafulli is a former Republican member of the Florida House of representatives, representing District 51 from 2008 to 2016. He served as Speaker of the House and was Majority Leader in 2014.

Crisafulli did not seek re-election to the Florida House of Representatives in 2016 because of term-limits. Crisafulli served as Supervisor of Brevard County Soil and Water Conservation from 1998 to 2002.

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Dr. Mary Lynne Dittmar

President and CEO, Coalition for Deep Space Exploration

President and CEO, Dittmar Associates

Dr. Mary Lynne Dittmar is President and CEO of the Coalition for Deep Space Exploration, an industry trade group supporting human exploration, science, commerce, and American leadership in space. Under her leadership the Coalition has grown from 5 companies to more than 70 over the past four years and is a recognized source for policy, technical and business information in the aerospace and defense sector.

Earlier in her career Dr. Dittmar managed the mission operations group for The Boeing Company on the International Space Station Program. Later, she acted as a special advisor to the NASA Astronaut Office before her appointment as Boeing Chief Scientist for Commercial Utilization of the ISS. More recently she was Senior Policy Advisor to International Space Station National Laboratory. She has also served as a senior advisor to NASA, the DoD, and the FAA.

Mary Lynne is a Fellow of the National Research Society and an Associate Fellow of the American Institute for Astronautics and Aeronautics. From 2012-2014 she served as a member of the National Research Council Committee on Human Spaceflight, and is beginning her third term as a member of the Executive Committee of the Space Studies Board of the National Academies of Sciences, Engineering and Medicine. In June of 2018 she was appointed as a member of the Users' Advisory Group of the National Space Council, and in October of 2018 also was appointed to the Commercial Space Transportation Advisory Committee for the Department of Transportation/FAA. Dr. Dittmar resides in Washington, D.C.

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Mr. Tim Ellis

Cofounder and CEO, Relativity Space

Tim is cofounder and CEO of Relativity Space, the first autonomous rocket factory and launch services leader for satellite constellations. Disrupting 60 years of global aerospace manufacturing, Relativity is developing the first and only aerospace platform to integrate machine learning, software, and robotics with metal 3D printing technology to build and launch rockets and other aerospace products in days instead of years, with the long-term goal of building the future of humanity in space. Since cofounding Relativity, Tim has helped change the future of space exploration by expanding the possibilities of additive metal manufacturing. Under his leadership, Relativity developed the largest robotic metal 3D printer in the world and tested its entirely 3D printed Aeon rocket engine over 190 times, on track to launching Relativity's Terran 1, the world's first 3D printed launch vehicle. Terran 1 has won launch contracts to support the Telesat LEO program, Spaceflight Industries, and Mu Space.

Tim played a leading role in closing hundreds of millions of dollars in partnership with the U.S. Government, including securing the first-ever US Air Force launch site award to a venture-backed company at Cape Canaveral, and exclusive 20-year agreements for multiple test sites and a 220,000-square-foot factory at NASA Stennis Space Center.

Prior to Relativity, Tim was responsible for bringing metal 3D printing in-house at Blue Origin and served as a Propulsion Development Engineer on Crew Capsule RCS thrusters, BE-4, and New Glenn. He holds an MS and a BS in Aerospace Engineering from USC, where he played a leadership role in launching the first student-designed and built rocket into space together with Relativity cofounder and CTO Jordan Noone.

Tim has testified to the U.S. Senate on commercial space policy and is the youngest member on the National Space Council Users Advisory Group by nearly two decades, directly advising the United States White House on all space policy. He also serves on the World Economic Forum as a Technology Pioneer, and has been honored as an MIT 35 Innovators Under 35 and "30 Under 30" from Business Insider, Forbes, and Inc. Magazine. Relativity is backed by Playground Global, Social Capital, Y Combinator, Mark Cuban, USC, and Stanford.

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Ms. Marillyn A. Hewson

Chairman, President, and CEO of Lockheed Martin Corporation

Marillyn A. Hewson is Chairman, President and Chief Executive Officer of Lockheed Martin Corporation. She previously held several increasingly responsible executive positions with the Corporation, including President and Chief Operating Officer and Executive Vice President of Lockheed Martin's Electronic Systems business area.

Ms. Hewson joined Lockheed Martin more than 35 years ago as an industrial engineer. During her career she has held several operational leadership positions, including President of Lockheed Martin Systems Integration; Executive Vice President of Global Sustainment for Lockheed Martin Aeronautics; and President and General Manager of Kelly Aviation Center, L.P. She has served in key corporate executive roles, including Senior Vice President of Corporate Shared Services; Vice President of Global Supply Chain Management; and Vice President of Corporate Internal Audit.

Ms. Hewson currently serves on the Board of Directors of Johnson & Johnson, the Congressional Medal of Honor Foundation, the Board of Governors of the USO, and as Chair of the Catalyst Board of Directors. She previously served on the boards of DuPont, DowDuPont and Carpenter Technology. She is a member of The University of Alabama's President's Cabinet and the Board of Visitors of the Culverhouse College of Business. Ms. Hewson has served on several U.S. government advisory bodies, including current appointments to the American Workforce Policy Advisory Board and the National Space Council's Users Advisory Group.

Ms. Hewson is former chairman and current Executive Committee member of the Aerospace Industries Association, a member of the Board of Directors of the Business Roundtable, a Director of the Atlantic Council's International Advisory Board, a Fellow of the Royal Aeronautical Society and an Associate Fellow of the American Institute of Aeronautics and Astronautics. Ms. Hewson also serves on the Board of Trustees of the King Abdullah University of Science and Technology in the Kingdom of Saudi Arabia, and the Khalifa University for Science and Technology in the United Arab Emirates.

In 2019, TIME magazine identified Ms. Hewson as one of the "100 Most Influential People in the World," and FORTUNE magazine ranked her No. 1 on its list of "50 Most Powerful Women in Business" for the second year in a row. In 2018, she was named the "CEO of the Year" by Chief Executive Magazine, a Top 10 "Businessperson of the Year" by FORTUNE magazine, and one of the "World's 100 Most Powerful Women" by Forbes.

Born in Junction City, Kansas, Ms. Hewson earned her Bachelor of Science degree in business administration and her Master of Arts degree in economics from The University of Alabama and has completed executive development programs at Columbia Business School and Harvard Business School.

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Mr. Homer Hickam, Jr.

Mr. Hickam graduated from Big Creek High School in 1960 and from the Virginia Polytechnic Institute (Virginia Tech) in 1964 with a BS degree in Industrial Engineering. A U.S. Army veteran, Mr. Hickam served as a First Lieutenant in the Fourth Infantry Division in Vietnam in 1967-1968 where he won the Army Commendation and Bronze Star medals. He served six years on active duty, leaving the service with the rank of Captain.

Hickam has been a writer since 1969 after his return from Vietnam. His latest work, published in October, 2015, is the critically acclaimed novel *Carrying Albert Home: The Somewhat True Story of a Man, his Wife, and her Alligator*. Mr. Hickam was also employed as an engineer for the U.S. Army Missile Command from 1971 to 1981 assigned to Huntsville, Alabama, and Germany. He began employment with the National Aeronautics and Space Administration at Marshall Space Flight Center in 1981 as an aerospace engineer. During his NASA career, Mr. Hickam worked in spacecraft design and crew training. His specialties at NASA included training astronauts on science payloads, and extravehicular activities (EVA). He also trained astronaut crews for many Spacelab and Space Shuttle missions, including the Hubble Space Telescope deployment mission, the first two Hubble repair missions, Spacelab-J (the first Japanese astronauts), and the Solar Max repair mission. Mr. Hickam is currently the board chair of the U. S. Space & Rocket Center (Space Camp) in Huntsville, Alabama.

Prior to his retirement in 1998, Mr. Hickam was the Payload Training Manager for the International Space Station Program. In 1984, Mr. Hickam was presented with Alabama's Distinguished Service Award for heroism shown during a rescue effort of the crew and passengers of a sunken paddleboat in the Tennessee River. Because of this award, Mr. Hickam was honored in 1996 by the United States Olympic Committee to carry the Olympic Torch through Huntsville, Alabama, on its way to Atlanta. Mr. Hickam is married to Linda Terry Hickam, an artist and his first editor and assistant.

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The Honorable Kay Ivey

Governor of Alabama

Governor Ivey is the 54th and current Governor of Alabama. She was sworn into office on April 10, 2017, following the resignation of Gov. Robert J. Bentley (R). She previously served as lieutenant governor from January 2011 to April 2017. She was elected to the position in 2010 and re-elected in 2014. Ivey was the first Republican in the state's history to serve two consecutive terms in the lieutenant governor's

office.

Initially a candidate for governor in 2010, Ivey switched to the lieutenant governor's race on March 31, 2010. She went on to defeat incumbent Jim Folsom, Jr. (D) by a slim margin in the general election on November 2, 2010. The victory made Ivey the first Republican woman to be elected lieutenant governor in the state's history. Ivey was first elected to statewide office in 2002, defeating Democratic opponent Stephen Foster Black in the general election to win election as state treasurer of Alabama.

She served two terms in this office before becoming lieutenant governor in 2011. Prior to entering public service, Ivey was director of government affairs for the Alabama Commission on Higher Education from 1985 to 1998, assistant director of the Alabama Development Office from 1982 to 1985 and a reading clerk for the Alabama House of Representatives from 1980 to 1982. Ivey was also assistant vice president of Merchants National Bank/Regions Bank from 1970 to 1979. Ivey was raised in Camden, Alabama. She attended Auburn University, Duke University's Governor's Center for Public Policy, Alabama Banking School and the University of Colorado School of Banking. Her professional experience includes working as a high school teacher, a bank officer, and as assistant director of the Alabama Development Office.

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Mr. Fred Klipsch

Chairman and CEO, Klipsch Audio Technologies, Retired

Mr. Klipsch has spent his life building successes in the business world and is now working to increase success in the classroom. He was educated in the public school system from grade school through graduate school. Mr. Klipsch earned a bachelor's degree from Purdue University in 1964 and a MBA degree from California State University at Long Beach in 1968. In 2007, Mr. Klipsch was awarded an honorary

PhD in Technology from Purdue University. He also served as an officer in the United States Air Force from 1964 to 1968.

Since 1979, Mr. Klipsch has acquired multiple healthcare operations and development companies including hospitals, medical buildings, retirement centers, nursing homes and assisted living facilities. From 1989 to 1996 Mr. Klipsch was Chairman and majority owner of national Guest Homes (NGH), a developer and operator of assisted living centers across the southern part of the U.S.A. In 1996 the company was sold to Marriott International (NASDAQ: MAR).

From 1989 to 2002, Mr. Klipsch was Chairman and majority owner of Hospital Affiliates Development Corporation (HADC), a medical properties development company active in the United States and Europe. In 2002, HADC was contributed to Windrose Medical Properties Trust (NYSE: WRS) as a wholly owned subsidiary. Mr. Klipsch served as Chairman and CEO of WRS from its formation and IPO in 2002 until merging with Healthcare REIT (NYSE: HCN) in 2006. During that 4-year cycle WRS acquired, developed, or had under contract approximately \$1billion in assets.

Also in 1989, Mr. Klipsch and his wife Judy purchased Klipsch Group Inc., a small premium boutique domestic loudspeaker company owned by his second cousin, Paul Klipsch, located in Hope, Arkansas. Over the next 22 years Mr. Klipsch, as Chairman and CEO, and majority owner, expanded its product offerings to include only high performance products for listening to music and movies, eventually becoming the number one high performance line sold in the United States and a leader in the global market. In 2005, Klipsch Group, Inc., expanded globally, opening offices in Paris and Shanghai. Klipsch Group was sold to VOXX International (NYSE: VOXX) in 2011. Since the sale of Klipsch Group, Mr. Klipsch has focused his business activities through Klipsch Strategic Partners, LLC.

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General Lester Lyles, USAF, Retired

Chairman, NASA Advisory Council

Retired from the United States Air Force after a distinguished 35 year career, most recently as Commander, Air Force Materiel Command, Wright-Patterson Air Force Base, Ohio. Prior to that he served as Air Force Vice Chief of Staff and Chief Technology Officer, and Director of the Ballistic Missile Defense Organization at the Department of Defense.

He is a senior executive with over 26 years experience running large, high-technology organizations involved in aeronautical and astronautical research, development, acquisition and logistics. Gen. Lyles is a director of General Dynamics Corp., Board of Battelle, and KBR Corp., previously serving as Chair of the board of United Services Automobile Association and on the board of directors for Precision Castparts Corp. He is Chairman of the NASA Advisory Council, a member of the Air Force Scientific Advisory Board, and was elected to the National Academy of Engineers in 2011. Gen. Lyles also previously Chaired the Aeronautics and Space Engineering Board of the National Academy of Engineering.

Lyles also served as a member of the President's Intelligence Advisory Board in the White House, the Defense Science Board, and the International Security Advisory Board (ISAB) in the State Department. His awards include the Defense Distinguished Service Medal, Distinguished Service Medal, Defense Superior Service Medal and Legion of Merit. Lyles received a bachelor's degree in mechanical engineering from Howard University. He received a master's degree in mechanical/nuclear engineering, as well as honorary doctors of laws, from New Mexico State University and Urbana University.

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Colonel Pamela Melroy, USAF, Retired
Former NASA Astronaut

Pam Melroy is an aerospace executive with government and industry experience across civil, commercial, and national security space. She is a retired Air Force test pilot and former NASA astronaut and Space Shuttle commander.

Colonel Melroy received a Bachelor's degree in Physics and Astronomy from Wellesley College and a Master of Science degree in Earth and Planetary Sciences from Massachusetts Institute of Technology. She flew the KC-10 for six years at Barksdale Air Force Base as an Air Force co-pilot, aircraft commander and instructor pilot. Colonel Melroy is a veteran of Operation Just Cause and Operation Desert Shield/Desert Storm, with more than 200 combat and combat support hours. After attending the Air Force Test Pilot School at Edwards Air Force Base, California, Colonel Melroy was assigned to the C-17 Combined Test Force, where she served as a test pilot until her selection for the Astronaut Program. She has logged more than 6,000 hours flight time in more than 50 different aircraft.

Colonel Melroy was selected as an astronaut candidate by NASA in March 1995. She flew three missions in space: as Space Shuttle pilot during STS-92 in 2000 and STS-112 in 2002, and as Space Shuttle Commander during STS-120 in 2007. All three missions were assembly missions to build the International Space Station. She is one of only two women to command the Space Shuttle. She has logged more than 38 days in space.

Colonel Melroy retired from the Air Force in 2007, and left NASA in August 2009. After NASA, she served as Deputy Program manager for the Lockheed Martin Orion Space Exploration Initiatives program and as Director of Field Operations and acting Deputy Associate Administrator for Commercial Space Transportation at the Federal Aviation Administration. She went on to serve as Deputy Director, Tactical Technology Office at the Defense Advanced Research Projects Agency (DARPA) where she executed a large air and space technology development portfolio. Colonel Melroy is now an independent consultant.

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Mr. Fatih Ozmen

CEO and Owner, Sierra Nevada Corporation (SNC)

Ozmen is CEO of Sierra Nevada Corporation (SNC), the global aerospace and national security leader based in Sparks, Nevada. SNC is solely owned by Fatih and his wife, Eren Ozmen, who is SNC's Chairwoman and President. Living a true American Dream story, the Ozmens came to the US separately as graduate students. They connected in Reno and after several years at SNC, where Fatih began his career as an intern and Eren served as controller, they acquired company and have since grown it into the top female-owned defense contractor in the U.S. Best known publicly for SNC's Dream Chaser® spacecraft, which will service the International Space Station under contract with NASA in 2021, SNC has become a trusted partner to civil, commercial, and national security customers worldwide. Fatih's commitment to advancing American leadership in technological innovation, along with his pay-it-forward spirit, inspire future generations and the consistent growth of American jobs.

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Dr. Eric Schmidt

Technical Advisor, Alphabet Inc.

Eric Schmidt is Technical Advisor to Alphabet Inc., holding company of Google Inc, where he advises its leaders on technology, business and policy issues.

Eric was Executive Chairman of Alphabet from 2015-2018, and of Google from 2011-2015.

From 2001-2011, Eric served as Google's Chief Executive Officer, overseeing the company's technical and business strategy alongside founders Sergey Brin and Larry Page. Under his leadership, Google dramatically scaled its infrastructure and diversified its product offerings while maintaining a strong culture of innovation, growing from a Silicon Valley startup to a global leader in technology.

Prior to joining Google, Eric was the chairman and CEO of Novell and chief technology officer at Sun Microsystems, Inc. Previously, he served on the research staff at Xerox Palo Alto Research Center (PARC), Bell Laboratories and Zilog. He holds a bachelor's degree in electrical engineering from Princeton University as well as a master's degree and Ph.D. in computer science from the University of California, Berkeley.

Eric was elected to the National Academy of Engineering in 2006 and inducted into the American Academy of Arts and Sciences as a fellow in 2007. Since 2008, he has been a trustee of the Institute for Advanced Study in Princeton, New Jersey. Since 2012, Eric has been on the board of the Broad Institute and the Mayo Clinic. Eric was a member of the President's Council of Advisors on Science 2009-2017. In 2013, Eric and Jared Cohen co-authored The New York Times bestselling book, The New Digital Age: Transforming Nations, Businesses, and Our Lives. In September 2014, Eric published his second New York Times bestseller, How Google Works, which he and Jonathan Rosenberg co-authored with Alan Eagle. In April 2019, Eric published his third New York Times bestseller, Trillion Dollar Coach: The Leadership Playbook of Silicon Valley's Bill Campbell, which he co-authored with Jonathan Rosenberg and Alan Eagle.

Eric became the Chairman of the Department of Defense's Innovation Board in 2016 and was awarded the Department of Defense Medal for Distinguished Public Service in January of 2017 by Secretary of Defense Ashton Carter. He is Chairman of the US National Security Commission for Artificial Intelligence. He is a member of NASA's National Space Council User Advisory Group which is chaired by the Vice President. Eric is an MIT Visiting Innovation Fellow, member of the Advisory Board for MIT IQ, member of the MIT Commission on the Work of the Future, member of the MIT CEO Advisory Board, and member of the MIT Schwarzman College of Computing Advisory Council. Eric is founder of Schmidt Futures which helps exceptional people do more for others by applying science and technology thoughtfully and working together across fields.

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The Honorable Harrison H. Schmitt

Former NASA Astronaut

Former United States Senator, New Mexico

Harrison Hagan Schmitt was born in New Mexico and grew up in the American West. He earned a Bachelors of Science from Caltech and a PhD in geology from Harvard, based on work in Norway as a Fulbright Scholar and a National Science Foundation Post-Doctorate Fellow. Schmitt is privileged to have received numerous honorary degrees from

United States and Canadian universities.

Schmitt joined the United States Geological Survey's Astrogeology Branch in Flagstaff, Arizona, in 1964, leading the development of early lunar field geological methods under contract to NASA. Selected by NASA as a Scientist-Astronaut in 1965, he earned Air Force T-38 jet pilot wings in 1966 and Navy H-13 helicopter wings in 1967.

After supporting the operational preparations and geological training for Apollo missions to the Moon, including being the Backup Lunar Module Pilot for Apollo 15, Schmitt flew in space as Apollo 17's Lunar Module Pilot. He landed in the Moon's Valley of Taurus-Littrow on December 11, 1972. He is the only scientist and last of 12 men to step on the Moon, Schmitt collected, documented and returned 240 pounds of lunar samples. The extensive field context he provided for those lunar samples is unique among the Apollo missions. He continues to integrate the results of 50 years of ongoing lunar research by his colleagues with his field observations.

Elected to the United States Senate from New Mexico in 1976, Schmitt worked on a wide variety of national legislation and New Mexico constituent services. He served on the Commerce, Appropriations, Banking, Small Business, and Intelligence Committees and chaired the Commerce Subcommittee on Space and Technology and the Appropriations Subcommittee on Health and Human Services.

Senator Schmitt later served on President Reagan's Foreign Intelligence Advisory Board, the Army Science Board, and President H. W. Bush's Ethics Commission. From 2005 to 2008, he chaired the NASA Advisory Council. Schmitt was a Director of Orbital Sciences Corporation and Orbital ATK for 35 years, serving until 2018 when Northrop Grumman acquired the company. He also has been a director of several corporations in the banking, technology, mining, and medical fields.

As an Adjunct Professor at the University of Wisconsin-Madison, Dr. Schmitt taught "Resources from Space" and remains an Associate Fellow in the university's Department of Engineering, working with faculty members on the commercialization of fusion power. Schmitt is currently a member of the User Advisory Group of the National Space Council and of the Science Advisory Board to the Blue Moon project of Blue Origin. He has authored "Return to the Moon; Exploration, Enterprise and Energy in the Human Exploration of Space" and has published numerous scientific and public policy papers. Most recently, Schmitt and his co-authors published "Revisiting the field geology of Taurus-Littrow" in *Icarus* (2017). Schmitt's account of the Apollo 17 Mission to the Moon is currently being published online as "Apollo 17: Diary of the 12th Man."

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Ms. Gwynne Shotwell

President and COO, Space Exploration Technologies Corp. (SpaceX)

As President and COO of SpaceX, Gwynne Shotwell is responsible for day-to-day operations and managing all customer and strategic relations to support company growth. She joined SpaceX in 2002 as Vice President of Business Development and built the Falcon vehicle family manifest to more than 100 launches, representing more than \$10 billion in business. Shotwell is a member of the SpaceX Board of

Directors.

Prior to joining SpaceX, Shotwell spent more than 10 years at the Aerospace Corporation, holding positions in Space Systems Engineering, Technology and Project Management. She was promoted to the role of Chief Engineer of an MLV-class satellite program, managed a landmark study for the Federal Aviation Administration on commercial space transportation, and completed an extensive analysis of space policy for NASA's future investment in space transportation.

In addition to being named the 2018 Satellite Executive of the Year, Shotwell was awarded the AIAA Goddard Astronautics Awards as well as the American Society of Mechanical Engineers Ralph Coats Roe Medal. Fortune Magazine placed Shotwell at #42 on their list of the World's 50 Greatest Leaders in 2018 and Forbes named her #70 on their list of Power Women in 2017. In 2014, Shotwell was appointed to the United States Export Import Bank's Advisory Committee and the Federal Aviation Administration's Management Advisory Council. Shotwell was elected to the honorable grade of Fellow with the American Institute of Aeronautics and Astronautics.

Through leadership in both corporate and external science, technology, engineering and math (STEM) programs, Shotwell has helped raise over \$1.8 million for STEM programs reaching thousands of students nationwide.

Shotwell received, with honors, her bachelor's and master's degrees from Northwestern University in Mechanical Engineering and Applied Mathematics, and serves on their Board. She has authored dozens of papers on a variety of space related subjects.

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Dr. Robert H. Smith

CEO, Blue Origin

Bob Smith is the Chief Executive Officer of Blue Origin, where he manages a team that is building reusable launch vehicles, modern powerful rocket engines and all the capabilities that will enable millions of people to live and work in space.

Bob came to Blue Origin from Honeywell Aerospace. At Honeywell, he was the Vice President of Advanced Technology, the Chief Technology Officer and Vice President of Engineering & Technology and, finally, the President of the Mechanical Systems & Components business. In those roles, his responsibilities spanned basic research, major system developments, production and business operations.

Bob also served as Executive Director of the Space Shuttle Upgrades Development Program for United Space Alliance where he managed a variety of projects that ranged from very large efforts, such as major modifications that replaced the Orbiter's auxiliary power and data handling systems, to smaller efforts, such as the development of new Shuttle tiles and landing systems. Bob also worked at The Aerospace Corporation where he served as a guidance, navigation & control analyst and a program manager for a number of Department of Defense and national security programs. Bob eventually became the leader for Aerospace's NASA business and the site manager for Aerospace's Houston operations.

Bob holds a Bachelor of Science degree in aerospace engineering from Texas A&M, a Master of Science degree in engineering/applied mathematics from Brown University, a doctorate from the University of Texas in aerospace engineering and a business degree from MIT's Sloan School of Management.

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Mr. Eric W. Stallmer

President, Commercial Spaceflight Federation

President of the Commercial Spaceflight Federation. The CSF is the largest trade organization representing over 75 organizations, dedicated to promoting the development of commercial spaceflight, pursue everhigher levels of safety, and share best practices and expertise throughout the industry.

As CSF President, Stallmer develops the strategy, plans and communications for the organization and works closely with CSF member companies to advocate for the commercial space industry. Prior to joining CSF, Stallmer served as the Vice President of Government Relations at Analytical Graphics Inc. (AGI). Stallmer came to AGI from The Space Transportation Association (STA), a nonprofit, industry trade organization providing government representation to companies with a vested interest in the U.S space launch industry. Prior to that, Stallmer worked on Capitol Hill in the office of then Congressman Tom Coburn.

For over two decades, Stallmer has served as an Officer in the United States Army and Army Reserves. He was awarded the Bronze Star Medal for meritorious service while engaged in combat operations during Operation Iraqi Freedom. He is currently assigned to the Pentagon in the office of the Deputy Chief of Staff Army for Logistics, G-4. Stallmer earned a Masters of Arts Degree in Public Administration from George Mason University and a Bachelor of Arts Degree in Political Science and History from Mount Saint Mary College. He and his wife Amy live in McLean, Virginia with their three children, Charlie, Billy and Catherine.

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Mr. David W. Thompson

Co-Founder and President/CEO, Orbital ATK (Retired)

Mr. Thompson is the Hunsaker Visiting Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology for the 2019-2020 year. He was President and Chief Executive Officer of Orbital ATK, a world leader in aerospace and defense technologies, from its founding in 1982 until its sale to Northrop Grumman in 2018. With annual revenues in excess of \$5.5 billion and a workforce of more than 14,000 people, the company designed, built and operated space, defense and aviation-related systems for customers around the globe. Under his leadership, Orbital ATK carried out more than 1,000 rocket launches and satellite missions over a 36-year period. During that time, the company grew from a start-up to a Fortune 500-class, NYSE-listed public company with an enterprise value in excess of \$9 billion.

Mr. Thompson co-founded one of Orbital ATK's main predecessors, Orbital Sciences Corporation, in 1982 and served as the company's Chairman, President and Chief Executive Officer. Before co-founding Orbital, Mr. Thompson was assistant to the president of Hughes Aircraft Company's Missile Systems Group and was a project manager and engineer at NASA's Marshall Space Flight Center. As a college student, he worked on the first Mars landing missions at Caltech's Jet Propulsion Laboratory and on Space Shuttle projects at NASA's Langley Research Center and Johnson Space Center. He received a B.S. in Aeronautics and Astronautics from Massachusetts Institute of Technology, a M.S. in Aeronautics from California Institute of Technology (Caltech), and a MBA from Harvard Business School. He serves as a member of the Boards of Trustees of Caltech, the Aerospace Corporation, the Carnegie Institution for Science, and the Hertz Foundation as well as the Princeton University Astronomy Advisory Council.

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Ms. Pamela Vaughan

STEM Integration Specialist for the Arkansas Department of Education

Pam Vaughan serves as STEM Integration Specialist for the Arkansas Department of Education. Her passion and enthusiasm for space education has been reflected in her classrooms and in the districts where she was employed throughout her career. From leading her district with a student competition for the opportunity to test an experiment on the International Space Station in 2017 to a student experiment flown on the space shuttle in 1984, her love for STEM education and the space program has been shared with students, community, state and the nation. In 2002, Pam was recognized as the National Space Club Space Educator of the Year and as a Cornell CONTOUR Comet Challenge National Student-Teacher Team Winner. In 2003, the Arkansas Education Association recognized her as the Human Relations Award Winner based on her efforts in promoting STEM education in underserved areas. Her students' successes earned acknowledgement through a Disney Teacher Award in 2004 and selection as a member of the USA Today All-Star Teaching Team in 2005, the only Arkansas educator recognized by both of these groups.

Vaughan and her students have received recognition for a variety of NASA educational programs. Through the Japan Fulbright Memorial Fund Teacher Program, she spread her enthusiasm for space education with students in Japan by sharing her students' work as Phoenix Mars Lander Student Interns. As an active member of the National Science Teachers Association, she served on their Aerospace Advisory Board and the national awards committee. Pam was a contributing author *Today I Made a Difference*, a Collection of Inspirational Stories from America's Top Educators with a forward by Art Linkletter. In 2019, Vaughan was honored as a Henderson State University Distinguished Alumni. Pam and her husband, Gary, reside in Heber Springs, Arkansas.

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Ms. Mandy F. Vaughn

President, VOX Space

Mandy Vaughn 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.

Prior to joining Virgin Orbit, Mandy was with General Dynamics Mission Systems' Space and Intelligence Systems Directorate, where she was responsible for the space control and space protection investment portfolios and analog-to-digital transitions for a variety of SIGINT payload families. She successfully initiated development programs for the next-generation space-based GPS receiver and managed the internal investment of GPS payload development efforts.

Prior to joining General Dynamics, she was a developmental engineer and program manager in the Air Force and a Director with Kinsey Technical Services. She primarily supported programs in the Space Superiority Systems Directorate (SMC/SY) at Los Angeles AFB, CA and earlier the ICBM system program office at Hill AFB, UT. In the Space Superiority mission area, she was the ground segment lead and chief engineer on the Space-Based Space Surveillance program, and then supported a variety of space and ground-based programs for the Directorate. In that role, she supported a multiple Space Situational Awareness and command and control programs supporting integration of requirements and demonstrations between the DoD and the intelligence community. She supported the NRO AS&T and DIA Directorate of Science and Technology in a variety of collection campaigns that spanned various collection system phenomena to demonstrate new systems and operational concepts for critical space operations.

Mandy has a BS in Mechanical Engineering and an MS in Aeronautics and Astronautics, both from MIT.

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Ms. Kathy Warden

Chairman, CEO, and President, Northrop Grumman Corporation

Kathy Warden is chairman, chief executive officer and president of Northrop Grumman Corporation. She was elected chairman of the Northrop Grumman Board of Directors on August 1, 2019, and has served as CEO and president since January 1, 2019. She was elected to the company's board of directors in 2018.

Prior to becoming CEO and president, Warden served as president and chief operating officer, responsible for the operational management of the company's four sectors as well as its enterprise services organization. Her role encompassed all aspects of the company's operations, including leading engagement with the senior customer community and partners around the globe. She also led the integration of Northrop Grumman's Innovation Systems sector.

Previously, she served as corporate vice president and president of Northrop Grumman's Mission Systems and Information Systems sectors.

Warden has extensive experience in operational leadership and business development in government and commercial markets. Prior to joining Northrop Grumman in 2008, Warden held leadership roles at General Dynamics and the Veridian Corporation, she was a principal in a venture internet firm, and she spent nearly a decade with the General Electric Company working in commercial industries.

Warden earned a bachelor's degree from James Madison University and a master's degree in business administration from George Washington University. Currently, she serves as the chair of the Board of Directors of the Federal Reserve Bank of Richmond and is a member of the Catalyst Board of Directors and the James Madison University Board of Visitors.

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Mr. Stuart O. Witt

Founder and Owner, S.O. Witt & Associates, LLC

Former General Manager and CEO, Mojave Air and Space Port.

As General Manager, East Kern Airport District (California), Stuart Witt was the force behind the Mojave Desert's primacy in the space business, as home to XCOR Aerospace, Scaled Composites, Rotary Rocket, Orbital Sciences L1011 Stargazer, Masten Space, Air Launch and Protoflight, Lunar Tech, Rocket Propulsion, and other space-related start-ups. Witt has been directing the expansion efforts of the Mojave Air and Space Port since 2002, dealing with everything from road and water system upgrades to runway, taxiway, lighting, communication, security and ground and air route flow with FAA regulators, commercial builders and state and county planners.

Born in Bakersfield, CA, and raised at Scodie Ranch in the central Sierra Nevada Mountains, Witt is a long-time aviator. He obtained his private pilot's license in 1971, graduated from Cal State Northridge in 1974, from the Naval Aviation Schools Command in 1976 and from the Naval Fighter Weapons School (TOPGUN training) in 1980; he is also a 1996 graduate of the University of Maryland's Center for Creative Leadership. His military career took him to sea as an F-14 Tomcat pilot on based on U.S.S. John F. Kennedy and as an FA-18A project pilot at the Naval Air Warfare Center in China Lake, CA. After the Navy, Witt joined what was then Westinghouse Electric Corporation (now NGC) for nearly nine years as an engineering test pilot on the B-1B, F-16C and F-23. In 1993 he joined Computer Technology Associates, where he managed a \$100-million-range contract and was later promoted to EVP.

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Dr. David Wolf

Former NASA Astronaut

Professor of Aerospace Engineering, Purdue University

28-year NASA veteran and astronaut, has spent 168 days in space and conducted seven spacewalks over four separate missions including Space Shuttles Columbia, Atlantis, Discovery, and Endeavor as well as the International Space Station, Russian Space Station MIR, and Spacelab. Prior to being selected as an astronaut, he led teams producing medical research instrumentation for spaceflight, including novel state of the art technology for three-dimensional tissue engineering. Wolf's initial work at NASA stemmed directly from his research while at Purdue in medical ultrasonics. A medical doctor, electrical engineer, and inventor, Wolf has been awarded 17 U.S. patents, received the NASA Exceptional Engineering Achievement Medal, and was named the NASA Inventor of the Year.