Dupont Summit 2014

::::::::: *Science, Technology, and Environmental Policy Issues*

December 5, 2014 ❖Historic Whittemore House, Washington, DC

The Policy Studies Organization

Panel
"Vision for Space Utilization: Exploration and Why It Is Important"

In 1969 American astronaut Neil Armstrong became the first human to step upon the moon's surface. This event instantly gave the United States recognition as the world leader in science and engineering innovation. Ever since, the U.S. space program has stood as the crowned jewel of U.S. excellence in these fields.

However, the U.S. space program does not rest on its history. It is still a major contributor to innovation and exceptionalism and sets the standard by which other nations are measured. It is nearly impossible to look around our society today without seeing some innovation or daily ritual that is not directly or indirectly impacted by the advances made through our space programs. Design innovations that were used in developing NASA's space suits have been commercialized to improve shoe insteps used in all walks of life, from athletic shoes, to work boots, to dress shoes, which are lighter in weight and absorb more shock, reducing fatigue on the legs throughout the day. NASA software engineers created the NASA Structural Analysis Program (NASTRAN) as an analytical tool for the space program. NASTRAN is widely used in private industry to improve structural components across sectors, refining designs while reducing costs. Scratch-resistant lenses, satellite-enabled communications, and cordless tools are all everyday items that were once cutting edge NASA research innovations. Temper foam designed to increase comfort and absorb force in launch vehicle seating is now used in pillows and mattresses to provide a more comfortable night of sleep. From the time we step out of bed in the morning until we lay our heads on the pillow at night, our space program is providing us with innovations that touch our lives.

These innovations have a much longer reach. NASA research has certainly met the goal of advancing science and technology innovation. These innovations become the building blocks of a strong U.S. economy, providing growth, security and resiliency. The success that U.S. space missions have achieved, and the recognition that these innovations have gained, have made the United States the highest sought global partner for other nations seeking to advance their own space aspirations. This plays a significant role in the United States' soft diplomacy efforts to increase U.S. influence in global affairs and in strengthening our alliances.

This panel will examine the significance that the U.S. space program holds in our national fabric, from meeting policy goals to improving the human experience. Aspects explored will include the value exploration provides in advancing science & technology, strengthening the nation's economy, improving international collaboration, and supporting national security.

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Value of Space Exploration in Advancing Science and Technology

The National Aeronautics and Space Act of 1958, which established NASA, requires that NASA provide the "widest practicable and appropriate dissemination of information concerning its activities and results." In its 1959 Long Range Plan, NASA stated, "Space science activities cover the frontiers of almost all the major areas of the physical sciences and these activities thus provide support of the physical sciences in specific applications in the field of electronics, materials, propulsion, etc., [and] will contribute, directly or indirectly, to all subsequent military weapons developments and to many unforeseen civilian applications." Today NASA has an active research and development program, at all levels of maturity, focusing on the development of the space technology needed for exploration beyond Low Earth Orbit. The breadth and depth of the investigations continues to push scientific discover and technology innovation in multiple areas, not only creating the spinoff technology of tomorrow but also inspiring and training the workforce that will take advantage of and transition new technologies for the benefit of society.

To date, NASA has documented over 1500 "spinoff" technology transition successes. These include technologies in fields such as health and medicine, communication, transportation, public safety, consumer goods and electronics, environmental and agricultural resources, computer technology, and industrial productivity. NASA's Small Business Innovation Research/Small Business Technology Transfer program helps business leverage NASA research to develop new products and services. Regional NASA technology transfer centers and commercialization incubators provide additional access to NASA research and expertise and helps universities and small businesses explore new uses to NASA research and innovations.

Value of Space for Economic Growth and Security

The economic return on investment for space exploration has been greater than 3 to 1 for every dollar spent. And every dollar that is spent on our space program is spent here on earth, and most of that investment remains in the United States

Many of those 1500 spinoff successes have been for commercial uses that lift U.S. companies above global competitors. These spinoff products are typically in high tech, high-value products that help bolster the U.S. gross domestic product. This also means high paying research and manufacturing jobs that support local communities.

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Panel
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Though tightly regulated, U.S. aerospace exports, including products developed through the space program, are second only to agriculture in creating a positive trade balance. The aerospace industry is an important U.S. industrial sector. It is important economically as well as globally, extending the influence of the United States abroad. U.S. companies, large and small are a strong partner in creating technology and then identifying innovates ways to take that technology and apply it to solving other problems. Indeed, there have been significant spinoffs from the Aerospace industry- even towards creating whole new industrial sectors.

The success of U.S. agricultural sector is dependent on remote sensing technologies and other innovations that have been derived from the U.S. investment in space. Modern medical diagnostics and the miniaturization of electronics are all derivatives of technology initially developed for the purpose of space exploration.

Value of Space to Developing International Partnerships that Extend "Scientific Diplomacy"
The ISS is a model for space cooperation, currently counting 15 nations (including the United States) among the international partnership. The ISS and shared launch systems helped the United States bridge the diplomatic divide with Russia after the fall of the Soviet government. The ISS program facilitates the development of an integrated, global definition of science and technology policy. Space is an area where international cooperation remains constant and serves as a bridge for other diplomatic discussions. As a leader and major supporter of the ISS, the United States is in a position to supply a vision for space global exploration. In addition, the United States is able to set international policy in areas such as climate monitoring because of the desire of other nations to access U.S. expertise in space exploration and utilization.

Value of Space to Developing National Security
It is an understatement to say that the United States invests much more heavily in national security space than it does in civilian and commercial space endeavors. However, that does not reduce the value that our civilian investments provide, nor does it mean that civilian research does not benefit our national security. U.S. national security benefits beyond the diplomacy achieved through international cooperation in space exploration and operations. Research collaboration and shared facility maintenance & utilization are among the benefits that our civilian space programs provide to our national security mission. NASA-supported research on orbital debris and mitigation allows the United States to reposition space-based national security assets to reduce the likelihood of loss or curtailed capabilities of those assets, and to increase the resiliency of those assets in the event of a debris collision.

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Panel Biographies
"Vision for Space Utilization: Exploration and Why It Is Important"

MODERATOR:
James (Jim) F. Albaugh, Senior Advisor, The Blackstone Group; President, American Institute of Aeronautics and Astronautics; and President and Chief Executive Officer (Retired), Boeing Commercial Airplanes, The Boeing Company

Jim Albaugh is President of the American Institute of Aeronautics and Astronautics (AIAA), the world's largest aerospace professional society. Currently a Senior Advisor to the Blackstone Private Equity Group and The Blackstone Group L.P., Albaugh retired as the President and Chief Executive Officer of Boeing Commercial Airplanes in 2012. Albaugh was named to this position in September 2009. He also served as Executive Vice President of The Boeing Company. From 2002 to 2009, Albaugh served as President and CEO of Boeing Integrated Defense Systems, a $34 billion business, providing defense, space and intelligence products for the United States and customers around the world. From 1998 to 2002, Albaugh was president and CEO of Boeing Space and Communications, which merged with the company's Military Aircraft and Missiles Systems unit in July 2002 to create Integrated Defense Systems. Prior to that, he served as president of Rocketdyne Propulsion & Power, part of the Rockwell aerospace and defense businesses acquired by Boeing in 1996, having joined the company in 1975 as an engineer. Albaugh is an elected member of both the National Academy of Engineering and the International Academy of Astronautics. He is an Honorary Fellow of the American Institute of Aeronautics and Astronautics and a Fellow of the Royal Aeronautical Society. A native of the State of Washington, Albaugh holds a bachelor's degree in mathematics and physics from Willamette University and master's degree in civil engineering from Columbia University.

PANELISTS:
Michael J. Gazarik, Ph.D., Associate Administrator of the Space Technology Mission Directorate, National Aeronautics and Space Administration (NASA)

Dr. Michael Gazarik has over 20 years' experience in the design, development, and deployment of spaceflight systems. He currently serves as NASA's Space Technology Mission Directorate Associate Administrator at NASA Headquarters with direct management, budget and implementation authority of the portfolio of space technology programs. Focused on enabling effective implementation of the space technology programs, Gazarik served as the Deputy Chief Technologist since January. Prior to this appointment, Gazarik was the deputy director for programs in the Engineering Directorate at NASA's Langley Research Center in Hampton, Virginia. In this role, he balanced the directorate's engineering and fabrication capabilities across projects that ranged from conceptual design to spaceflight operations, focused the directorate's resources to deliver flight hardware for numerous flight programs, and led the formulation of a variety of programs in aeronautics, exploration and science.

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Panel Biographies (continued)
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Prior to joining NASA, Gazarik served in engineering management roles in the telecommunications industry at Aware Inc. and Texas Instruments Inc., and supported the civilian weather space program at the Massachusetts Institute of Technology's Lincoln Laboratory. Gazarik earned his B.S. in electrical engineering from the University of Pittsburgh in 1987. He earned an M.S. in 1989 and Ph.D. in 1997, both in electrical engineering, from the Georgia Institute of Technology. Gazarik has received numerous awards, including NASA's Outstanding Leadership Medal in 2007 and the Silver Snoopy Award, one of the agency's highest honors, in 2006. He has authored or co-authored more than 20 peer-reviewed publications.

John W. Elbon, Vice President and General Manager, Space Exploration Division, Boeing Defense, Space and Security, The Boeing Company

John Elbon is vice president and general manager, the Space Exploration Division, of Boeing Defense, Space & Security. He is responsible for the strategic direction of Boeing's civil space programs, and support of NASA programs such as the International Space Station, Commercial Crew Development program, and the Space Launch System. He assumed his present position in August 2011. Previously Elbon served as vice president and program manager for Boeing's Commercial Programs. In this position, he managed Boeing's efforts on NASA's Commercial Crew Space Act Agreements, including the first two phases of the Commercial Crew Development program, leveraging innovations and capabilities from across Boeing in the development of crew transportation systems to support NASA and commercial customers in accessing destinations in Low Earth Orbit. As vice president and program manager of ISS, Elbon led Boeing in its role as prime integrating contractor for NASA's ISS contract to design, develop, test, launch and operate this orbiting facility. The multibillion dollar contract required the coordination of several thousand Boeing employees in five major locations as well as subcontractors and suppliers located in 23 states across the United States. Prior to leading the ISS team, Elbon managed the CAPPS contract at Kennedy Space Center, Fla., responsible for final assembly and testing of elements of the ISS as well as other space shuttle payloads. Elbon holds a Bachelor of Aerospace Engineering degree from the Georgia Institute of Technology.

Robert D. Braun, David and Andrew Lewis Professor of Space Technology and Founding Director of the Center for Space Technology and Research at the Georgia Institute of Technology

Dr. Robert D. Braun serves as the David and Andrew Lewis Professor of Space Technology and Founding Director of the Center for Space Technology ad Research at the Georgia Institute of Technology. He has been a member of the Georgia Tech faculty since 2003 and leads an active research and educational program focused on the design of advanced flight systems and technologies for planetary exploration. He has previously served as a leader and senior manager for several engineering organizations at NASA. In 2010-2011, he served as the first NASA Chief Technologist in more than a decade.

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Panel Biographies (continued)
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In this capacity, he was the senior Agency executive for technology and innovation policy and programs and was responsible for creating the NASA Space Technology programs. From 1989 to 2003, he served on the technical staff of the NASA Langley Research Center. In 2012, Dr. Braun co-founded Terminal Velocity Aerospace, LLC, a small-business focused on developing a suite of re-entry devices to improve orbital debris hazard prediction and promote space utilization. Dr. Braun presently serves on Advisory Boards for the Jet Propulsion Laboratory, Skolkovo Institute of Science and Technology, the Florida Space Institute, Planet Labs Inc., and the Planetary Society. He received a B.S. in Aerospace Engineering from Penn State, M.S. in Astronautics from the George Washington University, and Ph.D. in Aeronautics and Astronautics from Stanford University. He is a member of the National Academy of Engineering, Vice Chair of the NRC Space Studies Board, an AIAA Fellow, and the Editor-in-Chief of the AIAA Journal of Spacecraft and Rockets. He is the author or co-author of over 275 technical publications in the fields of atmospheric flight dynamics, planetary exploration, multidisciplinary design optimization, and systems engineering. He lives on a small farm in Newnan, Georgia with his wife Karen and is the proud father of Zack, Allie and Jessica Braun.

Michael Lopez-Alegria, Principal, MLA Space, LLC

Michael Lopez-Alegria graduated from the U.S. Naval Academy with a bachelor's degree in systems engineering and earned a master's degree in aeronautical engineering from the Naval Postgraduate School. He is also a graduate of Harvard University's Kennedy School of Government Program for Senior Executives in National and International Security. Lopez-Alegria has over three decades of aviation and space experience with the U.S. Navy and NASA in a variety of roles including naval aviator, engineering test pilot and program manager, NASA astronaut and International Space Station commander. He is a four-time astronaut, having flown on Space Shuttle missions STS-73, STS-92, and STS-113, and serving as Commander of ISS Expedition 14 (flying to and from the ISS aboard Soyuz TMA-9). He holds three NASA records: longest spaceflight (215 days); most Extravehicular Activities (EVA) or "space walks" (10) and cumulative EVA time (67 hours 40 minutes). After leaving NASA, Lopez-Alegria served as President of the Commercial Spaceflight Federation, a Washington-based industry association of leading businesses and organizations working to make commercial human spaceflight a reality. Since leaving the CSF he has been an independent consultant and also serves on the Human Exploration and Operations Committee of the NASA Advisory Council and the FAA's Commercial Space Transportation Advisory Committee. Lopez-Alegria a member of the Board of Directors of the Association of Space Explorers, a Fellow of The Explorers Club, and a member of the Society of Experimental Test Pilots and the Association of Naval Aviation.