



The Future of Human Spaceflight

May 8, 2009

Center for Strategic and International Studies
1800 K Street, NW
Washington, D.C. 20006



MIT Space, Policy, and Society research group
GW Space Policy Institute



Welcome

At this moment of transition in the U.S. space program, it is time to re-examine the fundamental questions: Why fly people into space? What is the role of a government-funded, human spaceflight program?

A new conversation about these and related questions will help evaluate the current U.S. human spaceflight policy and ensure it is ideally aligned with national goals and priorities.

The MIT Space, Policy, and Society research group was founded in 2007 to study the social and policy issues impacting space activities. The cross-disciplinary group brings together engineers, historians, astronauts and policy analysts from MIT and beyond, and is composed of faculty, researchers and students from MIT's Program in Science, Technology and Society, the Department of Aeronautics and Astronautics, the Technology and Policy Program, and the Engineering Systems Division.

<http://web.mit.edu/mitsps>



Cover photo: Astronaut Stephen K. Robinson, mission specialist, anchored to a foot restraint on the extended International Space Station's Canadarm2 during STS-114 (*Discovery*, July 26 to August 9, 2005)

Agenda

May 8, 2009

8:00 A.M. Coffee

8:30 A.M. Welcome and Introduction

PROF. DAVID MINDELL, Director, MIT Program in Science, Technology, and Society

9:00 A.M. Panel 1: Objectives for human spaceflight

DR. DAN LESTER, University of Texas, Austin

DR. JEFFREY HOFFMAN, MIT Department of Aeronautics and Astronautics

MARK CRAIG, SAIC NASA Account Manager

PROF. ASIF SIDDIQI, Fordham University

10:15 A.M. Coffee break

10:30 A.M. Panel 2: Human spaceflight and national priorities

DR. SCOTT UEBELHART, MIT Space, Policy and Society research group

PROF. SCOTT PACE, Director, GW Space Policy Institute

WAYNE HALE, NASA Deputy Associate Administrator for Strategic Partnerships

JOHN TYLKO, Vice President for Business Development, Aurora Flight Sciences

11:45 A.M. Closing Remarks

DR. JOHN LOGSDON, Charles A. Lindbergh Chair, National Air and Space Museum

Panelist Biographies

Mark K. Craig

NASA retiree and SAIC NASA Account Manager

Mark K. Craig began his career as a co-op student on the Apollo program in Houston. He is a technical expert in spacecraft design and analysis. At NASA in Houston he worked on the Apollo-Soyuz, Space Shuttle, Space Station, Mars Rover Sample Return and Moon-Mars Exploration programs in positions ranging from engineer to program manager. At NASA Headquarters in Washington he was Director of Space Exploration and architect of the NASA Strategic Plan. He has been Deputy Director of NASA's Stennis Space Center and Associate Director of NASA's Johnson Space Center. Mr. Craig is an advisor on space exploration to museums and themed attractions here and abroad. After a 38 year career with NASA, he is currently NASA Account Manager at Science Applications International Corporation (SAIC).

Mr. Craig earned a B.S. in Astronautical Engineering from Purdue University in 1971, pursued engineering post-graduate study at Rice University, and completed MIT's Sloan Program for Senior Executives. He has authored over 35 papers on technical and strategic aspects of space exploration. He has received the NASA Distinguished Service Medal, the NASA Outstanding Leadership Medal, and the Federal Engineer of the Year Award. He is a Fellow of the American Astronautical Society and is a Distinguished Engineering Alumnus of Purdue. Mr. Craig was elected to the International Academy of Astronautics in 1992 and is the immediate past President of the American Astronautical Society.

Wayne Hale

Deputy Associate Administrator of Strategic Partnerships, NASA Space Operations Mission Directorate

Wayne Hale is the Deputy Associate Administrator of Strategic Partnerships, Space Operations Mission Directorate, where he is responsible for coordinating and building partnerships with other agencies, foreign space programs, academic and business entities in relation to space operations. Mr. Hale has previously served as the Space Shuttle Program Manager and the Shuttle Launch Integration Manager. He was a Flight Director for 41 Space Shuttle flights, and prior to that a Propulsion Officer for 10 early Space Shuttle flights.

Mr. Hale has received special honors and awards such as: NASA Outstanding Leadership Medals in 1999, 2005, and 2007; NASA Space Flight Awareness Leadership Award 2002; NASA Exceptional Service Medal 1992; National Space Club Goddard Memorial Astronautics Engineer of the Year 2007; and National Air and Space Smithsonian Achievement Award of the Year 2007.

Mr. Hale holds a Bachelor of Science in Mechanical Engineering from Rice University and a Master of Science in Mechanical Engineering from Purdue University.

Dr. Jeffrey A. Hoffman

MIT Department of Aeronautics and Astronautics

Dr. Jeffrey A. Hoffman is Professor of the Practice of Aerospace Engineering in the Department of Aeronautics and Astronautics at MIT. Dr. Hoffman received a B.A. (summa cum laude) from Amherst College in 1966 and a Ph.D. in astrophysics from Harvard University in 1971. He subsequently received a M.Sc. in Materials Science from Rice University in 1988. He spent one year as a post-doctoral fellow at the Smithsonian Astrophysical Observatory, after which he worked on the research staff of the Physics Department at Leicester University in the UK (1972-1975) and MIT's Center for Space Research (1975-1978).

He was a NASA astronaut from 1978-1997, making five space flights and becoming the first astronaut to log 1000 hours of flight time aboard the Space Shuttle. Dr. Hoffman was Payload Commander of STS-46, the first flight of the US-Italian Tethered Satellite System. He played a key role in coordinating the scientific and operational teams working on this project. Dr. Hoffman has performed four spacewalks, including the first unplanned, contingency spacewalk in NASA's history (STS 51D; April, 1985) and the initial repair/rescue mission for the Hubble Space Telescope (STS 61; December, 1993). He worked for several years as the Astronaut Office representative for EVA and helped develop and carry out tests of advanced high-pressure space suit designs and of new tools and procedures needed for the assembly of the International Space Station. For several years, he was the astronaut office's representative on the Payload Safety Panel.

Following his astronaut career, Dr. Hoffman spent four years as NASA's European Representative, based at the US Embassy in Paris, where his principal duties were to keep NASA and NASA's European partners informed about each other's activities, try to resolve problems in US-European space projects, search for new areas of US-European space cooperation, and represent NASA in European media. In August 2001, Dr. Hoffman joined the MIT faculty, where he teaches space operations and design, and space policy. Dr. Hoffman is director of the Massachusetts Space Grant Alliance, responsible for statewide space-related educational activities designed to increase public understanding of space and to attract students into aerospace careers. His principal areas of research are advanced EVA systems, management of space science projects, and space systems architecture.

Dr. Daniel F. Lester

Department of Astronomy, University of Texas at Austin

Daniel F. Lester is a Research Fellow at the University of Texas. His research specialty is infrared studies of star formation in galaxies. He is the author of more than eighty refereed papers in professional journals.

He led the Kuiper Airborne Observatory (KAO) Users Group for several years, providing science leadership for various facility upgrades. He works closely on the Stratospheric Observatory for Infrared Astronomy (SOFIA), providing science and management policy, and is representing the astronomical community on the Lunar Exploration Roadmap effort. Dr. Lester is Principal Investigator and team leader for the Single Aperture Far Infrared (SAFIR) vision mission study for NASA. SAFIR is seen as the next flagship infrared space astronomy mission after Spitzer.

He has been active in community strategic planning and policy development for space astronomy, and served on the Structure and Evolution of the Universe Subcommittee (SEUS) of the NASA Space Science Advisory Committee. He now serves on the congressionally chartered Astronomy and Astrophysics Advisory Committee (AAAC), which reviews and provides advisory oversight and coordination of both space and ground-based astronomical research at NASA, NSF and DOE, and is a study group chair for the Astro2010 Astronomy Decadal Survey.

He is active in K-12 science education and public outreach efforts.

Dr. John M. Logsdon

National Air and Space Museum, Smithsonian Institution

Beginning in September 2008, John M Logsdon is the holder of a one year fellowship at the National Air and Space Museum, Smithsonian Institution, Washington, DC as Charles A. Lindbergh Chair in Aerospace History. From 1987-2008, Logsdon was Director of the Space Policy Institute at George Washington University's Elliott School of International Affairs. He remains a Professor Emeritus of Political Science and International Affairs at the university; he joined the faculty in 1970. He holds a B.S. in Physics from Xavier University (1960) and a Ph.D. in Political Science from New York University (1970). Dr. Logsdon's research interests focus on the policy and historical aspects of U.S. and international space activities.

Dr. Logsdon is the author of *The Decision to Go to the Moon: Project Apollo and the National Interest* and is general editor of the eight-volume series *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program*. He has written numerous articles and reports on space policy and history. He is frequently consulted by the electronic and print media for his views on space issues.

Dr. Logsdon is a member of the NASA Advisory Council. In 2003, he served as a member of the Columbia Accident Investigation Board. He is a recipient of the NASA Distinguished Public Service and Public Service Medals, the 2005 John F. Kennedy Award from the American Astronautical Society, and the 2006 Barry Goldwater Space Educator Award of the American Institute of Aeronautics and Astronautics. He is a Fellow of the American Institute of Aeronautics and Astronautics and the American Association for the Advancement of Science. He is a member of the International Academy of Astronautics.

Prof. David A. Mindell

Director of the MIT Program in Science, Technology, and Society

David A. Mindell directs the Space, Policy, and Society Research Group at MIT. He is the Dibner Professor of the History of Engineering and Manufacturing, Professor of Engineering Systems, and Director of the Program in Science, Technology, and Society at MIT. He has two decades of experience in technology development for deep ocean exploration. His most recent book is *Digital Apollo: Human and Machine in Spaceflight*. At MIT, Mindell teaches courses that combine engineering and the history of technology, such as "Engineering Apollo: The Moon Project as a Complex System," which integrates technical, political, and operational perspectives on the history of space exploration.

Dr. Scott Pace

Director of the Space Policy Institute, George Washington University

Scott Pace is the Director of the Space Policy Institute and a Professor of Practice in International Affairs at George Washington University's Elliott School of International Affairs. His research interests include civil, commercial, and national security space policy, and the management of technical innovation. From 2005-2008, he served as the Associate Administrator for Program Analysis and Evaluation at NASA. Prior to NASA, Dr. Pace was the Assistant Director for Space and Aeronautics in the White House Office of Science and Technology Policy (OSTP). From 1993-2000, Dr Pace worked for the RAND Corporation's Science and Technology Policy Institute (STPI). From 1990 to 1993, Dr. Pace served as the Deputy Director and Acting Director of the Office of Space Commerce, in the Office of the Deputy Secretary of the Department of Commerce. He received a Bachelor of Science degree in Physics from Harvey Mudd College in 1980; Masters degrees in Aeronautics & Astronautics and Technology & Policy from the Massachusetts Institute of Technology in 1982; and a Doctorate in Policy Analysis from the RAND Graduate School in 1989.

Dr. Asif A. Siddiqi

Fordham University

Dr. Asif A. Siddiqi is an assistant professor of history at Fordham University in New York. He specializes in the history of science and technology and has authored a number of works on the history of the Russian space program including the award-winning *Challenge to Apollo: The Soviet Union and the Space Race, 1945-1974*, published by the NASA History Office in 2000. His next book *The Rockets' Red Glare: Soviet Imaginations and the Birth of Sputnik*, is forthcoming from Cambridge University Press. He is currently a Visiting Scholar at MIT's Program in Science, Technology, and Society where he is working on a history of the Indian space program. He also serves on the advisory board for *Isis*, the journal of the History of Science Society. Dr. Siddiqi received his Ph.D. from Carnegie Mellon University in 2004.

John Tylko

Vice President, Aurora Flight Sciences

John Tylko was a founding member of Aurora's Board of Directors and has been continuously involved with the company since its inception in 1989.

Tylko holds a Bachelor's Degree in Aeronautics and Astronautics from the Massachusetts Institute of Technology and is a lecturer at MIT's Department of Aeronautics and Astronautics. He is a recipient of MIT's Founders Award which recognizes entrepreneurship.

Tylko was an Advanced Manufacturing Engineer at General Electric's Aircraft Engine Group from 1979 to 1981 where he was responsible for development of composite material structures on the F-404 and T-700 military aircraft engines.

Tylko co-founded General Computer Company in 1981 and served as its Chief Operating Office from 1987 to 2003. GCC developed a variety of innovative products in the consumer electronics and personal computer markets, ranging from video games to laser printers. Tylko was responsible for all aspects of operational management necessary to grow the company from a

startup to over \$50 million in revenue. He also co-founded Video Guide in 1993 and was instrumental in its sale to Gemstar TV Guide International. Video Guide develops interactive electronic program guides for television.

Tylko served as Vice President of Aurora Flight Sciences since May, 2003. He led Aurora's Aerostructures business sector through May, 2006 and was responsible for successfully managing Aurora's Global Hawk manufacturing program. He led the transition of Aurora's West Virginia manufacturing plant to a state of the art composite structures manufacturing center. In May, 2006 he assumed overall responsibility for Aurora's business development and strategic planning.

Dr. Scott A. Uebelhart

MIT Space, Policy, and Society research group

Scott A. Uebelhart is a postdoctoral associate with the Space, Policy, and Society research group in the MIT Program in Science, Technology, and Society. He leads the group research efforts examining the direction of human spaceflight, and organizes seminars connecting aerospace students with policy leaders. Before this Dr. Uebelhart analyzed the Space Shuttle attitude control system at the C.S. Draper Laboratory, and supported the STS-116 and STS-117 missions from NASA's Mission Control Center. He earned a doctorate in structural dynamics from the MIT Department of Aeronautics and Astronautics, researching the design and analysis of large, flexible space telescopes with the Space Systems Laboratory.