

NATIONAL SPACE STRATEGY WORKSHOP

4-5 FEBRUARY 2010

Biographies of Workshop Participants

Project Leads:

PI: Dr. Eligar Sadeh is President of Astroconsulting International. Astroconsulting addresses challenges facing Security, Civil and Commercial space by providing Organizational Consulting, Research of Best Practices, Professional Education and Workforce Development. Eligar held professorships in Space and Defense Studies at the College of Aerospace Sciences - University of North Dakota and at the United States Air Force Academy, and worked for Lockheed-Martin as a Space Systems Engineer. He serves as a Research Associate with the Eisenhower Center for Space and Defense Studies at the Air Force Academy and with the Space Policy Institute at George Washington University, Adjunct Professor with the University of Colorado, and Editor of *Astropolitics* published by Taylor and Francis, Routledge.

Co-PI: Dr. Ray Williamson is Executive Director of the Secure World Foundation, a private operating foundation with headquarters in Superior, Colorado. He was formerly Research Professor of Space Policy and International Affairs in the Space Policy Institute, The George Washington University. He is editor of *Imaging Notes* and serves on the editorial board of the journal *Space Policy*. As a member of the International Academy of Astronautics, Dr. Williamson serves on Commission Five: Space Policies, Law & Economics. He is the author of more than 100 articles on space policy, remote sensing and space security and author or editor of nine books on outer space, the technologies of historic preservation, and American Indian astronomy, myth and ritual. From 1979 to 1995, he was a Senior Analyst and then Senior Associate in the Office of Technology Assessment (OTA) of the U.S. Congress. While at OTA, Dr. Williamson led more than a dozen space policy studies requested by Congressional committees. Ray received his B.A. in physics from the Johns Hopkins University and his Ph.D. in astronomy from the University of Maryland.

Co-PI: Dr. 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 B.S. in Physics from Harvey Mudd College in 1980; a M.A. in Aeronautics & Astronautics and Technology & Policy from the Massachusetts Institute of Technology in 1982; and a Ph.D. in Policy Analysis from the RAND Graduate School in 1989.

Co-PI: Dr. John Sheldon is a Marshall Institute Fellow and a visiting professor at the School of Advanced Air and Space Studies, Air University, Maxwell AFB, Alabama. At SAASS he teaches and directs the Space and National Security and the Information, Cyber, and Intelligence Power courses. Prior to his Marshall Institute and SAASS appointments, Dr. Sheldon was program director for Space Security at the Centre for Defence and International Security Studies, Henley-on-Thames, UK. Dr. Sheldon is also Editor Emeritus of *Astropolitics*, of which he was a founding co-editor, a peer-reviewed space policy journal published by Routledge, and has published numerous articles and chapters on national security

space policy and strategy, cyberspace, and strategic theory. Dr. Sheldon formerly served in the British Diplomatic Service, and received his B.A. (Hons.) in Politics and International Relations and M.A. in Security Studies from the University of Hull, UK, and his Ph.D. in Politics and International Studies from the University of Reading, UK.

Co-PI: Col. Thomas James (Lieutenant Colonel, USAF) is currently attending the United States Air Force Air War College. He is a U.S. Army Space Operations Officer with over ten years of space operations experience. His space assignments include Commander, 1st Space Battalion; Deputy Director of Space Operations for the CENTCOM Combined Forces Air Component Commander; Space Operations Officer for Combined and Joint Headquarters in Iraq and Afghanistan; and Director of Space Capabilities Branch, Directorate of Combat Developments, Future Warfare Center, U.S. Army Space and Missile Defense Command. He is a graduate of the USAF Air Command and Staff College, the USAF School of Advanced Air and Space Studies, and various military space courses. He also holds a M.A. in International Relations from Auburn University at Montgomery. Before becoming a U.S. Army Space Operations Officer LTC James served over ten years as a U.S. Army aviator. He also has over nine years of service in special operations assignments.

Co-PI: Mr. Brian Weeden is the Technical Advisor for Secure World Foundation. Mr. Weeden specializes in the application of technical research and fundamentals to the policy and legal aspects of space security. He currently focuses on global space situational awareness, space traffic management, protection of space assets, and preventing conflict in space. Brian's work has been featured in articles, academic journals, presentations to the United Nations, and testimony before the U.S. Congress. Previously, Brian spent nine years as an officer in the U.S. Air Force working in space and ICBM operations. From 2004 through 2007 he was part of U.S. Strategic Command's Joint Space Operations Center where he directed the orbital analyst training program and developed tactics, techniques and procedures for space situational awareness and space control. Brian has a B.S. in Electrical Engineering from Clarkson University, M.S. in Space Studies from the University of North Dakota and is a graduate of the International Space University Space Studies Program (2007, Beijing).

Co-PI: Ms. Victoria Samson is the Washington Office Director for Secure World Foundation, where she engages Congressional staffers and agency officials on matters related to space security and governance. Previously, she was a Senior Analyst with the Center for Defense Information (CDI), where her areas of interest included missile defense, nuclear reductions, and space security issues. Prior to her time at CDI, Samson was the Senior Policy Associate at the Coalition to Reduce Nuclear Dangers, a consortium of arms control groups in the Washington, DC area. She previously worked as a subcontractor on war-gaming scenarios for the Missile Defense Agency's Directorate of Intelligence. Samson is the author of numerous op-eds, analytical pieces, journal articles, and electronic updates on missile defense and space security matters. She has a M.A. in International Relations from the Johns Hopkins School of Advanced International Studies, and holds a B.A. in Political Science with a specialization in international relations from UCLA.

Authors and Reviewers:

Dr. Andrew Aldrin is the director of Business Development and Advanced Programs for United Launch Alliance (ULA). Before that, Dr. Aldrin served in various positions in Business Development and Strategy at the Boeing Company, including Vice President and Director of Boeing Launch Services and director of Business Development for Boeing NASA Systems. Dr. Aldrin's previous career included leading U.S. policy research institutes, including the RAND Corporation and the Institute for Defense Analyses. He is currently a member of the adjunct faculty at International Space University and has also served as an adjunct professor at California State University at Long Beach and the University of

Houston-Clear Lake. He holds a Ph.D. in Political Science from the University of California at Los Angeles, writing his dissertation on the creation of the Soviet space program, a M.B.A. from Trium, a M.A. in Science, Technology and Public Policy from George Washington University, and a B.A. in Political Science and International Relations from the University of California at Santa Barbara. Dr. Aldrin is a Corresponding Member of the International Academy of Astronautics and has written on a range of issues related to international security and space exploration.

Gen. James Armor, Jr. (Major General, USAF, Retired) is Vice President of Strategy and Business Development for ATK Spacecraft Systems & Services in Beltsville, MD, where he is responsible for small satellite, satellite component and engineering services. Gen. Armor is on the Board of Directors of Integral Systems, Inc., MD, and of NAVSYS Corporation, CO, and is the founder and CEO of The Armor Group, LLC, an aerospace consultancy firm. Gen. Armor retired from the Air Force in January 2008, where his last position was as Director of the National Security Space Office (NSSO) in the Pentagon. Prior to the NSSO, he was Director, Signals Intelligence (SIGINT) at the National Reconnaissance Office (NRO), Vice Commander of the Warner Robins Air Logistics Center, GA, and Program Director of the NAVSTAR Global Positioning System (GPS) at Los Angeles Air Force Base, CA. He has served as a missile combat crew officer, a laser signal intelligence analyst, and was qualified as a DOD Space Shuttle astronaut. Gen. Armor was commissioned through ROTC at Lehigh University, PA where he received B.S. degrees in Electrical Engineering and in Psychology. He received an M.S. degree in Electro-Optics from the AF Institute of Technology, Ohio, and was a research fellow at the National War College, Washington, D.C.

Dr. Isaac Ben-Israel holds a Ph.D. from Tel-Aviv University, where he studied mathematics, physics and philosophy. The author of numerous articles and several books on military issues, he has held several senior posts in operations, intelligence and weapons development within the Israeli Air Force. In January 1998, he was promoted to Major-General and appointed as Director of Defense R&D Directorate in the Israeli Ministry of Defense. Dr. Ben-Israel has been teaching at Tel-Aviv University since 1989. He has also served in the Israeli Parliament as a Member and as Director of the Israeli Space Agency.

Mr. David Chen is a Principal Research Analyst at Centra Technology, Inc. with a regional focus on the Asia-Pacific region. He participated in the OECD Space Futures Program by modeling and forecasting future economic scenarios vis-à-vis space industries. He has also authored papers and presented on Chinese military modernization at the annual PLA conference at Carlisle Barracks and the Naval War College. He serves as a reviewer for *China Security Quarterly* and the journal, *Space Policy*. Mr. Chen holds a M.A. in Pacific International Affairs, with an International Economics focus, from the Graduate School of International Relations and Pacific Studies at the University of California, San Diego; and a B.A. in Public Policy Analysis-Politics from Pomona College, in Claremont, California. A native Mandarin speaker, he has also studied at Nanjing University, China, and in Taipei, Taiwan.

Dr. Damon Coletta is Professor of Political Science at the U.S. Air Force Academy. He was first trained as an electrical engineer, working electromagnetic compatibility issues for avionics on the C-17 aircraft. Dr. Coletta earned a M.A. in Public Policy from the Kennedy School of Government at Harvard University (1993), specializing in Science and Technology Policy. He performed research for the American Association for the Advancement of Science, the American Enterprise Institute, NASA, the Institute for Defense Analyses, the Office of Naval Research, and RAND Corporation. His work has appeared in *International Organizations*, *Contemporary Security Policy*, *Armed Forces & Society*, *Foreign Policy Analysis*, and *Astropolitics*. He co-edited the eighth edition of *American Defense Policy* (Johns Hopkins University Press, 2005) and the first edition of *Space and Defense Policy* (Routledge, 2009). He also authored *Trusted Guardian: Information Sharing and the Future of the Atlantic Alliance* (Ashgate, 2008). Dr. Coletta received his Ph.D. in Political Science from Duke University.

Mr. Richard DalBello is Vice-President of Intelsat Global. He is responsible for managing Intelsat General's legal team, for leading its government relations and public policy efforts, and for representing Intelsat General before numerous U.S. and international policy bodies. With more than 20 years of experience, Mr. DalBello is well known in satellite communications and government circles. He served previously as president of the Satellite Broadcasting and Communications Association, and for more than three years as the president of the Satellite Industry Association, the voice of the U.S. commercial satellite industry on policy, regulatory and legislative matters. Earlier, Mr. DalBello was general counsel for Spotcast Communications Inc., and Vice President of Government Affairs, North America, for ICO Global Communications, a provider of mobile satellite communications services. He also served for four years as the Assistant Director for Aeronautics and Space in the White House's Office of Science and Technology Policy. Mr. DalBello earned a B.A. in Political Science from the University of Illinois, a J.D. from the University of San Francisco, and a M.A. in Law from McGill University.

Col. Daniel Dant is a Chief of Staff of the Air Force Fellow and the Director of Space Policy for the Deputy Assistant Secretary of Defense for Cyber and Space Policy. Prior to assuming his current duties, Col. Dant was a student at the National War College, Fort McNair, Washington, DC. Col. Dant entered the Air Force in 1990 as a distinguished graduate of the East Carolina University ROTC program. He transitioned to space operations as a flight commander for the PAVE PAWS warning radar in Cape Cod, MA. Col. Dant was then one of fifty USAF Captains selected for the prestigious Air Force Intern Program at the Pentagon. He interned on the Air Staff in the Directorate of Operational Requirements, for the Office of the Secretary of Defense in Strategy and Requirements, and received a M.A. from George Washington University. Col. Dant then completed the rigorous USAF Weapons School course at Nellis AFB, NV. As a space weapons officer, he served on the Air Force Space Support Teams at Schriever AFB, CO, where he deployed numerous times to integrate space capabilities in to theater operations. Col. Dant was privileged to serve as the Commander, 4th Space Control Squadron, Holloman Air Force Base, NM. His unit was responsible for delivering defensive and offensive counterspace capabilities and space situation awareness, as appropriate, to rapidly achieve flexible and versatile effects in support of global and theater campaigns. In addition to his current assignment, Colonel Dant's staff assignments include duties as the commander of the weapons and tactics flight for the 21st Space Wing and speechwriter for the Commander of AFSPC, CINCNORAD, and CINCSPACE. He also served as the Aide-de-Camp to the Commander, AFSPC.

Dr. Shen Dingli, a physicist by training, is a professor of international relations at Fudan University. He is Executive Dean of Institute of International Studies and Director of Center for American Studies at Fudan. He teaches and conducts researches on China-US relations, nonproliferation and regional security, nuclear policy of China and the US, and China's foreign and defense policies. He is Vice President of Chinese Association of South Asian Studies, Vice President of Shanghai Association of International Studies, and on the Global Council of the Asia Society. He received his Ph.D. in physics in 1989 from Fudan and did arms control post-doc at Princeton University from 1989-91. In 1997, he was awarded an Eisenhower Fellowship. In 2002, he was invited to advise the then Secretary General of the UN Kofi Annan for strategic planning of his second term.

Dr. Jeff Foust is a Senior Analyst and Project Manager with the Futron Corporation of Bethesda, Maryland, and has been with the company since late 2001. He investigates current conditions and future trends in domestic and foreign commercial, civil, and military launch industries and related markets. He is also the editor of *The Space Review*, a weekly online publication with essays and articles about space policy, commercialization, exploration and other issues. In addition, he maintains Spacetoday.net, a space news aggregator; *Space Politics*, a space policy blog; and *NewSpace Journal*, a commercial spaceflight

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Dr. Joan Johnson-Freese has held the position of Chair, National Security Decision Making Department at the Naval War College in Newport, RI since August 2002. Dr. Johnson-Freese has focused her research and writing on space security issues, including technology transfer and export, missile defense, transparency, space and development, transformation, and globalization. Her book publications include: *Heavenly Ambitions: America's Quest to Dominate Space*, University of Pennsylvania Press, 2009; *Space As A Strategic Asset*, 2007; *The Chinese Space Program: A Mystery Within a Maze*, 1998. She has also published articles in such journals as *Joint Forces Quarterly*, *Nature*, *Space Policy*, *Issues in Science & Technology* and *The Nonproliferation Review*. She is a Fellow of the International Academy of Astronautics; a Visiting Fellow at the Watson Institute of International Affairs at Brown University; a member of the International Institute for Strategic Studies; on the Space Studies Board of the National Research Council; the Editorial Board of *China Security*; and has testified before Congress on multiple occasions regarding space security and China.

Prof. Joanne Gabrynowicz is a Professor of Space Law and Director of the National Center for Remote Sensing, Air, and Space Law, at the University of Mississippi School of Law. She is the Editor-in-Chief of the *Journal Of Space Law* and a Director of the International Institute of Space Law (IISL). Prof. Gabrynowicz serves as an official observer for the International Astronautical Federation to the UNCOPUOS Legal Subcommittee and has made a number of presentations to that group on space law issues. The UN Office of Outer Space Affairs has invited Prof. Gabrynowicz to lecture on space law at all of its space law capacity building workshops for government officials and policymakers. In 1999, the IISL invited Prof. Gabrynowicz to write and present the remote sensing law position paper at UNISPACE III. Prof. Gabrynowicz briefed former U.S. Secretary of the Interior Gayle Norton as part of the Secretary's preparation for the Earth Observation Summit. She was the organizer and chair of the U.S. Federal Advisory Committee for the National Satellite Land Remote Sensing Data Archive and was also is a member of the U.S. Department of Commerce Advisory Committee on Commercial Remote Sensing. Prof. Gabrynowicz advised the Eisenhower Institute on its study, *The Future of Space—the Next Strategic Frontier*. Prof. Gabrynowicz was a founding faculty member of the Space Studies Department at the University of North Dakota. Prof. Gabrynowicz was the managing attorney of a NYC law firm. She is a member of the American Bar Association Forum on Aviation and Space Law. In 2001 she was awarded the Women in Aerospace Outstanding International Award.

Dr. Nancy Gallagher is the Associate Director for Research at the Center for International and Security Studies at Maryland (CISSM) and a Senior Research Scholar at the University of Maryland's School of Public Policy. She co-directs the Advanced Methods of Cooperative Security Program, an interdisciplinary effort to address the security implications of globalization by developing more refined rules to regulate powerful, multipurpose technologies. Before coming to the University of Maryland, Dr. Gallagher was the Executive Director of the Clinton Administration's Comprehensive Test Ban Treaty Task Force. She worked with the Special Advisor to the President and the Secretary of State on recommendations to build bipartisan support for U.S. ratification. Dr. Gallagher is the author of *The Politics of Verification* (Johns Hopkins University Press, 1999), the editor of *Arms Control: New Approaches to Theory and Policy* (Frank Cass, 1998), and the co-author of *Reconsidering the Rules for Space Security* (American Academy of Arts and Sciences, 2008) and *Controlling Dangerous Pathogens: a Prototype Protective Oversight System* (CISSM, 2007). She has also written articles on space security, nuclear arms control and nonproliferation, public opinion, and other topics related to global security. She received her Ph.D. in Political Science from the University of Illinois, Urbana-Champaign.

Dr. Steve Green is Professor of Management at the U.S. Air Force Academy. He has an extensive record of professional publications and presentations and has provided consulting services to many different Department of Defense agencies and various not-for-profit organizations. His 21-year Air Force career included system program office tours performing acquisition, cost analysis, and business management on three major space systems. He also completed a special duty tour at the Defense Finance and Accounting Service. He is a Level III Program Manager, Certified Government Financial Manager (CGFM), and a Certified Cost Estimator/Analyst (CCE/A). He earned a D.B.A. from United States International University, an M.S. from the University of Southern California, and a B.S. from the U.S. Air Force Academy.

Gen. Michael Hamel (Lieutenant General, USAF, Retired) serves as Senior Vice President of Corporate Strategy and Development and is responsible for leading Orbital's strategic initiatives in current space and missile markets and adjacent areas, assessing new technology and product development plans, and supporting company growth. Prior to joining Orbital, Gen. Hamel was Commander of the Air Force Space Command's Space and Missile Systems Center (SMC) and Air Force Program Executive Officer (PEO) for Space, where he managed research, development, acquisition and sustainment of the country's primary portfolio of military space and missile programs, with an annual budget in excess of \$10 billion. Gen. Hamel's Air Force career included a broad array of national security space development, operations and policy responsibilities. He served as Commander of the 14th Air Force "Flying Tigers", where he commanded all Air Force space and launch operations supporting Department of Defense commands and agencies, as well as civil and commercial space sectors. Earlier, he served in senior staff positions at Headquarters U.S. Air Force and Air Force Space Command, where he led work defining user and program requirements, operations plans and policies, organization and management for military space forces and capabilities. He also was Military Advisor to the Vice President on defense, arms control, non-proliferation, critical infrastructure, space and technology policies and issues. Gen. Hamel holds a B.S. in Aeronautical Engineering from the U.S. Air Force Academy and a M.B.A. from California State University. He is also a Graduate of the Industrial College of the Armed Forces and the Program in National and International Security at the John F. Kennedy School of Government, Harvard University. Gen. Hamel is a member of the Council on Foreign Relations and is an Associate Fellow of the American Institute of Aeronautics and Astronautics.

Dr. Peter Hays works for SAIC supporting the National Security Space Office and the Eisenhower Center, and teaches at George Washington University. He helps develop space policy initiatives including the National Defense University Spacepower Theory Study. Dr Hays holds a Ph.D. from the Fletcher School at Tufts University and was an honor graduate of the U.S. Air Force Academy. He served internships at the White House Office of Science and Technology Policy and National Space Council and taught space policy courses at the U.S. Air Force Academy, School of Advanced Airpower Studies, and National Defense University. Major publications include: *Spacepower for a New Millennium*; "Going Boldly—Where?" and *United States Military Space*.

Dr. Kurt Heppard is a Professor of Management at United States Air Force Academy. His current research and teaching interests include entrepreneurial strategies, performance measurement, and strategic innovation. Dr. Heppard graduated from the U.S. Air Force Academy in 1982 and majored in Management. He received his M.B.A. from the Anderson Graduate School of Management at the University of California, Los Angeles and completed his Ph.D. at the Leeds School of Business at the University of Colorado in Boulder. While on active duty in the Air Force, Dr. Heppard was an acquisition officer for the MILSTAR satellite program, served as an Education with Industry Fellow, and was a contracting officer for advanced and applied technologies at the National Reconnaissance Office in Los Angeles. He is a Level III Program Manager.

Dr. Henry Hertzfeld is a Research Professor of Space Policy and International Affairs at the Space Policy Institute, Center for International Science and Technology Policy, Elliott School of International Affairs, George Washington University. He is an expert in the economic, legal, and policy issues of space and advanced technological development. Dr. Hertzfeld has served as a Senior Economist and Policy Analyst at both NASA and the National Science Foundation, and is a consultant to both U.S. and international agencies and organizations. He is the co-editor of *Space Economics* (AIAA 1992), as well as many articles on the economic and legal issues concerning space and technology. Dr. Hertzfeld has a B.A. from the University of Pennsylvania, a M.A. from Washington University, and a Ph.D. in economics from Temple University. He also holds a J.D. degree from the George Washington University and is a member of the Bar in Pennsylvania and the District of Columbia.

Dr. Dana Johnson is Senior Advisor, Bureau of Verification, Compliance and Implementation, U.S. Department of State. Dr. Johnson provides space and missile defense policy analysis and advice to the Assistant Secretary of State for Verification, Compliance, and Implementation. Until January 2010 she was a Senior Analyst with the Northrop Grumman Analysis Center in Arlington, VA, responsible for assessing space and missile defense issues and trends for Northrop Grumman's business sectors. She has extensive experience in government and aerospace industry-related research. Prior to Northrop Grumman, Dr. Johnson was a national security policy analyst at RAND with a specialty in space policy and operations. While at RAND she led or participated in a number of studies in space, aerospace, and aeronautics conducted for various U.S. Government departments and agencies, and participated in several congressionally mandated commissions. Dr. Johnson has a Ph.D. from the University of Southern California and is an adjunct professor at Georgetown University and Missouri State University.

Mr. Alan Ladwig is Senior Advisor, Office of Administrator at NASA Headquarters. He has more than 30 years of experience in senior management positions with NASA, commercial space companies, media companies, and non-profit organizations. He served at WBB Consulting as the Manager of Space Systems Consultancy. In this capacity, he was responsible for developing a new business unit dedicated to technical and management consulting services for the civil, commercial, and national security space sectors. Prior to joining WBB, Ladwig worked for Northrop Grumman Corporation as the Manager of NASA and Civil Space Programs for the Integrated Systems Sector and was responsible for business development activities with NASA. He was the Chief Operating Officer for the ZERO Gravity Corporation, a privately held space tourism and entertainment company offering commercial parabolic (weightless) flights to the public on a Boeing 727 aircraft. He also worked with Team Encounter as Vice President for Marketing for the company's solar sail initiative. When Space.com was established in 1999 Ladwig served as the Assistant to the Chairman and Vice President for Washington Operations. In addition to his duties for business development, he also authored an opinion column, "Are We There Yet?" for the company's magazine, *Space Illustrated*. Ladwig served at NASA Headquarters as a political appointee and as a civil servant. From 1993 to 1999 he was an appointee of the Clinton-Gore Administration serving as the Associate Administrator for Policy and Plans. In this position he was responsible for the coordination of Agency policy positions, the NASA Strategic Management System, the History Division, and operations of the NASA Advisory Council. He was also the Executive Secretary of the Interagency Working Group and Chair of Civil Space Sub-committee that developed the National Space Policy signed by President Clinton in 1996. From 1981 to 1989, Ladwig managed a variety of programs for the Office of Space Flight. He established procedures and managed the Space Flight Participant Program (Teacher in Space and Journalist in Space programs) and the Shuttle Student Involvement Program. He was the Assistant to the Director of Long-Range Planning Task Force that produced Leadership and America's Future in Space (the Ride Report) and implemented one of the Report's primary recommendations to establish the Office of Exploration where he served as the Director of Special Projects. As Senior Policy Analyst at SAIC, Ladwig provided support to NASA's Office of Space Science at Headquarters. He was Co-editor of America at the Threshold, report of the President's

Synthesis Group on America's Space Exploration Initiative (the Stafford Report), and co-editor of The Final Report to the President of the Advisory Committee on the Redesign of the Space Station (the Vest Report). NASA awarded Ladwig the Distinguished Service Medal, the Exceptional Achievement Medal, and two Exceptional Service Medals. He is a Fellow of the American Astronautical Society. Alan served in the Army in the 558th USA Artillery Group in Athens, Greece. He received a M.S. in Higher Education and a B.S. in Speech from Southern Illinois University.

Dr. David Livingston is the founder and host of The Space Show®, the nation's only talk radio show focusing on increasing space commerce, developing space tourism, and facilitating our move to a space-faring economy and culture. The Space Show® is broadcast multiple times per week on radio and the internet. Past show archives (about 900 shows), listening information, and coming events can be found at www.thespaceshow.com. The Space Show is fully licensed to the newly formed One Giant Leap Foundation (OGLF) which Dr. Livingston started to promote his special type of space education. OGLF is a 501(C)3 public benefit tax exempt foundation. In addition, Dr. Livingston is an adjunct professor at the University of North Dakota Graduate School of Space Studies, both on campus and in their distant learning program, specializing in space commerce economics, ethics, and management classes. He has also served as an adjunct professor in the Graduate School of Business at Golden Gate University teaching Entrepreneurship and Small Business Management and he has guest lectured at other university programs including Stanford University and Sonoma State University. He earned his B.A. from the University of Arizona, his M.B.A. in International Business Management from Golden Gate University in San Francisco, and his D.B.A. also at Golden Gate University. His doctoral dissertation was titled Outer Space Commerce: Its History and Prospects.

Dr. Molly Macauley is a Research Director and Senior Fellow at Resources for the Future (RFF). Her research expertise includes the economics of new technologies, the value of information, space economics and policy, and the use of economic incentives in environmental regulation and other policy design. She has frequently testified before Congress and serves on numerous national level committees and panels including the National Research Council's Space Studies Board, the Climate Working Group of the National Oceanic and Atmospheric Administration, and the Earth Science Applications Analysis Group of the National Aeronautics and Space Administration (NASA). She also served as a lead author on a project under the US Climate Change Science Program. She was selected as one of the National Space Society's "Rising Stars," and in 2001 she was voted into the International Academy of Astronautics. She has received awards from NASA and the Federal Aviation Administration for her research. Macauley has published widely and has also served as a visiting professor in the Department of Economics at Johns Hopkins University.

Ms. Joanne Maguire is Executive Vice President of Lockheed Martin Space Systems Company (SSC) and an officer of Lockheed Martin Corporation. SSC employs more than 17,000 people and generated \$8.6 billion in sales in 2009. SSC provides a broad spectrum of advanced-technology systems for national security, civil and commercial customers. Chief products include human space flight systems; a full range of remote sensing, navigation, meteorological and communications satellites; strategic and missile defense systems; space observatories and interplanetary spacecraft. She serves on the board of directors of United Launch Alliance, a Lockheed Martin joint venture. Ms. Maguire has been named one of the "Top 50 Women in Technology" by *Corporate Board Member* magazine and for the past several years has been included in *Fortune* magazine's "50 Most Powerful Women in Industry." She earned a B.S. in Electrical Engineering from Michigan State University and a M.S. in Engineering from the University of California at Los Angeles. Ms. Maguire is a graduate of the executive program in management at UCLA's Anderson School of Management and completed the Harvard Program for Senior Executives in National and International Security. She also is a fellow of the American Institute of Aeronautics and Astronautics.

Dr. James (Clay) Moltz is an associate professor in the Department of National Security Affairs at the Naval Postgraduate School, where he also holds a joint appointment in the Space Systems Academic Group. In addition, since September 2009, he has served as Academic Associate for Security Studies. His most recent book is *The Politics of Space Security, 1957-2007* (Stanford University Press, 2008). He is currently completing a book manuscript entitled *Asia's Space Race: National Motivations, Regional Dynamics, and Implications for U.S. Policy*. Moltz's recent articles have appeared in such journals as *Astropolitics*, *Space Policy*, and *Strategic Studies Quarterly*. He worked previously in the U.S. Senate and has served as a consultant to the U.S. Departments of Energy and Defense and to the NASA Ames Research Center. From 1993 to June 2007, Moltz worked at the Monterey Institute's Center for Nonproliferation Studies, where, among other positions, he served as Deputy Director and founded the journal *The Nonproliferation Review*.

Mr. Clayton Mowry is President of Arianespace, Inc. Mowry has worked for over 17 years in the commercial launch and satellite sectors serving in government, as the leader of an industry trade association and as an executive for the world's leading launch services company. Mr. Mowry joined Washington, D.C.-based Arianespace, Inc. as its President and Chairman in August 2001. As the head of the Arianespace's U.S. subsidiary, he is responsible for managing the company's sales, marketing, government relations and corporate communications activities. Before joining Arianespace, Mr. Mowry served for six years as executive director at the Satellite Industry Association (SIA), a non-profit alliance of U.S. satellite operators, manufacturers and ground equipment suppliers. Prior to his role at SIA, he worked as a satellite/launch industry analyst and senior international trade specialist with the U.S. Department of Commerce's International Trade Administration. Clayton Mowry received a M.B.A. from Georgetown University in Washington, D.C., and a B.A. in Politics and Government from Ohio Wesleyan University in Delaware, OH. In addition to his work at Arianespace, Inc., Mr. Mowry currently serves on the Board of Directors and as Chairman of the Society of Satellite Professionals International. He is now in his second term as Vice President for International Programs with the American Astronautical Society. Mr. Mowry is also an Associate Fellow of the American Institute of Aeronautics and Astronautics.

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