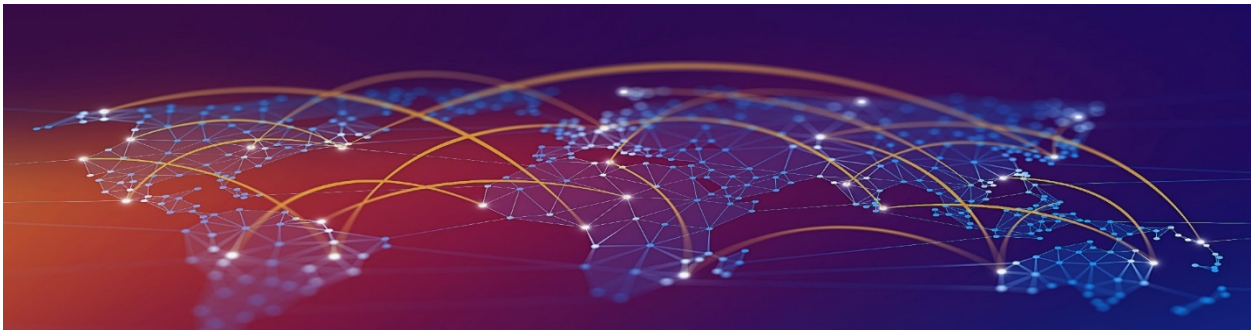


The Global Commercial Aviation Supply Chain a Meeting of Experts

Day 1: Thursday November 19

10:00 am ET /7:00 am PT	**Participants Connect** *Test Microphones and Cameras/Resolve connectivity Issues* *Breakout rooms are available for pre-meeting socializing.*	1 hour
11:00 am ET /8:00 am PT	**Call Meeting to Order and Welcome** *Meeting Schedule and Materials* Erik Svedberg, National Academies	5 min
11:05 am ET /8:05 am PT	**Opening Comments from NAE** Alton D. Romig, NAE	15 min
11:20 am ET /8:20 am PT	**Opening Comments from DOS** Mung Chiang, U.S. Department of State	15 min
11:35 am ET /8:35 am PT	**Introductions of Invited Experts and Staff** *All participants presented on group slides* Erik Svedberg, National Academies	10 min
11:45 am ET /8:55 am PT	**About the Meeting Request: Impetus and Goals** Moderator day 1 Tom Kurfess, ORNL Moderator day 2 Haydn Wadley, UVA	 6 min 6 min
12:00 pm ET /9:00 am PT	**Panel 1: Historical Perspectives: Why the Commercial Aviation Supply Chain is International** *How has the industry selected their own manufacture and assembly sites?* Chip Blankenship, UVA (Ret. GE) Tim Walton, Rolls Royce Q+A and General Discussion Moderated by Harm-Jan Steenhuis, HPU	 25 min 25 min 25 min

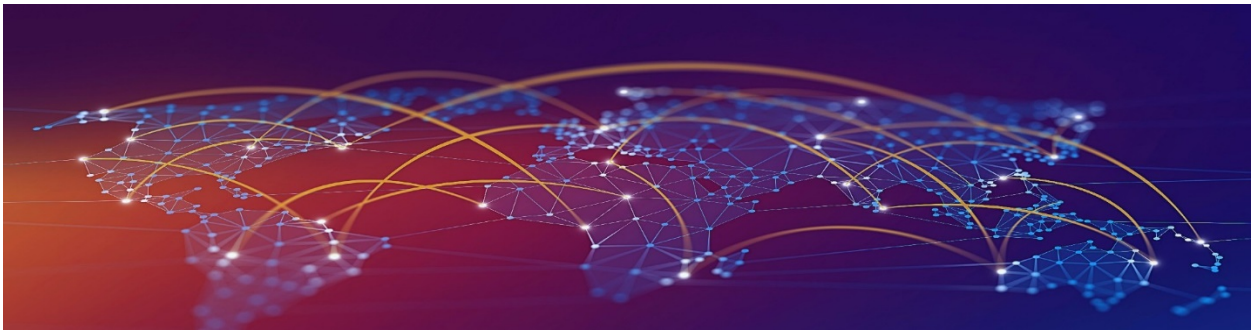
1:15 pm ET /10:15 am PT	**Panel 2: The Global Network of Subcontractors and Sub-Component Manufacturers** *How does the industry select their subcontractors?* Mike Packer, LMCO Joshua Walton, AeryAviation Kimberly Caldwell, Spirit AeroSystems Q+A and General Discussion Moderated by Tom Kurfess, ORNL	 15 min 15 min 15 min 30 min
2:30 pm ET /11:30 am PT	**Break**	10 min
2:40 pm ET /11:40 am PT	**Panel 3: Current International Developments in Commercial Aviation** *What do other countries plan to do next?* Aijaz Hussain and Bryan Terry, Deloitte Richard Aboulafia, Teal Group Corporation Harry Moser, the Reshoring Initiative Q+A and General Discussion Moderated by Joe Wilck, Mason WM	 15 min 15 min 15 min 30 min
3:55 pm ET /12:55 pm PT	**Day 1 Closing Remarks** Tom Kurfess, ORN	5 min
4:00 pm ET /1:00 pm PT	**Adjourn Day 1**	

Meeting Connection information:

Join ZoomGov Meeting:
https://nas-sec.zoomgov.com/j/1606285422?pwd=NmIzTmdOQytpK1B5Z0xLSDB6TnR3QT09

Meeting ID: 160 628 5422
Password: 528502

See end of Agenda for SIP, H.323, and Skype for business connection information.



The Global Commercial Aviation Supply Chain a Meeting of Experts

Day 2: Friday November 20

10:00 am ET /7:00 am PT	**Participants Connect** *Test Microphones and Cameras/Resolve connectivity Issues* *Breakout rooms are available for pre-meeting socializing.*	1 hour
11:00 am ET /8:00 am PT	**Call Meeting to Order and Welcome** Haydn Wadley, UVA	5 min
11:05 am ET /8:05 am PT	**Keynote Speaker** Dennis Bushnell, NASA	30 min
11:35 am ET /8:35 am PT	**Panel 4: Recent Science and Technology Developments in Commercial Aviation** *Where are the possible science and engineering breakthroughs in commercial aviation?* Alan Epstein, MIT Marty Bradley, USC Chris Saldana, Georgia Institute of Technology Q+A and General Discussion Moderated by Hayden Wadley, UVA	 15 min 15 min 15 min 30 min
12:50 pm ET /9:50 pm PT	**Panel 5: Making Decisions for Diversifying and/or Re-shoring the Supply Chains** *How is the industry making decisions for diversifying and/or re-shoring their supply chains?* John Langford, Electra.aero David Silver, VP/Commercial Aviation at AIA Salim Semssar, GE Q+A and General Discussion Moderated by Atherton Carty, LMCO	 15 min 15 min 15 min 30 min

2:05 pm ET /11:05 am PT	**Break**	10 min
2:15 pm ET /11:15 am PT	**Panel 6: Future Commercial Aviation Manufacturing** *Where can we go from here?* Tresa Pollock, UCSB Ajay P. Malshe, Purdue University Nick Lappos, LMCO Q+A and General Discussion Moderated by Tom Kurfess and Haydn Wadley	 15 min 15 min 15 min 30 min
3:30 pm ET /12:30 am PT	**Closing Remarks** Mung Chiang, U.S. Department of State Tom Kurfess, ORNL Haydn Wadley, UVA Erik Svedberg, National Academies	 10 min 10 min 10 min 1 min
4:00 pm ET /1:00 am PT	**Adjourn Meeting**	

Full Meeting Connection information:

Join ZoomGov Meeting: https://nas-sec.zoomgov.com/j/1606285422?pwd=NmIzTmdOQytpK1B5Z0xLSDB6TnR3QT09

Meeting ID: 160 628 5422
Password: 528502

Dial by your location
+1 669 254 5252 US (San Jose)
+1 646 828 7666 US (New York)
Meeting ID: 160 628 5422
Password: 528502
Find your local number: https://nas-sec.zoomgov.com/u/ac2K9Ho8li

Join by SIP: 1606285422@sip.zoomgov.com

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161.199.138.10 (US West)
161.199.136.10 (US East)
Meeting ID: 160 628 5422
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Would you like to test your Zoom connection? Please click on the link below.
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Additional Materials

Some recent relevant points of view from Deloitte on this topic:

- https://www2.deloitte.com/content/dam/Deloitte/us/Documents/manufacturing/us-manufacturing-midyear-2020-aerospace-and-defense-industry-outlook.pdf
- https://www2.deloitte.com/global/en/pages/about-deloitte/articles/covid-19/understanding-covid-19-impact-on-aerospace-and-defense.html

Reshoring Data Report: Statistics on the trend.

Aero Engine Makers Forced To Shrink, Pause Development Projects
FlightGlobal (11/12, Hemmerdinger) reports that aero-engine companies, including GE Aviation, Pratt & Whitney, CFM International, Safran, and Rolls-Royce “reported deep losses and tumbling revenue amid declines in new-engine shipments and shriveling aftermarket demand” in their third-quarter results due to the coronavirus pandemic. The suppliers are “taking steps to stem cash outflows, holding on until the industry recovers,” but “the ability of engine makers to pursue ambitious clean-energy technologies with the same gusto they showed pre-pandemic seems unlikely.” Many clean-energy projects have been put on hold.

Agreement on Trade in Civil Aircraft
https://www.wto.org/english/docs_e/legal_e/air-79_e.htm

BIOS

Alton (Al) D. Romig, Jr.
Executive Officer, National Academy of Engineering

Alton D. Romig, Jr. is the executive officer of the National Academy of Engineering. Under Congressional charter, the Academy provides advice to the federal government, when requested, on matters of engineering and technology. As executive officer, Dr. Romig is the chief operating officer responsible for the program, financial, and membership operations of the Academy, reporting to the NAE president.

He was previously vice president and general manager of Lockheed Martin Aeronautics Company Advanced Development Programs, better known as the Skunk Works®. He spent the majority of his career at Sandia National Laboratories, then operated by the Lockheed Martin Corporation, having joined Sandia as a member of the technical staff in 1979. Dr. Romig moved through a succession of R&D management positions leading to his appointment as executive vice president in 2005. He served as deputy laboratories director and chief operating officer until 2010, when he transferred to the Skunk Works.

Dr. Romig serves or has served on a number of Advisory Committees including those at Univ of Washington, MIT, Ohio State, Purdue, Georgia Tech, the Colorado School of Mines and Sandia National Laboratories. He is also visiting Associate of Applied Physics and Materials Science at Cal Tech. Dr. Romig is a member of the Board of Directors of Football Research, Inc., a non-profit entity created and supported by the National Football League to review engineering technology to improve the safety of the sport. From 2003 to 2008, he served on the Board of AWE, Aldermaston, UK and chaired the Program committee.

Dr. Romig is a Fellow TMS, IEEE, AIAA and AAAS. He is also a Fellow and Honorary Member of ASM International. Dr. Romig was elected to the National Academy of Engineering in 2003 and the Council of Foreign Relations in 2008. He was awarded the ASM Silver Medal for Materials Research in 1988. Dr. Romig graduated from Lehigh University in 1975 with a BS in Materials Science and Engineering. He received his MS and PhD in Materials Science and Engineering from Lehigh University in 1977 and 1979, respectively.

Mung Chiang

Science and Technology Adviser to the Secretary
Office of the Science and Technology Adviser

Mung Chiang is on an IPA detail at the U.S. Department of State from Purdue University, where he is the John A. Edwardson Dean of the College of Engineering and the Roscoe H. George Distinguished Professor of Electrical and Computer Engineering. Under his leadership, Purdue Engineering became the largest top-10 engineering college in the United States, and achieved milestones in education, research, online learning, entrepreneurship, diversity, economic development, industry collaboration, global partnership, philanthropic support, physical infrastructure and talent development.

Prior to July 2017, he was the Arthur LeGrand Doty Professor of Electrical Engineering at Princeton University. His research on communication networks received the 2013 Alan T. Waterman Award, the highest honor in the U.S. to scientists, engineers and social scientists under the age of 40.

A recipient of a Guggenheim Fellowship and the Institute of Electrical and Electronic Engineers' Kiyo Tomiyasu Technical Achievement Award, he has been an internationally renowned innovator in wireless communications, edge/fog computing, and Internet architecture. He founded the Princeton Edge Lab in 2009, which bridges the theory-practice gap in networking research by spanning from proofs to prototypes, and co-founded a few startup companies in mobile data, the Internet of Things and artificial intelligence, with products used by tens of millions of people worldwide.

A recipient of the American Society of Engineering Education's Frederick E. Terman Award, his textbook "Networked Life," popular science book "The Power of Networks," and online courses have reached hundreds of thousands of students.

Day Moderators

Thomas R. Kurfess is the Chief Manufacturing Officer of Oak Ridge National Laboratory. He received his S.B., S.M. and Ph.D. degrees in mechanical engineering from M.I.T. in 1986, 1987 and 1989, respectively. During 2012-2013 he was on leave serving as the Assistant Director for Advanced Manufacturing at the Office of Science and Technology Policy at the White House. In this position he was responsible for coordinating Federal advanced manufacturing R&D, addressing issues related to technology commercialization, identifying gaps in Federal R&D advanced manufacturing capabilities, and developing strategies to address these gaps. His research focuses on the design and development of advanced manufacturing systems targeting secure digital manufacturing, additive and subtractive processes, and large-scale production enterprises. He is a member of the National Academy of Engineering and is a Fellow of ASME, AAAS, and SME. He currently serves on the ASME Board of Governors and was the 2018 President of SME.

Haydn Wadley is a University and the Edgar Starke, Jr Professor of Materials Science and Engineering at the University of Virginia. His research has addressed the design of advanced materials including ultralight microarchitectured materials, multilayered thin films, high temperature coatings, and advanced composites, and has explored their applications in extreme environments. He served as a member of the National Academies National Materials and Manufacturing Board for many years, and is the current Chair of the National Academies Standing Committee on Defense Materials, Manufacturing and Infrastructure. He was the deputy Chair of the 2020 Quadrennial review of the National Nanotechnology Initiative. He was a long serving member (and former chair) of DARPA's Defense Science Research Council (DSRC) where he co-led numerous yearlong studies on topics ranging from Technology Tools for Reconstruction and Stabilization Operations, The Future of Asymmetric Warfare, The Exploitation of Space, and The Future of Engines. Haydn Wadley has published more than 490 papers in scientific journals and conference proceedings, co-written a book on cellular materials, and been awarded more than 30 US patents. There have been more than 25,000 citations of his research and his Google Scholar h-index is currently 76. Three companies have been launched from his University of Virginia research group.

Moderators

Dr. Harm-Jan Steenhuis is Associate Dean and Professor of Management, International Business at the College of Business, Hawaii Pacific University. Harm-Jan has been involved in research on the aviation industry for 25 years including, but not limited to, companies in countries such as Brazil, Canada, England, India, the Netherlands, Romania, South Africa, and the United States.
His PhD was on the topic of moving aircraft production from industrially developed to industrially developing countries. He has studied issues such as the regional aircraft industry, overcapacity in regional aircraft production, downfall of European regional aircraft manufacturers, strategy of large commercial aviation companies, offset agreements in aerospace, development of aviation manufacturing clusters, commercial aviation and economic development, airports, international differences in shopfloor productivity, manufacturing networks and location selection, and international divestments.
Harm-Jan has published 150 scientific articles and three books. His books include International operations, How multiple international environments impact productivity and location decisions (2015) and co-authored The Global Commercial Aviation Industry (2016).
His latest research is on additive manufacturing technology developments (3D printing). This includes adoption of additive manufacturing and the impact this technology has on industries such as commercial aviation. Dr. Steenhuis is Editor-in-Chief of the Journal of Manufacturing Technology Management as well as the International Journal of Information and Operations Management Education.

Joseph Wilck, Ph.D., P.E.
Faculty Director, Business Analytics, Raymond A. Mason School of Business: William & Mary. Dr. Joe Wilck has been teaching analytics, operations research, engineering, and supply chain since 2006. His research is in the area of applied optimization and analytics, and it has been funded by the National Science Foundation, Department of Energy, Defense Advanced Research Projects Agency (DARPA), and North Carolina Department of Transportation; among others. He is a registered Professional Engineer. He is an active member of the Institute of Industrial and Systems Engineers (IISE), Institute for Operations Research and the Management Sciences (INFORMS), and Military Operations Research Society (MORS). His most recent faculty position prior to coming to William & Mary was at the United States Air Force Academy. Dr. Steenhuis is Editor-in-Chief of the Journal of Manufacturing Technology Management as well as the International Journal of Information and Operations Management Education.

Atherton A. Carty is an executive leader within the Lockheed Martin Advanced Development Programs (ADP) organization, also known as 'The Skunk Works'. He is responsible for leading and advancing ADP's Technology Roadmaps portfolio including air vehicle, mission systems, survivability and revolutionary technologies, as well as the conceptual design core competency. This portfolio supports both current and future programs to best serve our customers. Prior to his current role, Atherton led the ADP Conceptual Design organization and served in various programs management roles, as well as within the Enterprise Technology Roadmap and Aeronautics ADP Improvements and Derivatives executive leadership teams. In past roles he served as Executive Assistant to the EVP and General Manager of Aeronautics Operations, led the ADP Tools and Processes organization, and founded the ongoing Rapid Conceptual Design (RCD) effort within Lockheed Martin. Atherton first joined the Aeronautics Company as part of the Flight Sciences Division supporting High-Speed initiatives within the Advanced Development Projects organization. Since that time he was fortunate to support a wide variety of research, design and development related activities. He is an AIAA Associate Fellow, received the Lockheed Martin NOVA award and AeroStar awards for his technical achievements, and was selected as a 2006 Most Promising Young Scientist. Atherton earned his Master's degree in mechanical engineering through the George Washington University's Joint Institute for the Advancement or Flight Sciences (JIAFS) at the NASA Langley Research Center and a Bachelor's degree in aerospace engineering from Syracuse University.

Keynote Speaker:

Dennis Bushnell [NAE], Chief Scientist, NASA Langley Research Center, HFAIAA, FASME, FRAeS, Responsible for Technical Oversight and Advanced Program formulation, Technical Specialties include Flow Modeling and Control across the Speed Range, Advanced Configuration Aeronautics, Aeronautical Facilities, Advanced Power and Energy, Planetary Exploration and Hypersonic Airbreathing Propulsion. Contributions to National Programs include Sprint, HSCT/SST, FASTSHIP, Gemini, Apollo, RAM, Viking, X15, F-18E/F [patent holder for the “fix” to the wing drop problem], Shuttle, NASP, Submarine/Torpedo Technology, Americas’ Cup Racers, Navy Rail Gun, MAGLEV Trains and Planetary Exploration, 250 publications, 400 invited lectures.

Panelists:

Charles (Chip) Blankenship [NAE] is a proven executive leader in aerospace, industrial and consumer businesses with international experience in more than 40 countries, including significant time working in Brazil, China, France, Germany, Italy, Japan and UK. Blankenship is currently Montgomery Distinguished Professor of Practice in Materials Science and Engineering at the University of Virginia. He is leading

transformations in undergraduate education focused on learning at the intersection of engineering and business. He was Chief Executive Officer and Director of Arconic, Inc., a $13B engineered materials company focused on Aluminum, Titanium and Ni-Base Superalloy materials and products for aerospace, automotive and industrial applications. Prior to that role, he spent 25 years at the General Electric Company, concluding tenure as CEO of GE Appliances and Lighting, an $8B business. Blankenship led a reshoring of manufacturing initiative at GE Appliances, rebuilt technical capability and concluded a strategic sale to Haier for $5.4B in 2016. Blankenship began his career with GE in 1992 as a staff scientist at GE's Corporate Research and Development facility. His technical work resulted in 23 papers published in refereed journals and eight U.S. and European patents. As a program manager, he led a team of scientists and engineers developing alloys and processes for aircraft engines, land-based gas turbines, lighting systems, medical systems and diesel engines. He then joined GE Aviation, holding positions of increasing responsibility, including program manager for the first GE engine development program with Embraer: a 70-90 passenger jet family from startup through certification and entry-into-service. He also led the GE Aeroderivative Energy business focused on power generation and oil & gas markets prior to returning to GE Aviation as VP & GM of Commercial Engines, a $5B business.

Timothy L Walton (Tim), Executive Vice President Procurement – Defense, Rolls-Royce. Tim is the Executive Vice President - Procurement of Rolls-Royce Defense. In this role, he is accountable for developing the Defense business' supply chain strategy and managing the external supply chain for Defense's Aerospace and Naval products. Tim joined the company in 2001 as Finance Manager, Indianapolis Operations. Since that time, Tim has assumed finance roles with increasing accountability (primarily in Defense) and most recently served as CFO of Rolls-Royce's Defense segment. Prior to joining Rolls-Royce, Tim held finance roles in several industries, including oil and gas, aerospace, heavy construction, and automotive parts Distribution. Tim holds a Bachelor's Degree in Management (Finance Concentration) from Tulane University. He is married with two children. His personal interests include outdoor activities and playing guitar.

Mike Packer is Director of Production Strategy, Lockheed Martin Aeronautics Company. His career has spanned 45 years of production engineering and operations experience in staff, line management and executive leadership roles at department, plant, division and corporate levels. He was elected to the SME International Board of Directors since 2012, will serve as SME President in 2021 and has been elected to the SME College of Fellows. Mr. Packer currently Chairs the National Center for Defense Manufacturing and Machining (NCDMM) Board of Directors and serves as Director and Treasurer on the Manufacturing Skill Standards Council (MSSC) Executive Board. He has served as a Board Member of the Manufacturing Leadership Council since its inception in 2008 and is currently Vice Chair. Mike is also actively engaged in the American Institute of Aeronautics and Astronautics (conferred Associate Fellow in 2011), in SAE International for whom he served as a past General Chair for the AeroTech World Congress, and in the National Defense Industrial Association (NDIA) as a past Manufacturing Division Executive Committee Chair. Mike is Shingijutsu Lean Production System certified and is a past Board Member of MIT's Lean Aerospace Initiative (LAI). Mr. Packer has published numerous articles concerning manufacturing strategy, advance manufacturing technologies, team-based organization development and talent management. He earned a BS in Industrial Technology from Eastern Michigan University, an MBA from Washington University at St. Louis and completed the Manufacturing Executive Program at the University of Michigan.

Joshua Walton, PMP, Vice President of Programs, AeryAviation
Project Management Professional (PMP) with experience managing mission system integrations and VVIP interior modifications. Experience managing certification programs and working with FAA, EASA, HKCAD & CAA. He is an aviation enthusiast with robust experience in FAA Part 21 aircraft modifications spanning complex mission systems (ISR, hyperspectral, LIDAR), heavy structural aircraft modifications, VVIP aircraft interiors and FAA Supplemental Type Certificate (STC) development. His portfolio contains numerous programs successfully executed in both government and commercial aviation sectors, with

specific personal satisfaction derived from efforts with significant constraints; he likes compressed schedules of significant technical risk where the stakes are high; and he thrives in situations most people find uncomfortable or difficult. His professional interests recently have been on growing Aery's operational capabilities by emphasizing the embracement of technology innovation and technical capability increases to create efficient means of modifying and subsequently conducting flight operations for our clientele in as optimized a manner as possible. He enjoys finding solutions to problems.

Kimberly Caldwell at Spirit AeroSystems is a senior leader in advanced aerospace technology development with over 20 years' experience developing and leading research and development activities, including conceptual design, strategic planning and portfolio development, and business development with the Defense and commercial aerospace research communities. She is a senior thought leader, enabling strategic communications and supporting Congressional activities. She is adept at working across business units to build consensus and support growth initiatives.
She leads the R&D portfolio strategy and collaborative R&D initiatives, developing technologies that drive corporate growth in the defense and commercial sectors. She conducts regular engagement with defense and government organizations, universities, and OEMs to further strategic initiatives. She serves on Political Affairs Council and Executive Steering Committees for DoD Service Lab and NASA initiatives.

Aijaz Hussain is a research and insights leader serving the manufacturing industry at Deloitte. He leads the aerospace and defense sector research for Deloitte. Aijaz has over 18 years of experience in research, thoughtware development, and business strategy. He has authored numerous compelling, high impact thought leadership studies in the areas of business strategy, advanced technologies, digital transformation, innovation, future of mobility, and the future of work.

Bryan Terry is a Managing Director in Deloitte's Enterprise Performance practice and serves as the firm's Global Aviation Leader. With more than 25 years of industry experience Bryan has successfully led challenging and complex projects across the airline enterprise, including commercial strategy (M&A, joint ventures, network planning); customer experience (loyalty, inflight entertainment & connectivity, corporate sales); operational excellence (technical operations, crew management, airport operations, supply chain, cargo); technology (passenger service systems, MRO, ERP, CRM); and other corporate functions (talent, finance, fuel).
He has served on Aviation Week magazine's Top Performing Airlines Council of Advisors and has led numerous company specific and industry-wide transformation projects that have generated more than $1 billion in tangible benefits

Richard Aboulafia is Vice President of Analysis at Teal Group. He manages consulting projects in the commercial and military aircraft field and analyzes broader defense and aerospace trends. He has advised numerous aerospace companies, including most prime and many second- and third-tier contractors in the US, Europe and Asia. He also advises numerous financial institutions on aerospace market conditions.
Richard writes and edits Teal Group's World Military and Civil Aircraft Briefing, a forecasting tool covering over 135 aircraft programs and markets. He also writes publicly about aviation and defense, with regular columns in Aviation Week and Space Technology and at Forbes.com. His articles have also appeared in the Wall Street Journal, Slate, AIAA's Aerospace America, the Financial Times, Professional Pilot, and other publications.
Frequently cited as an aviation industry authority by trade and news publications, Richard has appeared on numerous television news and radio programs including ABC, BBC, Bloomberg, Reuters, CBS, CNN, NBC, NPR and PBS. He has spoken at numerous conferences.

Before he joined Teal Group in 1990, Richard analyzed the jet engine market at Jane's Information Group. He has a Master's degree in War Studies from King's College, University of London and a Bachelor's degree from George Washington University.

Harry Moser, founder and president of the Reshoring Initiative. Harry founded the Reshoring Initiative to bring five million manufacturing jobs back to the U.S. after working for high end machine tool supplier GF AgieCharmilles, starting as President in 1985 and retiring 12/31/10 as Chairman Emeritus. Largely due to the success of the Reshoring Initiative, Harry was inducted into the Industry Week Manufacturing Hall of Fame 2010 and was named Quality Magazine's 2012 Quality Professional of the year and FAB Shop Magazine's Manufacturing Person of the year. Harry participated actively in President Obama's 1/11/12 Insourcing Forum at the White House, won The Economist debate on outsourcing and offshoring, and received the Manufacturing Leadership Council's Industry Advocacy Award in 2014 and the Made in America 2019 Reshoring Award. He was recognized by Sue Helper, then Commerce Department Chief Economist, as the driving force in founding the reshoring trend and named to the Commerce Department Investment Advisory Council in August 2019.
Harry is frequently quoted in the Wall Street Journal, NYT, Forbes, Financial Times, New Yorker, Washington Post and USA Today and seen on Fox Business, MarketWatch, PRI, NPR, Manufacturing Talk Radio and other national TV and radio programs. He received a BS in Mechanical Engineering and an MS in Engineering at MIT in 1967 and an MBA from U. of Chicago in 1981.

Alan H. Epstein is the R.C. Maclaurin Professor of Aeronautics and Astronautics Emeritus at MIT. He retired as Pratt & Whitney's Vice President Technology and Environment in 2018. Dr. Epstein has served on many panels and committees advising governments, industry, and academia. He is currently the chair of the National Academies' Aeronautics and Space Engineering Board, a member of the NASA Advisory Council, and a member of the Singapore Advanced Manufacturing and Engineering International Advisory Panel.

Marty K. Bradley, Is a retired Technical Fellow for The Boeing Company, Boeing Commercial Airplanes Advanced Concepts Group
Dr. Bradley currently advises and executes projects to investigate advanced sustainable aviation and electric aircraft concepts for Boeing Commercial Airplanes and NASA. Over his 36 year aerospace career, he has been a team leader for projects related to advanced concepts and technologies, electric and hybrid electric aircraft, green aircraft design, alternative fuels, environmental life cycle assessment (LCA), and propulsion.
He has a B.S., M.S., and Ph.D. in Aerospace Engineering, all from the University of Southern California and currently teaches their capstone senior aircraft design course.
He is an AIAA Fellow and the Founder of the AIAA Aircraft Electrified Propulsion and Power (AEPP) Working Group. He helped create and was the General Chair of the Electric Aircraft Technologies Symposium (EATS). He previously was Chair of the AIAA Green Engineering Program Committee and the High Speed Airbreathing Propulsion Technical Committee. He is an instructor for the AIAA short course on the "Design for Electric and Hybrid Electric Aircraft". He is the Technical Chair for P&E 2020. He has authored 2 book chapters, 50 publications, 2 patents, and conducted 15 addresses or speeches at technical conferences related to green aviation and advanced propulsion. He has lectured in courses and seminars at USC, Auburn, MIT, and Cal State Los Angeles and Long Beach on electric aircraft, alternative fuels and green aviation technologies.
As a kid, he was inspired by his math and science teachers and the Apollo program. As a college student and early career, he was inspired by the Cold War technological race with the Soviet Union. In about 2000, he realized that the environmental impact of aviation was going to be his next inspirational challenge and has led to his significant role in what today is called Sustainable Aviation.

Chris Saldana is an Associate Professor in the George W. Woodruff School of Mechanical Engineering at Georgia Tech, where he directs the Enhanced Preparation for Intelligent Cybermanufacturing Systems Program, a graduate research traineeship program focused on digital and additive/hybrid manufacturing technology development and leveraging collaborations between the US Department of Energy, industry and academia. Dr. Saldana previously has held positions at The Pennsylvania State University, M4 Sciences Corporation, the US Air Force Research Laboratory, and Sandia National Laboratories. He presently serves as Associate Editor of IISE Transactions, on the editorial boards of Manufacturing Letters, Computer Aided Design and Applications, the ASTM Journal of Smart and Sustainable Manufacturing Systems, and on the Society of Manufacturing Engineers NAMRI Scientific Committee.

John S. Langford III [NAE], is president-elect of the American Institute of Aeronautics and Astronautics (AIAA). Formerly, he was the chairman and CEO of Aurora Flight Sciences Corporation, which he founded. Prior to Aurora, Langford worked for the Institute for Defense Analyses in Alexandria, Virginia, for the Lockheed Corporation as an engineer on the development of the F-117 stealth fighter, and as an intern at the White House Office of Science and Technology Policy. In 2014, the National Aeronautics Association (NAA) awarded Langford the Cliff Henderson Trophy for “significant and lasting contributions to the promotion and advancement of aviation and aerospace in the United States”. He has also received the DeFlorez Prize from MIT, the Kremer Speed Prize from the Royal Aeronautical Society, the Young Engineer of the Year award from the AIAA National Capital Section, the National Tibbets Award for outstanding contributions to the SBIR Program, the Barry M. Goldwater Educator Award from the AIAA, Virginia’s Outstanding Industrialist award from the Commonwealth of Virginia, and the President’s Award for Exceptional Service and the Howard Galloway Award from the National Association of Rocketry. Langford is a Fellow of AIAA and has served as the organization’s president. He is also a Fellow in the Royal Aeronautical Society (RAeS), and has served on academic advisory boards at MIT, the University of Maryland, and Mississippi State University. He has served on the board of directors of the NAA, the Executive Committee of the Aerospace Industries Association (AIA), and the Institute Development Committee (IDC) of the AIAA. Langford served on the NASA Advisory Council (NAC) and chaired its Subcommittee on Unmanned Air Systems. He has served on several study committees for the National Research Council. He has been named by the Governor of Virginia to chair the Virginia Commission on Unmanned Systems. Dr. Langford earned his Ph.D. in aeronautics and public policy from the Massachusetts Institute of Technology. He has participated in several National Academies projects, including the Committee to Assess NASA's Aeronautics Flight Research Capabilities and the Committee on Autonomous Vehicles in Support of Naval Operations.

David Silver is the Vice President for Civil Aviation at the Aerospace Industries Association (AIA). In this role, he uses his expertise in aviation certification, safety, and emerging technologies to collaborate with AIA members and advance public policies and positions beneficial to the entire industry and the United States. David represents AIA on a number of boards and committees, including the European Union Aviation Safety Agency Stakeholder Advisory Board and the Commercial Aviation Safety Team. He was also nominated by Secretary of Transportation Elaine Chao to serve on the U.S. Drone Advisory committee. Silver joined AIA with over 20 years of experience in aviation, most recently serving as the Director of Engineering & Regulatory Affairs for the Boeing Company in Washington D.C., where he worked extensively with both regulatory and legislative committee leadership. He developed an array of experience in working with a variety of international organizations involved in certification and validation programs. Silver also served as the 787-8 Deputy Fleet Chief for the introduction of aircraft into commercial operations. Silver worked with airline customers, regulators, and airplane program chief engineers on model-specific technical and safety issues affecting the in-service fleet to increase reliability and ensure smooth operations for the airlines. Silver also has vast experience working Airplane Systems

for airplane programs such as the 777 and 767. Silver served for 22 years in the Army National Guard as an Engineer Officer, with successive leadership roles culminating in Battalion Command and Assistant G3 for Washington State. Silver received the Legion of Merit and retired as a Lieutenant Colonel in 2014. Silver holds a B.S. in engineering and B.A. political science from Arizona State University and a M.S. in engineering management from Washington State University. He is also a graduate of the U.S. Army Command and General Staff College and a Fellow of the Royal Aeronautical Society.

Salim Semssar is Senior Executive & Head of Global Quality Operations for General Electric Aviation. In this Capacity, Salim is responsible for Supply Chain Quality activities for both Commercial and Military programs. He Joined GE Aviation in 2014 where he served as the Executive Quality Leader in the Composite Value Stream and later as the Assembly, Test, Maintenance, Repair, and Overhaul Executive Quality Leader for Commercial and Military programs.
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Nick Lappos is a Sikorsky Aircraft Senior Technical Fellow in Advanced Technology, responsible for the Technical Fellow community and introduction of advanced technologies into new and existing products. He has flown over 70 different helicopter types, achieving over 7,500 hours of flight time, and is the holder of three FAI world speed records. Nick started his career at Sikorsky Aircraft in 1973 as a Chief Research and Development Test Pilot, flying over 27 years for Sikorsky. He participated in development of the S76, UH-60, RAH-66, ABC, Fantail, Shadow, CH-53E, and S92. Nick then worked as Director of Test Engineering and the Flight Test Development Center and later served as S-92 Program Director during development, certification, and awarding of the Robert J. Collier Trophy. Nick left Sikorsky in 2005 to become Vice President of Government Programs at Gulfstream Aerospace Corp, where he was responsible for production and maintenance of Gulfstream jets to meet special mission requirements for governments worldwide. He then joined Bell Helicopter in 2008, first as Senior Vice President of XworX and later as Chief Technology Officer responsible for the development of new products, internal R&D and rapid prototyping. Nick returned to Sikorsky in 2011 as Senior Technical Fellow. Nick holds a Bachelor of Aerospace Engineering from Georgia Institute of Technology where he was on the Dean's List, part of Who's Who, Tau Beta Pi, Sigma Gamma Tau, and the Academy of Distinguished Alumni.