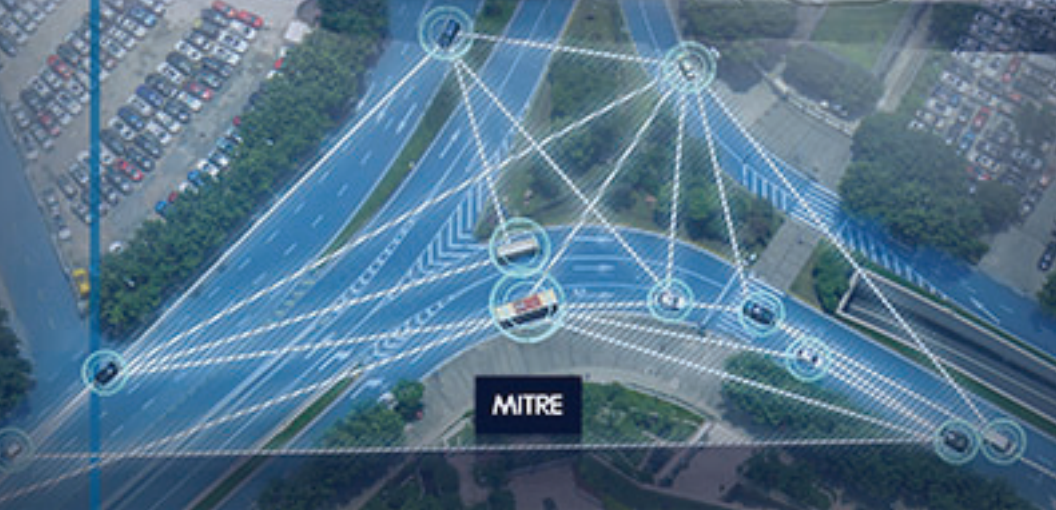


CREATING THE FUTURE OF AEROSPACE AND TRANSPORTATION

TECHNICAL & PROFESSIONAL ACTIVITIES 2018



MITRE



BOOKS, JOURNALS, AND PERIODICALS



CONFERENCE PARTICIPATION



HONORS, AWARDS, AND RECOGNITION



PROFESSIONAL SOCIETIES



COMMITTEE PARTICIPATION



ACADEMIC AND SPECIAL APPOINTMENTS



BOOK AND JOURNAL EDITORS AND REVIEWERS



TECHNOLOGY TRANSFER

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MITRE

Creating the Future of Aerospace and Transportation

**Technical and Professional Activities
2018**

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INTRODUCTION

It is my great pleasure to introduce MITRE's nineteenth annual compendium of our staff's technical and professional activities in aerospace and transportation. This booklet highlights the expertise, capabilities, and research our staff shared in 2018 with other organizations in many ways and venues.

MITRE's mission is to solve problems for a safer world. Our staff are passionate about advancing our sponsors' mission capabilities, in this case aerospace and other transportation systems for meeting the growing and broadening demands for efficient and safe travel on the ground, in the air, and in space. They also have broad and deep understanding of transportation system operations, domestically and internationally. They thrive on collaborating with others inside and outside MITRE to innovate solutions and bring them into existence for delivering significant and lasting societal impacts made possible by the improvements in operations.

We greatly value the external engagements and knowledge sharing activities our staff make through technical publications, conferences, committees, professional societies, and academic and special appointments. We are proud of their efforts and results. We celebrate their achievements, including their honors, awards, and recognitions received from our government sponsors and key industry and community stakeholders. We reward them for their inventions, patents, and transfers of MITRE technology to government and industry.

Sponsor mission focus. Innovation. Collaboration. Leadership. Drive. These attributes define MITRE staff, especially those recognized herein. Please join me in acknowledging and celebrating their contributions, achievements, and recognitions. They deserve and have our utmost appreciation!

A handwritten signature in black ink, appearing to read "Gregg A. Leone". The signature is fluid and cursive, with the first name "Gregg" being the most prominent.

Gregg A. Leone
Vice President, The MITRE Corporation
Director, Center for Advanced Aviation System Development



BOOKS, JOURNALS, AND PERIODICALS

“Examining Head-Down Time in Transportation: A Case Study in Single-Pilot General Aviation Operations,” **Sara A. Wilkins**, *Journal of the Transportation Research Board*, June 2018, Transportation Research Record, Published Online, SAGE Journals.

“Generating Diverse Reroutes for Tactical Constraint Avoidance,” **Christine P. Taylor, Sheng S. Liu, Craig R. Wanke**, and **Timothy B. Stewart**, *Journal of Air Transportation*, vol. 26, no. 2 (2018), pp. 49–59, the American Institute of Aeronautics and Astronautics.

“On-Demand Assessment of Air Traffic Impact of Blocking Airspaces,” **Amal Srivastava, Thomas J. St. Clair**, and **Grant Pan**, *The Aeronautical Journal*, vol. 122, iss. 1258, 2018, Royal Aeronautical Society.

“Social Conformity Effects on Trust in Simulation-Based Human-Robot Interaction,” William G. Volante, Janine Sosna, Theresa Kessler, **Tracy L. Sanders**, and P. A. Hancock, *Human Factors: The Journal of the Human Factors and Ergonomics Society*,” November 2018, Published Online, SAGE Journals.

Books, Journals, and Periodicals

“Technical Note: Solving Inventory Models by Algebraic Method,” Xu-Ren Luo and **Chih-sheng Chou** *International Journal of Production Economics*, vol. 200 (2018), pp. 130–133, June 2018, Elsevier.

“Using Ensemble Weather Forecasts for Predicting Airport Arrival Capacity,” **Shin-Lai Tien, Christine P. Taylor, Erik P. Vargo,** and **Craig R. Wanke**, *Journal of Air Transportation*, vol. 26, no. 3 (2018), pp. 123–132, the American Institute of Aeronautics and Astronautics.



CONFERENCE PARTICIPATION

Conferences are an important part of our outreach to the global aviation community. MITRE staff participate in many ways: as presenters, moderators, panelists, chairs, and attendees to share their work, learn from other experts, make connections, and inform the aerospace and transportation research communities.

Our Conference Coordinators champion and manage staff participation where we will have a significant presence or exhibition. The conferences for which we have coordinators are listed below, with the respective coordinator. (Note: this list does not include all conferences in which we participate.)

Conference	Coordinator
Air Line Pilots Association (ALPA) Air Safety Forum	Wallace N. Feerrar
Air Traffic Control Association (ATCA) <ul style="list-style-type: none">• Annual Conference and Exposition• Technical Symposium	Anuja Verma
Air Transport and Operations Symposium (ATOS)	David R. Maroney
American Association of Airport Executives (AAAE) <ul style="list-style-type: none">• Annual Conference and Exposition• Aviation Security Summit	Gregory F. Tennille

Conference Participation

Conference	Coordinator
American Institute of Aeronautics and Astronautics (AIAA) AVIATION Forum	David R. Maroney
American Institute of Aeronautics and Astronautics (AIAA) AVIATION Forum • Intelligent Systems Workshop	Andrew R. Lacher
American Institute of Aeronautics and Astronautics (AIAA) Science & Technology (SciTech) Forum	Lesley A. Weitz
American Meteorological Society (AMS) • Annual Meeting • Conference on Aviation, Range, and Aerospace Meteorology	Matthew J. Fronzak
Association for Unmanned Vehicle Systems International (AUVSI) Xponential Conference	Andrew R. Lacher
Civil Air Navigation Services Organisation (CANSO) • Asia Pacific Conference • World ATM Congress	Miyoun L. Dobbs
Congress of the International Ergonomics Association (IEA)	Valerie J. Gawron
Digital Avionics Systems Conference (DASC)	Hilton Bateman
EASA-FAA International Aviation Safety Conference	Wallace N. Feerrar
FAA and AUVSI UAS Symposium	Mary A. Minnix
FAA Commercial Space Transportation (CST) Conference	Dean E. Fulmer
FAA Managers Association (FAAMA) Annual Gathering of Eagles	Michael L. Klinker

Conference Participation

Conference	Coordinator
Friends and Partners in Aviation Weather (FPAW)	Matthew J. Fronzak
Human Factors and Ergonomics Society (HFES) Annual Meeting	Valerie J. Gawron
Institute of Electrical and Electronics Engineers (IEEE) Conference on Intelligent Data Understanding	Andrew R. Lacher
Institute of Navigation (ION): <ul style="list-style-type: none"> • GNSS+ • International Technical Meeting • Joint Navigation Conference • Pacific PNT Conference • ION/IEEE Position, Location, and Navigation Symposium (PLANS) 	Christopher J. Hegarty
Integrated Communications, Navigation, and Surveillance (ICNS) Conference	Amal Srivastava
International Aviation Safety Symposium by Flight Safety Foundation	Wallace N. Feerrar
International Conference on Applied Human Factors and Ergonomics (AHFE)	Valerie J. Gawron
International Symposium for Personal and Commercial Spaceflight (ISPCS)	Dean E. Fulmer
International Symposium on Aviation Psychology	Valerie J. Gawron
MIT Lincoln Laboratory Air Traffic Control Workshop	Thomas A. Becher
Munich Satellite Navigation Summit	Christopher J. Hegarty

Conference Participation

Conference	Coordinator
National Air Traffic Controllers Association (NATCA) Communicating for Safety (CFS)	Gregory F. Tennille
Space Foundation's Space Symposium	Dean E. Fulmer
Space Traffic Management Conference (The University of Texas at Austin and Embry-Riddle Aeronautical University)	Dean E. Fulmer
Transportation Research Board (TRB) Annual Meeting	Michael J. Yablonski
University of New Mexico's UAS Technical Analysis and Applications Center (TAAC) Conference	R. Michael Guterres
USA/Europe Air Traffic Management Research and Development (ATM R&D) Seminar	Craig R. Wanke

“Adaptive Network Design for Dynamic Rerouting,”
**Christine P. Taylor, Paden J. Coats, Daniel J. Larsen,
Sheng S. Liu, Craig R. Wanke, and Timothy B. Stewart,**
*Proceedings of the American Institute of Aeronautics
and Astronautics (AIAA) 2018 Aviation Technology,
Integration, and Operations Conference, AIAA AVIATION
Forum, June 2018, Atlanta, GA.*

“Addressing the Counter-UAS Threat at Home and
Abroad,” **Andrew R. Lacher,** Panel Moderator,
Association for Unmanned Vehicle Systems International
(AUVSI) Unmanned Systems – Defense, Protection,
Security, February 2018, National Harbor, MD.

“Advanced Trajectory Modeling with Air-Ground Data
Exchange,” **Gabriele Enea, Stephane L. Mondoloni,
Roland M. Sgorcea,** and Jesper Bronsvort, *Proceedings
of the American Institute of Aeronautics and Astronautics
(AIAA) 2018 Aviation Technology, Integration, and
Operations Conference, AIAA AVIATION Forum, June
2018, Atlanta, GA.*

“Air Traffic Controller Conduct of a No-Closer-Than
Spacing Operation,” **Randall S. Bone and Andrew
S. Mendolia,** *Proceedings of the 2018 Integrated
Communications, Navigation, and Surveillance (ICNS)
Conference, April 2018, Herndon, VA.*

“Air Traffic Management (ATM) [Track 3], Track Co-
Chair, **Ralf H. Mayer,** 2018 Integrated Communications,
Navigation, and Surveillance (ICNS) Conference, April
2018, Herndon, VA.

Conference Participation

“Airspace Considerations in Spaceport Location Planning,” Scott Rosenbloom and **Michael T. Wells**, presented at the Transportation Research Board (TRB) 10th National Aviation System Planning Symposium, May 2018, Anchorage, AK.

“Analysis of Cost Effectiveness for Remote Tower Facilities,” **John McQueston**, **Susan S. M. Hanson**, and **Ronald K. Stevens**, *Proceedings of the 2018 Integrated Communications, Navigation, and Surveillance (ICNS) Conference*, April 2018, Herndon, VA.

“An Analysis of Flight Time at Lower-than-Optimal Cruise Altitude,” **John G. Foster**, **James S. DeArmon**, and **Hilton Bateman**, *Proceedings of the American Institute of Aeronautics and Astronautics (AIAA) 2018 Aviation Technology, Integration, and Operations Conference, AIAA AVIATION Forum*, June 2018, Atlanta, GA.

“Artificial Intelligence in Air Traffic Management – Opportunities and Challenges,” **Juliana J. Goh**, presented at Civil Air Navigation Services Organisation (CANSO) Asia Pacific Conference, June 2018, Bangkok, Thailand.

“Autonomous Aerial Systems So Near and Yet So Far,” **Andrew R. Lacher**, Panel Moderator, 2018 Association for Unmanned Vehicle Systems International (AUVSI) XPONENTIAL Conference, April–May 2018, Denver, CO.

“Benefits of Reducing National Playbook Flight Routing via Advanced Flight-Specific Trajectories (AFST),”

William E. Weiss, John G. Foster, and Timothy B. Stewart, *Proceedings of the 2018 Integrated Communications, Navigation, and Surveillance (ICNS) Conference*, April 2018, Herndon, VA.

“CMD and Special Operations,” Session Chair, **Anuja Verma**, 2018 Integrated Communications, Navigation, and Surveillance (ICNS) Conference, April 2018, Herndon, VA.

“Comparing Interval Management Control Laws for Steady-State Errors and String Stability,” **Lesley A. Weitz** and Kurt A. Swieringa, *Proceedings of the American Institute of Aeronautics and Astronautics (AIAA) Guidance, Navigation, and Control Conference, AIAA SciTech Forum*, January 2018, Kissimmee, FL.

“Comparison of sUAS Safety Risk Approaches and Implementations,” **Arthur D. Branch Jr., Jeffrey L. Breunig, Joyce M. Forman, Michael Hadjimichael, and Michael T. Noe**, presented at Madrid RPAS Seminar, July 2018, Madrid Spain.

“Concept of Operations for Advanced Interval Management Applications,” **William J. Penhallegon and H. Peter Stassen**, *Proceedings of the 37th Digital Avionics Systems Conference (DASC)*, September 2018, London, England, UK.

Conference Participation

“Concepts for Delivering IFR Clearances & Exchanging Pre-Departure Data Using Mobile Devices,” **Paul A. Diffenderfer, Kevin M. Long, and Sara A. Wilkins**, *Proceedings of the 2018 Integrated Communications, Navigation, and Surveillance (ICNS) Conference*, April 2018, Herndon, VA.

“Cross-domain and Intra-domain Reuse,” **Uma D. Ferrell**, Panelist, SAFECOMP 2018: The 37th International Conference on Computer Safety, Reliability, and Security, September 2018, Vasteras, Sweden.

“Cross-domain Reuse,” **Uma D. Ferrell**, Keynote Address, SAFECOMP 2018: The 37th International Conference on Computer Safety, Reliability, and Security, September 2018, Vasteras, Sweden.

“Cutting-Edge Applications of Modeling and Simulation to Support Future NAS,” **Paul V. MacWilliams**, presented at the Air Traffic Control Association (ATCA) Tech Symposium, May 2018, Atlantic City, NJ.

“Data Analytics to Improve Aviation Safety,” **Gregory M. Nelson**, presented at the Singapore Aviation Safety Seminar (SASS 2018), March 2018, Singapore.

“Development and Implications of the Singapore GBAS Ionospheric Threat Model (GITM),” **Timothy P. Cashin, M. Bakry El-Arini, S. Vincent Massimini, Frederick A. Niles, Ali M. Odeh, Guijin Zheng**, Sam Pullen, Chew Guang Wei, and Gao Shu, presented at Workshop INCT GNSS-NavAer 2018, November 2018, Presidente Prudente, Brazil.

“DME Potential for Data Capability,” **Dongsong Zeng, Francis Box, John C. Ashley, Leonid Globus, Dmitri V. Baraban, Frederick A. Niles,** and Brent Phillips, *Proceedings of the 2018 Integrated Communications, Navigation, and Surveillance (ICNS) Conference*, April 2018, Herndon, VA.

“Enhancing Cognitive Assistants with Low-Cost Computer Vision,” **Joseph G. Menzenski,** *Proceedings of the 37th Digital Avionics Systems Conference (DASC)*, September 2018, London, England, UK.

“Evaluating National Airspace System (NAS) Performance in Context,” **Simon H. Heitin, Wayne W. Cooper, Jr.,** and **Chih-sheng Chou,** *Proceedings of the American Institute of Aeronautics and Astronautics (AIAA) 2018 Aviation Technology, Integration, and Operations Conference, AIAA AVIATION Forum*, June 2018, Atlanta, GA.

“Examining Heads-Down Time in Transportation: A Case Study in Single-Pilot General Aviation Operations,” **Sara A. Wilkins,** presented at the Transportation Research Board (TRB) 97th Annual Meeting, January 2018, Washington, DC.

“Flight Planning Under Trajectory-Based Operations,” **Stephane L. Mondoloni,** *Proceedings of the 37th Digital Avionics Systems Conference (DASC)*, September 2018, London, England, UK.

Conference Participation

“Frequency Assignment Function for Unmanned-Aircraft Command and Control Links,” **Francis Box, Richard E. Snow, Angela Chen, Steven R. Bodie, Leonid Globus,** and **Timothy S. Luc**, *Proceedings of the 2018 Integrated Communications, Navigation, and Surveillance (ICNS) Conference*, April 2018, Herndon, VA.

“Further Analysis of Sensitivity of ARAIM Performance to Integrity Support Message Deviations,” **Young C. Lee, Brian Bian,** and **Ali M. Odeh**, *Proceedings of the Institute of Navigation (ION) GNSS+ 2018 Technical Meeting*, September 2018, Miami, FL.

“Fusion with EMS,” **Eugene A. Mwendwa** and **Seth A. Ransohoff**, presented at the GE Aviation Waypoint, March 2018, Dallas, TX.

“The Future in Aerospace, Considering Technology & Innovation in Context,” **Mark W. Huberdeau**, presented at the 10th National Aviation System Planning Symposium, May 2018, Anchorage, AK.

“General Aviation Operation (Session I),” Session Chair, **Ralf H. Mayer**, 2018 Integrated Communications, Navigation, and Surveillance (ICNS) Conference, April 2018, Herndon, VA.

“General Aviation ASIAS Program,” Challenging the Status Quo Panel, **Jeffrey P. Mittelman**, presented at the Pacific Northwest Business Aviation Association (PNBAA) Safety and Security Day, April 2018, Seattle, WA.

“The Global Navigation Satellite System (GNSS) and Air Traffic Management (ATM),” **S. Vincent Massimini**, presented at Workshop INCT GNSS-NavAer 2018, November 2018, Presidente Prudente, Brazil.

“GNSS and Performance Based Navigation (PBN) Status in the U.S.A.,” **S. Vincent Massimini**, presented at Workshop INCT-NavAer 2018, Presidente Prudente, Brazil, November 2018.

“Growing Your Safety Culture,” **Kent V. Hollinger**, presented at the SMS Industry Forum 2018, August 2018, Fort Worth, TX.

“Guidelines for Speech Interactions Between Pilot and Cognitive Assistant,” **Steven L. Estes, John R. Helleberg, Kevin M. Long, Matthew E. Pollack, and Marco Quezada**, *Proceedings of the 2018 Integrated Communications, Navigation, and Surveillance (ICNS) Conference*, April 2018, Herndon, VA.

“How is Pedestrian Safety Changing over Time at Highway–Rail Grade Crossings?” **Anthony P. Colavito, Gregory L. Orrell, David L. Rabinowitz, and Martin A. Lopez**, presented at SafeRail Congress 2018, June 2018, Washington, DC.

“Human Factors in Practice: Past and Future Directions,” **Valerie J. Gawron**, *Proceedings of the Human Factors and Ergonomics Society International Annual Meeting*, October 2018, Philadelphia, PA.

Conference Participation

“If You Think Infrastructure is Mundane, You’re Not Paying Attention,” **Dennis A. Sawyer**, Panel Moderator, Air Traffic Control Association (ATCA) Annual Symposium and Conference, October 2018, National Harbor, MD.

“Information Management (Session H),” Session Chair, **Ralf H. Mayer**, 2018 Integrated Communications, Navigation, and Surveillance (ICNS) Conference, April 2018, Herndon, VA.

“Integrated Aerospace Traffic Management Concepts: Shared Situation Awareness,” **Dean E. Fulmer**, **Thomas J. St. Clair**, and **Amal Srivastava**, *Proceedings of the Embry-Riddle Aeronautical University (ERAU) Space Traffic Management Conference*, January 2018, Daytona Beach, FL.

“Interval Management: A Future Air Traffic Concept to Increase Efficiency in the National Airspace System,” **Lesley A. Weitz**, presented at a Rutgers University Mechanical and Aerospace Engineering Graduate Seminar, November 2018, New Brunswick, NJ.

“Levels of Automation—A Discussion,” **Andrew R. Lacher**, **Tracy L. Sanders**, and **Brock J. Lascara**, presented at the 2nd Annual Symposium—At the Intersection, October 2018, Blacksburg, VA.

“Leveraging Commercial Autonomy Innovation to Advance DoD Operational Superiority,” **Andrew R. Lacher**, Panelist, 2nd Annual Autonomous Capabilities for DoD, September 2018, Alexandria, CA.

“Measures of Air Traffic Controller Performance, Workload, and Situational Awareness,” **Valerie J. Gawron**, presented at the Human Factors and Ergonomics Society International Annual Meeting, October 2018, Philadelphia, PA.

“Methods to Identify Air Traffic Management Capabilities for Integrating Commercial Space Transportation,” **Zheng Tao** and **William C. Lash**, presented at AIAA Space Forum 2018, September 2018, Orlando, FL.

“Mindful Application of Standards for Avionics – An Intentional, Systematic, and Measurable Transformation,” **Uma D. Ferrell**, *Proceedings of the 37th Digital Avionics Systems Conference (DASC)*, September 2018, London, England, UK.

“Model-based Approaches in Aviation,” Session Co-Chair, **Uma D. Ferrell**, 37th Digital Avionics Systems Conference (DASC), September 2018, London, England, UK.

“Modeling Risk-Based Approach for Small Unmanned Aircraft Systems,” **Jeffrey L. Breunig**, **Joyce M. Forman**, **Laurence F. Audenaerd**, **Arthur D. Branch Jr.**, and **Michael Hadjimichael**, *Proceedings of the American Institute of Aeronautics and Astronautics (AIAA) 2018 Aviation Technology, Integration, and Operations Conference, AIAA AVIATION Forum*, June 2018, Atlanta, GA.

“Moving Toward a Collaborative Safety Culture,” **Anthony P. Colavito** and **Gregory L. Orrell**, presented at SafeRail Congress 2018, June 2018, Washington, DC.

Conference Participation

“Needed CNS Capabilities in Major Terminal Areas,”
Plenary Panel II: Stakeholder Expectations on CNS from
the Airport/Airlines Community, **Thomas A. Becher,**
Frederick A. Niles, and **Robert C. Strain,** *Proceedings*
of the 2018 Integrated Communications, Navigation, and
Surveillance (ICNS) Conference, April 2018, Herndon, VA.

“New Entrant Operations above Flight Level 600 (FL600),”
Jennifer L. Gentry and **Madison H. Welch,** *Proceedings*
of the 2018 Integrated Communications, Navigation, and
Surveillance (ICNS) Conference, April 2018, Herndon, VA.

“Operational Concepts and Analysis Framework for
Managing Noise Issues, Including from PBN Flight Path
Concentration,” **Koffi A. Amefia** and **John E. Brandt II,**
presented at the UC Davis Aviation Noise and Emissions
Symposium, February 2018, Long Beach, CA.

“Operational Integration of Required Time of Arrival
(RTA) with Time-Based Management (TBM): Concept of
Operations and Human-in-the-Loop Simulation Results,”
Roland M. Sgorcea, **John M. Timberlake,** **Steven T.**
Osborne, **William L. Symionow,** and **Gabriele Enea,**
Proceedings of the American Institute of Aeronautics
and Astronautics (AIAA) 2018 Aviation Technology,
Integration, and Operations Conference, AIAA AVIATION
Forum, June 2018, Atlanta, GA.

“Paired Approach Flight Demonstration: Planning and Development Activities,” Kenneth Leiden, **Stephanie A. Priess**, Paul Harrison, Rocky Stone, Paul Strande, and Mark Palmer, *Proceedings of the 2018 Integrated Communications, Navigation, and Surveillance Conference (ICNS), Conference*, April 2018, Herndon, VA.

“Practical Application of the Levels of Driving Automation Scale,” **Tracy L. Sanders**, **Michael R. French**, and **Andrew R. Lacher**, presented at the Automated Vehicles Symposium 2018, July 2018, San Francisco, CA.

“Predictive Models of Departure and Arrival Occupancy Time and Take-Off Distance,” **Thomas L. Spencer** and Antonio A. Trani, *Proceedings of the American Institute of Aeronautics and Astronautics (AIAA) 2018 Aviation Technology, Integration, and Operations Conference, AIAA AVIATION Forum*, June 2018, Atlanta, GA.

“Principles for Minimizing Cognitive Assistance Distraction in the Cockpit,” **Steven L. Estes**, **John R. Helleberg**, **Kevin M. Long**, **Joseph G. Menzenski**, **Chad R. Myles**, **Matthew E. Pollack**, **Marco Quezada**, and **Jeffrey L. Stein**, *Proceedings of the 37th Digital Avionics Systems Conference (DASC)*, September 2018, London, England, UK.

“Proactive Safety Performance Metrics,” **Kent V. Hollinger**, presented at the SMS Industry Forum 2018, August 2018, Fort Worth, TX.

Conference Participation

“Rapid Assessment of Air Traffic Impact of Blocking Airspaces,” **Amal Srivastava**, *Proceedings of the 2018 Integrated Communications, Navigation, and Surveillance Conference (ICNS), Conference*, April 2018, Herndon, VA.

“Rapid Impact Assessment of Air Traffic Impact of Blocking Airspaces,” **Amal Srivastava** and **Grant Pan**, presented at Embry-Riddle Aeronautical University (ERAU) Space Traffic Management Conference, January 2018, Daytona Beach, FL.

“Rapid Impact Assessment—MITRE Commercial Space Research,” **Dean E. Fulmer**, **Grant Pan**, and **Amal Srivastava**, presented at Civil Air Navigation Services Organisation (CANSO) World ATM Congress 2018, March 2018, Madrid, Spain.

“Reducing Airspace Constraints via Advanced Flight-Specific Trajectories (AFST),” **James S. DeArmon**, **Mary E. Hokit**, **Kyle A. Jaranson**, and **David A. Chaloux**, *Proceedings of the American Institute of Aeronautics and Astronautics (AIAA) 2018 Aviation Technology, Integration, and Operations Conference, AIAA AVIATION Forum*, June 2018, Atlanta, GA.

“Resiliency Developments in Civil Aviation,” **Christopher J. Hegarty**, presented at the Center for Strategic and International Studies (CSIS) Civil Space Conference, January 2018, Washington, DC.

“Safety Culture Lessons Learned from Aviation,” **Kent V. Hollinger**, presented at the American Public Transportation Association TRB Modern Approach to Safety and Safety Culture Conference, June 2018, Denver, CO.

“Scaling Up Unmanned Aircraft Systems (UAS): Characterizing Noise Impacts from Future Urban Air Taxis,” **Brock J. Lascara**, presented at UAS and UAV (Drone): Noise Emissions and Noise Control Engineering Technology, December 2018, Washington, DC.

“Simulation-Based Analysis of Early Scheduling in the Time-Based Flow Management (TBFM) System for Flights with Expect Departure Clearance Times (EDCT),” **Christopher D. Swol**, **Sarah E. Stalnaker**, and **Paden J. Coats**, *Proceedings of the American Institute of Aeronautics and Astronautics (AIAA) 2018 Aviation Technology, Integration, and Operations Conference, AIAA AVIATION Forum*, June 2018, Atlanta, GA.

“Spoofing Detection for Airborne GNSS Equipment,” **Christopher J. Hegarty**, **Ali M. Odeh**, Karl Shallberg, Kyle Wesson, Todd Walter, and Ken Alexander, *Proceedings of the Institute of Navigation (ION) GNSS+ 2018 Technical Meeting*, September 2018, Miami, FL.

“Surveillance System Performance and Possible Paths Forward for Small UAS,” **R. Michael Guterres**, **Gregory L. Orrell**, and **Robert C. Strain**, *Proceedings of the 2018 Association for Unmanned Vehicle Systems International (AUVSI) XPONENTIAL Conference*, April 2018, Denver, CO.

Conference Participation

“Updated Assessment of GNSS Intrasystem and Intersystem Interference for Airborne Equipment,” **Christopher J. Hegarty, Kevin W. Bean,** Olivier Julien, Sai Kalyanaraman, A.J. Van Dierendonck, Sam Pullen, Karl Shallberg, and Swen Ericson, *Proceedings of the 2018 International Technical Meeting (ITM) of The Institute of Navigation*, January 2018, Reston, VA.

“Updated Aviation Assessment of Interference in the L5/E5A Bands from Distance Measuring Equipment,” Karl Shallberg, John Flake, **Christopher J. Hegarty,** and **Dmitri V. Baraban,** *Proceedings of the Institute of Navigation (ION) GNSS+ 2018 Technical Meeting*, September 2018, Miami, FL.

“Urban Air Mobility,” **Andrew R. Lacher,** Panelist, NuAir UAS Symposium, September 2018, Verona, NY.

“Using Machine Learning to Improve Regulatory Review of Flight Waivers and Exemptions,” **Carlos E. Martinez** and **David S. Day,** *Proceedings of the 37th Digital Avionics Systems Conference (DASC)*, September 2018, London, England, UK.

“Using Mobile Devices for IFR Clearance Delivery and Release and Data Exchange,” **Paul A. Diffenderfer,** **Kevin M. Long,** and **Sara A. Wilkins,** *Proceedings of the American Institute of Aeronautics and Astronautics (AIAA) 2018 Aviation Technology, Integration, and Operations Conference, AIAA AVIATION Forum*, June 2018, Atlanta, GA.

“Using Model Predictive Control for Trajectory Optimization to Meeting Spacing Objectives,” **Lesley A. Weitz** and Xiaoli Bai, *Proceedings of the American Institute of Aeronautics and Astronautics (AIAA) Guidance, Navigation, and Control Conference, AIAA SciTech Forum*, January 2018, Kissimmee, FL.

“Very High Frequency Omni-directional Range (VOR) Minimum Operational Network (MON) Implementation Program,” **S. Vincent Massimini**, presented at Oshkosh AirVenture, July 2018, Oshkosh, WI.

“Why Unmanned Aircraft Systems (UAS) Make the Perfect Systems Engineering System,” **David R. Maroney** and Danielle Soban, *Proceedings of the 37th Digital Avionics Systems Conference (DASC)*, September 2018, London, England, UK.

“Women’s Leadership in Human Factors Engineering: Past, Present & Future,” Gabriella M. Hancock, Kimberly Stowers, Ellen J. Bass, Nancy Cooke, Mary Cummings, Haydee Cuevas, and **Valerie J. Gawron**, *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, October 2018, Philadelphia, PA.

Technical Exchange Meetings

Technical Exchange Meetings (TEM) are forums for exchanging ideas, starting a new initiative, learning about a new technology, sharing resources, or collaborating across programs and organizational boundaries. We sponsored, co-sponsored, or presented at four TEMs in 2018:

“Aviation Security–Supply Chain Integrity Panel Presentation,” **Uma D. Ferrell**, MITRE’s Inaugural Supply Chain Integrity Technical Exchange Meeting, April 2018, McLean, VA.

A Risk-Based Approach for sUAS Airworthiness and Safety Certification Technical Exchange Meeting, **Jeffrey L. Breunig** and **Joyce M. Forman**, George Mason University Center for Air Transportation Systems Research, March 2018, Fairfax, VA.

National Academies Committee on Assessing the Risk of UAS Integration Technical Exchange Meeting, UAS EXCOM Science and Research Panel (SARP) Approaches to UAS Risk, Dallas Brooks, Rodney Cole, **Edward A. Lester**, and **Brian C. Patterson**, January 2018, Washington, DC.

Sharing Analytical Results with Sponsors or Partners through Web Portals Technical Exchange Meeting, December 2018, McLean, VA.



HONORS, AWARDS, AND RECOGNITION

Special Honors and Recognition

William J. Penhallegon received an IMPALA (Interval Management Project Manager Award for Literally Anything) award from the Federal Aviation Administration for his indefatigable and tireless efforts for leading and completing the Advanced Interval Management (A-IM) Concept of Operations, February 2018.

The Department of Aerospace Engineering at Texas A&M University congratulated **Lesley A. Weitz** on being selected as an Outstanding Young Aerospace Engineer to their Aerospace Alumni Academy for 2018–2019, September 2018.

Breanna G. Hall was one of three MITRE employees to be named a Modern-Day Technology Leader during the Black Engineer of the Year Award Science, Technology, Engineering and Math Global Competitiveness Conference Modern-Day Technology Luncheon, February 2018.

Most Promising Engineer Award was presented to **Hamza Syed** during the Black Engineer of the Year Award Science, Technology, Engineering and Math Global Competitiveness Conference Gala Awards Dinner, February 2018.

Honors, Awards, and Recognition

RTCA presented its Significant Contributor Award to **Clark R. Lunsford** for his contributions on Special Committee 206: Aeronautical Information Services and Meteorological Data Link Services in producing DO-369: “Guidance for the Usage of Data Linked Forecast and Current Wind Information in Air Traffic Management (ATM) Operations” during the 2018 Global Aviation Symposium Awards Luncheon, June 2018.

RTCA presented its Significant Contributor Award to **Kelly R. Markin** for his contributions on Special Committee 228: Minimum Operational Performance Standards for Unmanned Aircraft Systems in producing “WP-3 and WP-4, Phase Two White Papers for DAA MOPS and C2 MOPS” during the 2018 Global Aviation Symposium Awards Luncheon, June 2018.

RTCA presented its Outstanding Leadership Award to **Edward A. Lester** for his contributions on Special Committee 228: Minimum Operational Performance Standards for Unmanned Aircraft Systems in producing DO-365: “Detect and Avoid Minimum Operational Performance Standards Phase 1 (DAA MOPS)” during the 2018 Global Aviation Symposium Awards Luncheon, June 2018.

Sara A. Wilkins was selected by the Transportation Research Board Executive Committee to receive Fred Burggraf Award, which recognizes excellence in transportation research by researchers 35 years or younger. This award was in recognition of her paper “Examining Heads Down Time in Transportation: A Case Study in Single Pilot General Aviation Operations.” July 2018.

Best Paper Awards

Best Professional Paper award presented to **Francis Box, Richard E. Snow, Angela Chen, Steven R. Bodie, Leonid Globus, and Timothy S. Luc**, for their paper entitled: “Frequency Assignment Function for Unmanned-Aircraft Command and Control Links,” at the 2018 Integrated Communications, Navigation, and Surveillance (ICNS) Conference, April 2018.

Letters of Commendation

From the Federal Aviation Administration in appreciation for the MITRE team’s highly successful non-TFDM workshop. Our internal team members participated in the workshop, filled in the gaps, and provided valuable information to the Subject Matter Experts, April 2018.

From the Federal Aviation Administration in appreciation of **Shweta P. Mulcare’s** contributions to the Go-Around Study working group session in leading the team to a profitable end, July 2018.

Honors, Awards, and Recognition

From the Federal Aviation Administration in appreciation for another outstanding job in supporting the FAA and specifically iTBO. The PBN NIWG meeting **Marshall E. Koch, Paul V. MacWilliams, and Elida C. Smith** hosted went extremely well. In particular, the demo proved very beneficial in helping Industry better understand the capabilities and therefore the challenges and complexities we face in trying to roll out iTBO, August 2018.

From the Federal Aviation Administration in appreciation of the MITRE TARGETS teams' response to questions and quandaries. The Tuesday 5.5 test group addresses user needs and suggestions in addition to correcting a critical error. In my opinion, that process and honest respect for the user is already resulting in a productive tool vs. one that "works," September 2018.

From the Federal Aviation Administration in appreciation for Dongsong Zeng's outstanding technical leadership and international coordination towards the development and harmonization of the DataComm standards, September 2018.

From the Federal Aviation Administration in appreciation for the MITRE team's support of the Part 101 Aviation Rulemaking Committee (ARC) Final Recommendations Report, September 2018.

From the Federal Aviation Administration in recognition of **Michael Borowski's** support for the 3T portfolio as the portfolio relates directly to the high visibility TBO initiatives that FAA has identified with stakeholders as crucial to the future of the NAS, September 2018.

From the Treasury Department in appreciation for the MITRE team's dedicated work in support of the Task Force on the U.S. Postal System (the Task Force). The work was analytical in nature, and the more than 500 pages shared with the Task Force members enabled us to deliver our findings and recommendations to the White House, as prescribed by the April 2018 Executive Order on the topic, October 2018.

From the Federal Aviation Administration in appreciation for **Jon I. Parker's** contributions in moving the ARIA project forward, October 2018.

From Honeywell in appreciation of **William J. Penhallegon's** and **H. Peter Stassen's** contributions on the AIM CONOPS. It's clear, easy to read and understand, and presents a comprehensive picture of ground and airborne TBO system concepts operating in a fully integrated environment, October 2018.

From the Federal Aviation Administration in appreciation of **Brian M. Crow's** contributions on the South/Central Florida Metroplex Project, November 2018.

Honors, Awards, and Recognition

From the Federal Aviation Administration in appreciation of the MITRE team's work on TARGETS 550. Thank you to all the effort being put forth on the reference software, December 2018.

Patents

“Camera Surveillance Planning and Tracking System,”
Emily K. Stelzer, Ronald S. Chong, Shuo Chen, Jacob Richkus, David M. Tuomey, and Vilas Nene, U.S.

Patent #: 10,140,872, November 27, 2018.

“Systems and Methods for Displaying Aircraft Separation Information,” **Clark D. Britan and Paul A. Diffenderfer, U.S. Patent #:** 10,163,356, December 25, 2018.



PROFESSIONAL SOCIETIES

Fellows

- **Human Factors and Ergonomics Society**
Valerie J. Gawron
- **The Institute of Electrical and Electronics Engineers**
Christopher J. Hegarty
- **The Institute of Navigation**
Ronald Braff
Christopher J. Hegarty
- **International Ergonomics Association**
Valerie J. Gawron
- **Royal Aeronautical Society**
Stephane L. Mondoloni

Associate Fellows

- **American Institute of Aeronautics and Astronautics**
Thomas A. Becher
Valerie J. Gawron
Christopher J. Hegarty
Andrew R. Lacher
David R. Maroney
S. Vincent Massimini
Ralf H. Mayer
Stephane L. Mondoloni
Craig R. Wanke
Lesley A. Weitz
Andrew D. Zeitlin

Professional Societies

Memberships

Air Force Association (AFA)

Air Line Pilots Association, International (ALPA)

Air Traffic Control Association (ATCA)

Aircraft Owners and Pilots Association (AOPA)

American Association for the Advancement of Science

American Association of Airport Executives (AAAE)

American Association of University Women (AAUW)

American Helicopter Society (AHS)

American Institute of Aeronautics and Astronautics
(AIAA)

- Air Transportation Systems
- Life Sciences and Systems (LLS) CoS

American Mathematical Society (AMS)

American Mensa

American Meteorological Society (AMS)

American Public Transport Association

American Physical Society (APS)

American Society for Quality (ASQ)

American Society of Civil Engineers (ASCE)

American Society of Safety Engineers (ASSE)

American Statistical Association (ASA)

APMG International

Armed Forces Communications and Electronics
Association (AFCEA)

Association for Aviation Psychology (AAP)

Association for Computing Machinery (ACM)

Association for Unmanned Vehicle Systems International
(AUVSI)

Certified Consulting Meteorologist (CCM)

Certified Information Systems Security Professional
(CISSP)

The Data Warehousing Institute (TDWI)

Experimental Aircraft Association (EAA)

Federal Aviation Administration Managers Association
(FAAMA)

Flight Safety Foundation

Friends and Partners in Aviation Weather

Human Factors and Ergonomics Society (HFES)

Information Systems Audit and Control Association
(ISACA)

Institute for Operations Research and the Management
Sciences (INFORMS)

Professional Societies

Institute of Electrical and Electronics Engineers (IEEE)

- Communications Society (COMSOC)
- Computer Society (CS)
- Industrial Electronics Society (IES)
- Industry Applications Society (IAS)
- Women in Engineering (WIE)

Institute of Navigation (ION)

International Council on Systems Engineering (INCOSE)

International Federation of Automatic Control (IFAC)

International Information System Security Certification Consortium (ISC)²

International Institute of Forecasters (IIF)

International Society of Air Safety Investigators (ISASI)

International Union of Radio Science (URSI)

Military Cyber Professionals Association (MCPA)

National Air Traffic Controllers Association (NATCA)

National Association of Flight Instructors (NAFI)

National Safety Council (NSC)

The Ninety-Nines: International Organization of Women Pilots

Project Management Institute (PMI)

Royal Aeronautical Society (RAeS)

Royal Institute of Navigation (RIN)

RTCA, Inc.

SAE International (SAE)

Signal Corps Regimental Association (SCRA)

Society of Automotive Engineers (SAE)

Society of Women Engineers (SWE)

Transportation Research Board (TRB)

Transportation Research Forum (TRF)

Virginia Helicopter Association (VHA)

Virginia Society of Professional Engineers (VSPE)

Whirly Girls–International Women Helicopter Pilots

Women in Aerospace (WIA)

Women in Aviation, International (WAI)

Women Military Aviators (WMA)

Young Aviation Professionals (YAP)

Honor Societies

Beta Gamma Sigma (Business)

Eta Kappa Nu (Electrical and Computer Engineers)

Omega Rho (International Operations Research)

Phi Beta Kappa (Liberal Arts and Sciences)

Sigma Pi Sigma (Physics)

Tau Beta Pi (Engineering)

Users Groups

ACM Special Interest Group on Computer-Human Interaction (SIGCHI)

Airline Group of the International Federation of Operational Research Societies (AGIFORS)

AirTOP User Group (AUG)

Americas & Pacific Rim TAAM Users Group (APTUG)

BADA User Group (BUG)

Worldwide TAAM Users Group (WWTUG)



TECHNICAL COMMITTEE MEMBERSHIPS

American Association of Airport Executives (AAAE)

- **Operations, Safety, and Planning Committee**
Cheryl R. Andrews

American Institute of Aeronautics and Astronautics (AIAA)

- **Aerospace Sciences Group**
Lesley A. Weitz, Deputy Director
- **Program Committees**
 - ***Transformational Flight***
David R. Maroney
 - ***Unmanned Systems***
Andrew R. Lacher
David R. Maroney
- **Technical Activities Committees**
 - ***Aircraft Technology Integration and Operations (ATIO) Group***
David R. Maroney, Deputy Director
 - ***Air Transportation Systems***
David R. Maroney, Emeritus Member
 - ***Complex Aerospace Systems Exchange (CASE)—Executive Committee***
David R. Maroney

Committee Participation

- ***Guidance, Navigation, and Control***
Lesley A. Weitz, Chair
- ***Intelligent Systems Technical Committee***
Andrew R. Lacher
- ***Modeling and Simulation***
Christine P. Taylor

American Institute of Aeronautics and Astronautics (AIAA) and Institute of Electrical and Electronics Engineers (IEEE)

- **Digital Avionics Systems Conference (DASC)**
Uma D. Ferrell, Technical Program Committee, Session Co-Chair

American Meteorological Society (AMS)

- **Aviation, Range, and Aerospace Meteorology (ARAM)**
Matthew J. Fronzak, Vice Chairman
- **Aviation, Range, and Aerospace Meteorology (ARAM) Conference**
Michael Robinson

European Workshop on Industrial Computer Systems, TC7

- **SAFECOMP 2018—International Conference on Computer Safety, Reliability and Security**
Uma D. Ferrell

EU-U.S. Cooperation on Satellite Navigation

- **Working Group C—Service Evolutions Subgroup (Previously called ARAIM Technical Subgroup)**
Young C. Lee

Federal Aviation Administration (FAA)

- **1090 MHz Spectrum Risk Assessment Team**
Stanley R. Jones
- **Air Carrier Training Aviation Rulemaking Committee (ACT ARC) Flight Path Management Working Group**
William A. Miller
- **Collaborative Decision Making (CDM) Group**
 - ***Weather Evaluation Team (WET)***
Matthew J. Fronzak
- **Drone Advisory Committee Subcommittee (DACSC)**
Hassan Shahidi
- **Drone Tracking and Identification Aviation Rulemaking Committee (ARC)**
Hassan Shahidi
- **Equip 2020**
Arthur D. Branch Jr.
Sean F. McCourt
- **Flight Standards: CNS Task Force** (*Joint with Airlines for America*)
Michael R. Cramer
Sean F. McCourt
William A. Miller

Committee Participation

- **General Aviation Issues Analysis Team (GA-IAT)**
Jeffrey P. Mittelman, Tri-chair
- **Performance-Based Operations Aviation Rulemaking Committee (PARC)**
 - *Communications Working Group*
Dongsong Zeng
 - *Navigation Working Group*
Michael R. Cramer, Chair
- **Research, Engineering, and Development Advisory Committee (REDAC)**
 - *REDAC Human Factors Subcommittee*
Christopher T. DeSenti
 - *REDAC NAS Operations Subcommittee*
Emily K. Stelzer
 - *REDAC Subcommittee for Aircraft Safety*
Andrew R. Lacher
- **Space-Based ADS-B Support Team**
Stanley R. Jones
- **Unmanned Aircraft Safety Team (UAST)**
Hassan Shahidi
Anuja Verma
- **Unmanned Aircraft System in Controlled Airspace Aviation Rulemaking Committee**
Kelly R. Markin
Debra A. Moch-Mooney

- **Unmanned Aircraft Systems Executive Committee (DHS, DoD, FAA, NASA)**

- *Science and Research Panel (SARP)*

Brian C. Patterson

Federal Aviation Administration and EUROCONTROL

- **USA/Europe Air Traffic Management R&D Seminar**

Craig R. Wanke

Human Factors and Ergonomics Society

- **A. R. Lauer Safety Award Committee**

Valerie J. Gawron, Chair

- **Aerospace Systems Technical Group**

Valerie J. Gawron

David A. Domino

Scott H. Mills

Emily K. Stelzer

- **Cognitive Engineering and Decision Making Technical Group**

Emily K. Stelzer

- **Surface Transportation Technical Group**

Valerie J. Gawron

International Telecommunication Union—Radiocommunication Sector (ITU-R)

- **Efficient Orbit/Spectrum Utilization for FSS and BSS (WP 4A)**

Michael Tran

Committee Participation

- **Efficient Orbit/Spectrum Utilization for MSS and RDSS (WP 4C)**

Michael Tran

- **MMS/GMDSS: Aeronautical Mobile Service and Radiodetermination (WP 5B)**

Michael Tran

- **Remote Sensing Systems (WP 7C)**

Michael Tran

- **Space Radiocommunication Applications (WP 7B)**

Michael Tran

National Academy of Sciences

- **Assessing the Risk of Unmanned Aircraft Systems**

Andrew R. Lacher

National Aviation Authorities

- **Joint Authorities for Rulemaking on Unmanned Systems (JARUS)**

Brian C. Patterson

National Business Aviation Association (NBAA)

- **Safety Committee, Safety Assurance Working Group**

Jeffrey P. Mittelman

Regional Airline Association

- **Flight Technology Committee**

Todd M. Stock

RTCA, Inc.

- **Forum for Aeronautical Software**
Uma D. Ferrell
- **NextGen Advisory Committee (NAC)**
Gregg A. Leone
- **NextGen Advisory Committee Joint Analysis Team (JAT)**
Debra A. Pool
- **NextGen Advisory Committee (Subcommittee Member)**
Dennis A. Sawyer
- **Policy Board**
Gregg A. Leone
- **Program Management Committee (PMC)**
Christopher J. Hegarty, Chair

(See also RTCA, Inc., Standards Committee Memberships.)

Transportation Research Board (TRB)

- **Airfield and Airspace Capacity and Delay (AV060)**
Marcus Smith
- **Aviation Economics and Forecasting Committee (AV040)**
Katherine T. Harback, Chair
- **Aviation System Planning (AV020)**
Ehsan Esmaeilzadeh
Michael T. Wells

Committee Participation

- **Committee on Intergovernmental Relations in Aviation (AV010)**
 - *Commercial Space Transportation Subcommittee*
Cheryl R. Andrews
Marcus Smith, Chair
- **Common Performance Metrics for Airport Infrastructure and Operational Planning (ACRP 03-41)**
Marcus Smith
- **Environmental Impacts of Aviation (AV030)**
Anuja A. Mahashabde
- **Standing Committee on Aircraft/Airport Compatibility (AV070)**
Neal A. Westlund
- **Standing Committee on Airfield and Airspace Capacity and Delay (AV060)**
Neal A. Westlund
- **Standing Committee on Light Commercial and General Aviation (AV080)**
Neal A. Westlund

Transportation Research Forum (TRF)

- **Chicago Chapter**
Laurence F. Audenaerd, Vice President, Programs

Women in Aerospace (WIA)

Emily K. Stelzer
Anuja Verma



STANDARDS COMMITTEE MEMBERSHIPS

3rd Generation Partnership Project (3GPP)

Izabela L. Gheorghisor

ARINC Industry Activities (IA) (An SAE-ITC Industry Program)

- **Airlines Electronic Engineering Committee (AEEC)**
 - ***Data Link (DLK) Systems Subcommittee***
Dongsong Zeng
 - ***Flight Management Systems (FMS) Subcommittee***
William A. Miller
 - ***Navigation Database (NDB) Subcommittee***
William A. Miller
 - ***Systems Architecture and Interfaces (SAI) Subcommittee***
William A. Miller

ASTM International

- **F38 Unmanned Aircraft Systems**
Arthur D. Branch Jr.
Jeffrey L. Breunig
Matthew T. DeGarmo
R. Michael Guterres
Andrew R. Lacher
Edward A. Lester
Brian C. Patterson

- **AC377 Autonomy Design and Operations in Aviation**

Andrew R. Lacher

European Organisation for Civil Aviation Equipment (EUROCAE)

- **WG-62 GALILEO**

Christopher J. Hegarty

- **WG-92 VDL Mode 2 Standards Working Group**

Dongsong Zeng

- **WG-108 Internet Protocol Suite**

Dongsong Zeng

International Civil Aviation Organization (ICAO)

- **Aeronautical Communications Panel Working Group I**

Dongsong Zeng

- **Air Traffic Management Requirements and Performance Panel (ATMRPP)**

Stephane L. Mondoloni

- **Instrument Flight Procedures Panel (IFPP) Integration Working Group (IWG)**

William A. Miller, Adviser

- **Navigation Systems Panel (NSP)**

Timothy P. Cashin, Adviser

National Academy of Engineering

- **Aviation Safety Assurance Committee**

Craig R. Wanke

RTCA, Inc.

- **RTCA/EUROCAE Combined Surveillance Committee (CSC)**

Clark R. Lunsford

- **RTCA/EUROCAE Forum on Aeronautical Software (FAS)**

John C. Angermayer

- **SC-147 Traffic Alert & Collision Avoidance System (TCAS)**

Edward A. Lester

Andrew D. Zeitlin

- **SC-159 Navigation Equipment Using the Global Navigation Satellite System (GNSS)**

Kevin W. Bean

M. Bakry El-Arini

James P. Fernow, WG-2

Christopher J. Hegarty, Co-Chair

Dongsong Zeng

- **SC-186 Automatic Dependent Surveillance-Broadcast (ADS-B)**

Randall S. Bone
D. Stuart Bowman
David A. Domino
Stanley R. Jones
Raphael D. Katkin
Daniel B. Kirk
Brock J. Lascara
William J. Penhallegon
Stephanie A. Priess
H. Peter Stassen
Robert C. Strain
Lesley A. Weitz

- **SC-206 Aeronautical Information Services and Meteorological Data Link Services**

Laurence F. Audenaerd
J. William Carson
Izabela L. Gheorghisor
Brock J. Lascara
Clark R. Lunsford
Robert C. Strain

- **SC-213 Enhanced Flight Vision Systems and Synthetic Vision Systems (EFVS/SVS)**

David A. Domino

- **SC-214 Standards for Air Traffic Data Communication Services**

Randall S. Bone
Stephen L. Giles
Daniel B. Kirk
Dongsong Zeng, Secretary

- **SC-216 Aeronautical Systems Security**
John C. Angermayer
- **SC-223 Internet Protocol Suite (IPS) and AeroMACS**
Francis Box
Izabela L. Gheorghisor
Stephen L. Giles
Dongsong Zeng, Secretary
- **SC-227 Standards of Navigation Performance**
Michael R. Cramer, Chair
William A. Miller
- **SC-228 Minimum Operational Performance Standards for Unmanned Aircraft Systems**
Donald S. Arnstein
Francis Box
Joseph M. Boyd
Jeffrey L. Breunig
Izabela L. Gheorghisor
Leonid Globus
Edward A. Lester, Co-Chair WG-1
Brian C. Patterson
Dongsong Zeng
- **SC-233 Addressing Human Factors/Pilot Interface Issues for Avionics**
Valerie J. Gawron



ACADEMIC AND SPECIAL APPOINTMENTS

Teaching Positions

DePaul University

- **Visiting Scholar**

Laurence F. Audenaerd

George Washington University School of Engineering and Applied Science

- **National Advisory Council**

Andrew R. Lacher

Northwestern University

- **Adjunct Faculty**

Laurence F. Audenaerd

Queens University, Belfast, Northern Ireland

- **Visiting Professor in Remotely Piloted Aircraft Systems**

David R. Maroney

State University of New York at Buffalo

- **Department of Mechanical and Aerospace Engineering, Faculty Advisory Board**

Lesley A. Weitz, Board Member

Courses Taught Through MITRE

“Safety Management Systems (SMS) Overview,”
May 2, 2018, Newark, NJ.

“SMS Principles,” June 4–8, 2018, September 17–21, 2018,
December 3–7, 2018, McLean, VA.

Other Courses Taught

“DO-178C: Software Considerations in Airborne Systems and Equipment Certification,” **John C. Angermayer** and **Kent V. Hollinger**. RTCA Training, RTCA, Inc.: Washington, DC, March, June, September and December 2018; Plano, TX, November 2018; St. Louis, MO, November 2018.

“DO-178C: Software Considerations in Airborne Systems and Equipment Certification,” **John C. Angermayer** and **Uma D. Ferrell**, Mesa, AZ, August 2018.

“GPS Operation for Engineers and Technical Professionals,” **Christopher J. Hegarty**, presented for Navtech GPS at numerous venues, February 2000 to January 2018.

“Simulation Applications in Training,” **Valerie J. Gawron**, presented for the Flight and Ground Vehicle Simulation Update, Binghamton University, Binghamton, NY, May 2018.



BOOK & JOURNAL EDITORS & REVIEWERS

- **The Aeronautical Journal**
Amal Srivastava, Reviewer
- **American Institute of Aeronautics & Astronautics, Inc.**
 - *Journal of Aerospace Information Systems*
Craig R. Wanke, Reviewer
 - *Journal of Air Transportation*
Matthew J. Fronzak, Reviewer
Stephane L. Mondoloni, Reviewer
Shin-Lai Tien, Reviewer
Craig R. Wanke, Associate Editor
Lesley A. Weitz, Reviewer
 - *Journal of Aircraft*
Craig R. Wanke, Reviewer
 - *Journal of Guidance, Control, and Dynamics*
Shin-Lai Tien, Reviewer
Erik P. Vargo, Reviewer
Craig R. Wanke, Reviewer
Lesley A. Weitz, Reviewer
- **American Society for Quality**
 - *Software Quality Professional*
Uma D. Ferrell, Editorial Review Board Member
and Technical Book Reviewer

- **Canadian Journal of Civil Engineering**
Panta Lucic, Reviewer
- **Ergonomics in Design: The Quarterly of Human Factors Applications**
Valerie J. Gawron, Editorial Board
- **European Journal of Operational Research**
Panta Lucic, Reviewer
Craig R. Wanke, Reviewer
- **Global Navigation Satellite System: Technologies and Applications Series, Artech House**
Christopher J. Hegarty, Co-series Editor
- **Institute of Electrical and Electronics Engineers**
 - *Aerospace and Electronics Systems*
R. Michael Guterres, Reviewer
 - *Transactions on Aerospace and Electronic Systems*
Brian Bian, Reviewer
Izabela L. Gheorghisor, Reviewer
Young C. Lee, Reviewer
 - *Transactions on Intelligent Transportation Systems*
Craig R. Wanke, Reviewer
- **International Academy of Astronautics**
 - *Journal of Acta Astronautica*
Lesley A. Weitz, Reviewer

- **International Journal of Aerospace Psychology**
Valerie J. Gawron, Domain Editor
Emily K. Stelzer, Reviewer
- **Journal of Navigation (Royal Institute of Navigation)**
Christopher J. Hegarty, Editorial Advisory Board
- **Journal of the Transportation Research Board**
Laurence F. Audenaerd, Reviewer
- **Journal of the Transportation Research Forum**
Laurence F. Audenaerd, Reviewer
- **NAVIGATION: Journal of the Institute of Navigation**
Christopher J. Hegarty, Associate Editor
Young C. Lee, Reviewer
- **Transportation Research Part C: Emerging Technologies: An International Journal**
Shin-Lai Tien, Reviewer
- **Wiley**
 - *Journal of Software: Evolution and Process*
Uma D. Ferrell, Reviewer



TECHNOLOGY TRANSFER

MITRE's Technology Transfer Office works with staff members to ensure that the benefits of their innovations reach the largest possible user base. We share our innovations with sponsoring as well as non-sponsoring agencies. In many situations, it benefits our sponsors to make our knowledge and intellectual property more readily available to a broader audience. We do this through publications, open source contributions, and relationships with industry and other research partners.

We also transfer our technologies to commercial organizations when appropriate so that they can undertake the technical, business, and manufacturing activities necessary to bring products and services incorporating our intellectual property to market. As product development is not part of our mission, commercialization may be the only viable transfer mechanism to bring commercial products that are accessible, affordable, and supported to our sponsors.

Technology transfer provides government organizations with new capabilities. It also helps MITRE achieve its mission to advance technology and return value to the nation's economy. Furthermore, it enhances U.S. competitiveness in the world market.

Technology Transfer

Here is a list of recent aviation technologies and capabilities that MITRE transferred or is in the process of transferring:

Technology	Year	Recipient
R Analysis Packages for Big Data Analytics	FY18	Industry
Risk Assessment and Analysis Model for UAS Operations within the Singapore National Airspace	FY18	Civil Aviation Authority of Singapore (CAAS)
Open Source Software Community for Accelerating Use of SWIM Data	FY18–FY19	FAA and Industry
NAS-Wide Real-Time Monitoring and Alerting Capability	FY18–FY19	FAA
Mobile Instrument Flight Rules Clearance Delivery	FY18–FY19	FAA and Industry
Airport Construction Reporting	FY18–FY19	FAA
PBN Flight Procedures Design Criteria	FY18–FY20	FAA
Digital Co-Pilot Prototype	FY18–FY20	FAA and Industry
Threaded Track/Flight Story	Planned for FY19–FY20	FAA

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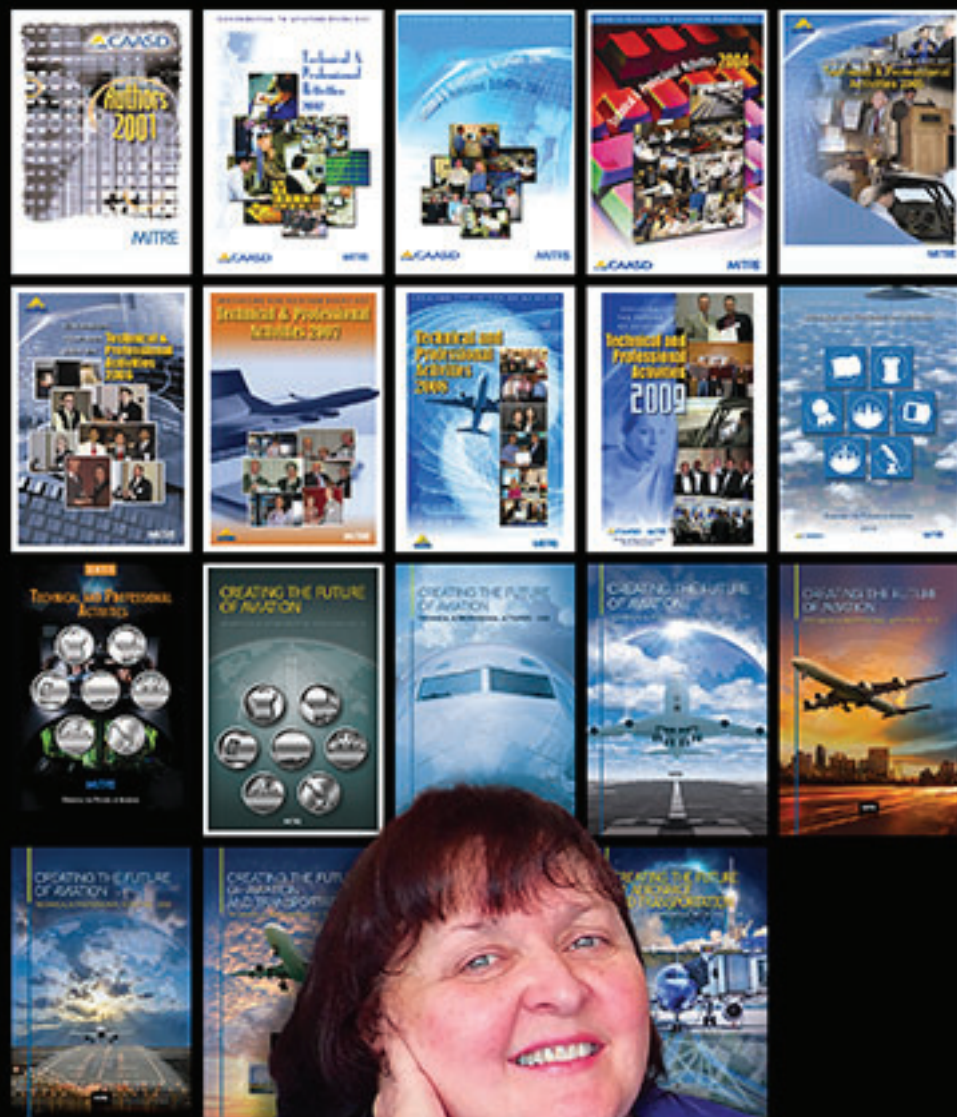
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