NEW HEIGHTS REACHED TOGETHER
2016 Annual Report
New Heights Reached, Together

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“This past year has seen unprecedented collaboration among the many and varied decision makers in aviation.”

—Margaret Jenny, President, RTCA
Over the course of 2016, thousands of participants in RTCA committees with many unique perspectives, ambitions and objectives, worked alongside the FAA, and found common ground on ways to overcome impediments to building and maintaining the world’s safest, most efficient and secure air transportation system.


The NextGen Advisory Committee (NAC) brought the FAA and industry together to forge a common understanding of the benefits being derived by the implementation of high-priority. They also agreed on early NextGen capabilities, sought mitigations to the myriad challenges of community outreach for new procedures, and provided feedback on the FAA’s forward plans.

The Tactical Operations Committee (TOC) delivered valuable input on PBN routing, graphical temporary restrictions and procedures to mitigate problems associated with airport construction.

Recognizing the value of industry engagement through the RTCA Committee process, the FAA turned to RTCA to establish the Drone Advisory Committee (DAC). This Committee identified its key issues associated with the integration of drones into the airspace and formed working groups to develop recommendations to the FAA on airspace access, funding, and the respective roles of local and federal authorities in making and enforcing regulations.

This report reflects the tremendous contribution of the aviation community from all corners of the aviation industry—a unique public-private partnership among aviation system users, providers and regulators.

Margaret Jenny
President, RTCA
RTCA is the only organization I know that will bring together the right technical and operational talent—efficiently and effectively—to work together for the greater good of aviation.

Members throughout the world include:

- Academia
- Airlines
- Airports
- Aviation Service Providers Department of Defense General Aviation
- Government Organizations Labor Unions
- Manufacturers (Aircraft & Avionics, etc.)
- R&D Organizations
- Suppliers of Automation and Infrastructure
- UAS
Board of Directors

The RTCA Board of Directors is comprised of individuals from RTCA member companies that provide management and fiduciary oversight.

The Board of Directors works in conjunction with the RTCA Policy Board to establish policies and programs.

Policy Board

The Policy Board serves as an important link between the members of RTCA and the organization’s policy development activities by establishing RTCA policies and programs. Individuals from RTCA member organizations are elected to serve on the Policy Board.

The Policy Board also includes all the members of the Board of Directors.

Board of Directors

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Todd Zarfos
The Boeing Company
Founded in 1935 and chartered by the FAA, RTCA is the premier public-private partnership venue for developing consensus among diverse, competing interests on critical aviation modernization issues in an increasingly global enterprise.
At the core of RTCA are the thousands of dedicated individuals from the U.S. and around the world who come together to develop comprehensive, industry-vetted and endorsed recommendations. Leveraging the experience and expertise of RTCA members, recommendations are provided to the government, affecting policy and investment priorities to facilitate implementation of air traffic management system improvements, and minimum performance standards, reports and guidance documents used by the FAA as a partial basis for the certification of equipment and systems.

Drone Advisory Committee (DAC)
The newest policy committee was launched in 2016 to provide an open venue for the FAA and key decision-makers supporting the safe introduction of Unmanned Aircraft Systems (UAS) into the National Airspace System (NAS). The Committee seeks to identify and propose actions to the FAA on how best to facilitate the resolution of issues affecting the efficiency and safety of integrating UAS into the NAS.

NextGen Advisory Committee (NAC)
Established in 2010, the NAC is a Federal advisory committee formed to provide advice on policy-level issues facing the aviation community in implementing NextGen (modernizing the aviation system). The NAC is tackling issues that are broader than air traffic management, including safety, airports, the environment and global harmonization.

Program Management Committee (PMC)
Established in 1998, the PMC manages the technical Federal advisory committee-related business of RTCA. In response to an identified need by government and industry, the PMC establishes and oversees Special Committees.

RTCA Federal Advisory Committees

Special Committees (SCs)
SCs leverage the expertise of the aviation community to generate recommendations in response to requests from the FAA to address technical topics. Special Committees develop Operational and Safety Performance Requirements, Interoperability Requirements, Minimum Aviation System Performance Standards (MASPS), Minimum Operational Performance Standards (MOPS), reports and guidelines. These documents shape FAA certification of the safety and efficiency of new equipment and provide a competitive market for the implementation of these technologies. RTCA documents are also used by the private sector for development, investment and other business decisions. Many of these Special Committees work jointly with EUROCAE committees to develop international technically equivalent standards.

Tactical Operations Committee (TOC)
Established in 2013, the TOC provides an open venue for the FAA and those who operate in the NAS to work in partnership to identify and resolve operational issues and establish associated policies to facilitate the efficiency of the NAS.
The DAC provides a venue for organizations with varied views and opinions to strive to find consensus on issues critical to the safe and secure integration of drones into the airspace. They are providing advice to the FAA on priorities for drone applications and missions, respective roles of local and federal authorities, as well as institution funding mechanisms. During 2016, the Committee focused on defining the priorities for their work program.

Brian Krzanich  
Intel (Chair)  

Victoria Wassmer  
Federal Aviation Administration (Designated Federal Officer)  

Greg Agvent  
CNN  

Juan Alonso  
Stanford University  

Mark Baker  
Aircraft Owners and Pilots Association  

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Lockheed Martin Corporation  

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Ed Sayadian  
Harris Corporation  

Brendan Schulman  
DJI Technology  

Phil Straub  
Garmin, Ltd.  

Dave Vos  
Consultant  

Brian Wynne  
Association for Unmanned Vehicle Systems International  

Robert Young  
Precision Hawk USA, Inc.  

Matthew Zuccaro  
Helicopter Association International
NextGen Advisory Committee

The NAC is a committee of aviation executives working to develop recommendations for NextGen priorities, as well as identifying and recommending mitigations of the myriad challenges to implementing NextGen.

The NAC provided a series of recommendations for community outreach to assist the FAA and industry with overcoming the noise and environmental challenges associated with Performance-Based Navigation (PBN) implementations. The Committee also identified specific actions to address risks, such as training, decision support tools, procedures and policies, as well as evaluating the deployment of DataComm, Improved Multiple Runway Operations (IMRO), PBN and Improved Surface Operations capabilities. The NAC approved a 15-year plan for deployment of PBN that identifies and prioritizes the tools and technologies that are ground- vs. aircraft-based in 5-year increments.

Richard Anderson
Delta Air Lines, Inc.
(Chair)

Victoria Wassmer
Federal Aviation Administration
(Designated Federal Officer)

Eduardo Angeles
Federal Aviation Administration

Mark Baker
Aircraft Owners & Pilots Association

Ed Bolen
National Business Aviation Association

Frank Brenner
EUROCONTROL

Teri Bristol
Federal Aviation Administration

Pete Bunce
General Aviation Manufacturers Association

Tim Canoll
Air Line Pilots Association International

Russell “Chip” Childs
SkyWest, Inc.

Carl D’Alessandro
Harris Corporation

Mario Diaz
City of Houston Department of Aviation

Steve Dickson
Delta Air Lines, Inc.

Craig Drew
Southwest Airlines

Pete Dumont
Air Traffic Control Association

Jim Eck
Federal Aviation Administration

Carl Esposito
Honeywell Aerospace

Ginger Evans
City of Chicago

Florian Guillermet
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John Harris
Raytheon International, Inc.

Ryan Hartman
Insitu, Inc.

Angie Heise
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RTCA, Inc.

Tracy Lee
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Jeff Martin
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David Melcher
Aerospace Industries Association

Per Noren
The Boeing Company

Michael Perrone
Professional Aviation Safety Specialists

Brad Pierce
Aurora City Council

Paul Rinaldi
National Air Traffic Controllers Association

Lillian Ryals
The MITRE Corporation

Chance Saltzman
United States Air Force

Dr. Jaiwon Shin
National Aeronautics and Space Administration

Jennifer Solomon
Federal Aviation Administration

Kimball Stone
American Airlines, Inc.
Program Management Committee

The PMC is comprised of 17 senior leaders from RTCA member organizations including the airlines, the Department of Defense, aircraft manufacturers, pilots, providers of Communications, Navigation and Surveillance (CNS) and air traffic management (ATM) technology.

The PMC approves the establishment of Special Committees, tracks progress, provides important oversight in guiding committees technical work and approves the final products for submittal to the FAA. The PMC approved ten Special Committee deliveries and approved the creation of one new Special Committee in 2016.

Dr. Christopher Hegarty
The MITRE Corporation
(Chair)

Lou Volchansky
Federal Aviation Administration
(Designated Federal Officer)

Douglas Arbuckle
Federal Aviation Administration

Steve Brown
National Business Aviation Association

Lawrence Dibble
United States Army

Chris Durkin
Honeywell International, Inc.

Robert Grove
Garmin, Ltd.

Richard Heinrich
Rockwell Collins, Inc.

Jens Hennig
General Aviation Manufacturers Association

Robert Ireland
Airlines for America

Margaret Jenny
RTCA, Inc.

Dr. George Ligler
Consultant

Thomas Shields
United States Air Force

Randy Kenagy
Air Line Pilots Association International

Michele Merkle
Federal Aviation Administration

Al Secen
RTCA, Inc.

CDR Donald Sigley
United States Navy

Jessie Turner
The Boeing Company
RTCA’s 24 SCs continued their work developing comprehensive, industry endorsed recommendations. These recommendations are provided to the FAA as minimum performance standards and guidance documents.

**SC-135, Environmental Testing**, continues to maintain RTCA DO-160 (current version is DO-160G), *Environmental Conditions and Test Procedures for Airborne Equipment*. This document is the international de facto standard for environmental testing of commercial avionics and provides standard procedures and environmental test criteria for testing airborne equipment to determine their performance characteristics. DO-160G was published in December 2010, and an update of the Users’ Guide material for this document is in development, with the aim of providing rationales, guidance and background information for the environmental, test procedures and requirements, as well as lessons learned from aircraft and laboratory experience.

**SC-147, Traffic Alert & Collision Avoidance System (TCAS)**, is developing the new Aircraft Collision Avoidance System for NextGen (ACAS X) MOPS to specify minimum requirements for a collision avoidance system including surveillance, tracking and threat resolution functionalities. These MOPS will specify the optimized logic methodologies used by the collision avoidance logic and its performance, as well as providing testing of all requirements.

In addition to developing the deliverables stated above, the committee will provide a venue for industry discussion of other near-term operational performance of TCAS II systems within the NAS.

The ACAS X₃ MOPS will be used by the regulators as a basis for new or revised Technical Standard Order(s) and guidance material as appropriate. These MOPS are also envisioned to be used by SC-228 in its Phase II UAS Detect and Avoid standards development effort.

**SC-159, Global Positioning System (GPS)**, is developing minimum standards that form the basis for FAA approval of equipment using GPS as a primary means of civil aircraft navigation. The Committee’s most recent publication, DO-229D with Change 1, *Minimum Operational Performance Standards for Global Positioning System/Satellite-Based Augmentation System Airborne Equipment*, contains Minimum Operational Performance Standards (MOPS) for airborne navigation equipment (2D and 3D) using the Global Positioning System (GPS) augmented by the Satellite-Based Augmentation System (SBAS). The Committee is monitoring GNSS developments for the next activity; developing a dual frequency / multi-constellation MOPS.

**SC-186, Automatic Dependent Surveillance-Broadcast (ADS-B)**, is publishing MOPS intended to be used by the FAA and other civil aviation authorities (CAAs) as an acceptable means of certifying ADS-B equipment for civil aircraft. Additional documents from SC-186 may form the basis of advisory material.
for certification authorities, and may inform the operational approval process and safety risk management directives for the FAA and other CAAs.

There are three categories of MOPS: ADS-B, FIM, and FIM SPR.

**ADS-B MOPS**: provides equipment specifications for the ADS-B link on 1090MHz (1090ES) and 978 MHz (UAT). The FAA is expected to issue a TSO referencing this standard, and to be used for manufacturers of this equipment. Version 3 ADS-B (DO-260C and DO-282C) systems will be compatible with Version 2 ADS-B (DO-260B and DO-282B), which serves as the minimum avionics standards for the U.S. ADS-B Out rule.

**FIM MOPS**: provides equipment specifications for the Interval Management set of ADS-B-In applications. This is intended to result in a TSO for manufacturers of this equipment.

**FIM SPR**: Will provide the revised operational and environment description (ISED) for the FIM application used to reach joint RTCA/EUROCAE agreement for the scope of the FIM MOPS. Will also update accordingly the DO-328 safety and performance analysis and derived requirements. This will be used to develop and justify the MOPS-level requirements for the FIM MOPS which will be tightly coupled to the ASA System MOPS (DO-317B).

**SC-209, ATCRBS & Mode S Transponder**, is developing operational requirements based upon the airborne and ground user needs for a Mode S system. They are working closely with ICAO Panels, FAA/CAAs, EUROCAE, AEEC, SAE, and other RTCA Special Committees to ensure a global view of these MOPS. Specifically, they are working with SC-186 - ADS-B Working Group 3 and Working Group 4. The results of this coordination will be RTCA/DO-181F, a revision to the current Minimum Operational Performance Standards (MOPS) published by SC-209. This revised standard is intended to be used by the FAA and other Civil Aviation Authorities (CAAs) as an acceptable means of certifying Mode S equipment that use this link, such as civil aircraft and ground vehicles on an airport surface.

**SC-213, Enhanced Flight Vision Systems and Synthetic Vision Systems (EFVS/SVS)**, is developing MASPS for SVS, EFVS, EVS and combined architectures to identify intended operations and systems architectures and enable the development of MOPS; and DO-315B, Minimum Aviation System Performance Standards (MASPS) for Enhanced Vision Systems, Synthetic Vision Systems, Combined Vision Systems and Enhanced Flight Vision Systems. They will develop another revision to DO-315 as well as a MASPS for vision systems for approach, landing and rollout (300ft. RVR).

**SC-214, Standards for Air Traffic Data Communication Services**, is developing Safety and Performance Requirements (SPR) and Interoperability Requirements (INTEROPS) documents for the Air Traffic Services (ATS) supported by data communications to be implemented in the United States in defined environments through 2025 and in Europe as part of the Single European Sky ATM Research (SESAR) operational improvements. Data communications will introduce services that allow evolution from the current workload-intensive, voice-based air traffic control concepts, to collaborative, management-by-exception operations. Advanced data links between ground and airborne systems are envisioned to increase capacity,
allowing greater user access and more efficient flight routing. The committee is also revising DO-224C, *Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques*, and DO-281B, *Minimum Operational Performance Standards (MOPS) for Aircraft VDL Mode 2 Physical Link and Network Layer*.

**SC-216, Aeronautical Systems Security**, is revising DO-326, *Airworthiness Security Methods and Considerations*, for harmonization with ED-203 (same title) jointly with WG-72. The Committee’s recommendations and guidance material will help ensure safe, secure and efficient operations amid the growing use of highly integrated electronic systems and network technologies used on-board aircraft, for CNS/ATM systems, and air carrier operations and maintenance.

**SC-217, Aeronautical Databases**, is working jointly with WG-44, Aeronautical Databases, on a revision to DO-201, *Standards for Aeronautical Data*. The objective is targeted towards data supporting new airborne and ground navigation applications, but it does not aim to standardize the applications themselves. The document will be updated to align with the developments in the navigation domain over the past 15 years in general, with emphasis on the Performance Based Navigation principles. The update will consider the requirements of the new ATM application – with inputs from SESAR and NextGen – (e.g. 4D trajectory, Advanced PBN, SWIM, etc.) as well as changes suggested by industry and derived from authorities’ experience feedback. The update will aim at ensuring consistency with ICAO, ARINC and other related EUROCAE and RTCA standards for data processing, particularly data quality (ED-76A/DO-200B, published in 2015).

**SC-222, AMS(R)S**, is developing Minimum Aviation Performance Standards (MASPS) with system level attachments from Inmarsat and Iridium, and Minimum Operational Performance Standards (MOPS) with normative appendices from Inmarsat and Iridium (AMS(R)S), incorporating DO-270 satellite subnetwork material and aligned with ICAO’s Global Operational Data Link (GOLD) document. The Committee is working jointly with EUROCAE WG-82 and has been tasked to develop standards relative to new air-ground data link technologies including three components: airport surface, satellite and en route/TMA L band systems. The committee completed Change 1 to DO-262B - *MOPS for Avionics Supporting Next Generation Satellite System (NGSS) Iridium Specific Appendix D*, providing information and requirements specific to an Aircraft Earth Station (AES) using the Iridium communication system for providing Aeronautical Mobile Satellite (Route) service (AMS(R)S).

**SC-223, Aeronautical Mobile Airport Communication System**, having completed the initial standard for the Airport Wireless Surface Communications System (AeroMACs), SC-223 is now developing the Internet Protocol (IP) Standard for use by AeroMAC implementations. The Committee will first identify the certification profiles to be used over AeroMACs and then develop the MOPS for avionic certification of air to ground communications. These standards are required to support data communication developments for collaborative decision making (CDM), surveillance broadcast system (SBS) and system wide information management (SWIM), as well as weather and flight information systems efforts on the airport surface.

**SC-224, Airport Security Access Control Systems**, published two releases of DO-230, *Integrated Security System Standard for Airport Access Control*. DO-230F predominately addresses the Credentialing Section of the document and the technical criteria needed due to rapid advances in technology, trends and policy. While DO-230G incorporated the latest technological advances in security access control systems and identity management technologies, including smart cards and biometrics, the nature of the changes in available technology, and the need to
enhance sections pertaining to perimeter security, security operation support, and identity management requirements, has led to a major change in the layout and content of the document. DO-230G includes the addition of checklists to the major sections covered in this document. The group is working on DO-230H to update the Credentialing, Access Control Systems, and Communications sections.

**SC-225, Rechargeable Lithium Batteries & Battery Systems**, is developing certification guidance for small- and medium-sized rechargeable lithium batteries and battery systems installed in the aircraft. The document identifies battery categories by energy level as well as sub-categories by venting provisions. It also identifies battery types and includes the requirements and test procedures to be performed on rechargeable lithium battery systems. They include general, performance and environmental requirements and tests. The document does not contain design requirements, but does provide installation considerations that may impact the design of the battery system. It also provides installation considerations for the installer.

The focus of the work of the Committee has been to address feedback from the Program Management Committee (PMC) concerning guidance for installation, testing, and validation.

**SC-227, Standards of Navigation Performance**, is developing navigation standards intended for designers, manufacturers and installers of avionics equipment; airspace managers and service providers; and the users of these navigation systems for worldwide operations. The revision to DO-283, Minimum Operational Performance Standards (MOPS) for Required Navigation Performance for Area Navigation, will provide guidance for the development of airspace and operational concepts needed to obtain the benefits of enhanced navigation capability in the aircraft; this revision will be aligned on the MASPS DO-236C Change 1 developed to cover the Time of Arrival Control (TOAC) and wrong runway monitoring. Moreover, the MOPS will be compatible with the upcoming ICAO navigation specification for advanced RNP, to be published in the update to the ICAO PBN Manual, Document 9613. In 2014, the Committee published DO-236C Change 1, Minimum Aviation System Performance Standards (MASPS): Required Navigation Performance for Area Navigation. This Change defines the four-dimensional standards that support both RNP and trajectory-based operations and a standard for wrong runway monitoring in support of aviation safety initiatives.

In March 2015, the Committee was tasked to revise the DO-257A, Minimum Operational Performance Standards for the Depiction of Navigational Information on Electronic Maps. The Committee will update this document consistent with DO-236C and Change 1, and Revision to DO-283A to ensure its minimum standards for display of navigation information on electronic maps further facilitate the implementation of PBN.

**SC-228, Minimum Operational Performance Standards for Unmanned Aircraft Systems**, is developing the MOPS for DAA equipment and a Command and Control (C2) Data Link MOPS establishing L-Band and C-Band solutions. Working Group 2 completed DO-362 in September 2016 and Working Group 1 will complete their work in December. With the publication of these documents, the special committee is looking forward to Phase II work.

In Phase Two, SC-228 will develop Detect and Avoid performance standards for a broad range of civil UAS capable of operations Beyond Visual Line of Sight (BVLOS). These operations, at a minimum, will take place in Class D, E and G, for the entire duration of a flight (i.e., extended operations). Three development efforts are envisioned for Phase Two: MOPS for a ground-based sensor; MOPS for an airborne sensor; and an update to the DAA MOPS (Rev A and Rev B) to incorporate new technology and operational concepts.
In Phase Two, Working Group 2 (C2) will develop system architectures / performance allocations to C2 architectures, with focus on how differing DAA allocations could impact required C2 performance. Additionally, the team will look closely at the L Band and C Band solutions for point-to-point and network C2 architectures that must be supported; reduce certification; improve system performance; explore the physical integration of L band and C band into a common radio for SWAP advantage.

**SC-229, 406 MHz Emergency Locator Transmitters (ELTs),** is updating DO-204A standards addressing the latest design, performance, installation and operational issues for 406 MHz emergency beacons. These standards will be useful to users, designers, manufacturers, and installers of ELTs and will help ensure a more standardized approach in these systems and the installations approval process. The revision to DO-204A is warranted for several reasons: First, Cospas-Sarsat is upgrading its satellite ELT detection system by placing search and rescue transponders on new GPS, GLONASS, and GALILEO satellites. These new transponders will dramatically improve the speed and accuracy of ELTs. Second, analysis of recent aircraft accidents has led to a call from air safety investigators as well as the National Search and Rescue Committee to develop standards for pre-accident automatic ELT activation. Third, new GPS technology allows ELTs to provide accurate accident positioning to first responders. Development of GPS requirements for use in ELTs will help standardize this valuable tool. This committee is joining with WG-98 from EUROCAE which is updating ED-62A. DO-204B and ED-62B will be issued jointly as technically equivalent documents.

**SC-230, Airborne Weather Detection Systems,** provided recommendations for an advisory circular for airworthiness approval for aircraft weather radar systems by completing revisions of two documents. DO-220A, *MOPS for Airborne Weather Radar Systems,* includes significant technological advances in weather radar systems, turbulence detection and other related features and functions. DO-213A, *MOPS for Nose-Mounted Radomes,* was updated to add consideration of current technology and industry practices. These revised guidance documents will enable a more efficient and standardized certification approach across the industry. The group is also developing a report on the feasibility to standardize In-Flight Ice Crystals Long Range Awareness capabilities by Weather Radar (WXR), jointly with EUROCAE WG-95, and considering opportunities for future changes or updates to DO-220A and/or DO-213A based on the findings of this report.

**SC-231, Terrain Awareness Warning Systems (TAWS),** is developing an industry consensus set of TAWS standards reflecting the mature nature of this technology and incorporating enhanced requirements and new capabilities.

**SC-232, Airborne Selective Calling Equipment,** completed RTCA DO-93A, *MOPS for Airborne Selective Calling Equipment.* Airworthiness and operational authorities intend to use the MOPS to update FAA Technical Standard Order (TSO) - C59. The

The new MOPS will also incorporate the revised Ground Proximity Warning System (GPWS) requirements (from DO-161A) and will be useful to designers, equipment manufacturers, aircraft manufacturers, airlines, and aircraft operators, installers, and aviation authorities. The new MOPS for TAWS will provide the foundation for the revision to Technical Standard Orders (TSOs), TSO-C151c. This committee will present the standard to PMC in March 2017.
SELCAL system is a signaling method used to alert an individual aircraft that a ground station wishes to communicate with the aircraft. SELCAL signals are capable of being transmitted on En route frequencies with existing High Frequency (HF) or Very High Frequency (VHF) ground-to-air communication transmitters and receivers. With the SELCAL calling system, the normal voice calling method is replaced with the transmission of coded tones to the aircraft over the voice communications channel. Based on the current 16-tone system, SELCAL code assignments provide for a total of 10,920 unique codes. However, there are currently over 30,000 existing assignments and new requests are averaging approximately 200 per month. To meet the requirements for new assignments, it is necessary to assign duplicate codes. Therefore, it was necessary to update the SELCAL standards to allow unique code assignments to each aircraft. The committee was sunset in March 2016 upon completion of its work.

SC-233, Addressing Human Factors/Pilot Interface Issues for Avionics, is developing recommendations for a process evaluating the human factors/pilot interface aspects of avionics as well as to document some prevalent human factors issues that may aid the early identification and resolution of these issues as part of the design and evaluation process. Industry input would be gathered for designs of systems, features, and functions that are “best practices” and have been previously approved, and can be publicly shared (non-proprietary) to facilitate future approvals and streamline the certification process. The intent is to raise the level of awareness about human factors, to facilitate the identification and resolution of human factors issues by the individuals who are responsible for design and evaluation of avionics, specifically FAA Flight Test Pilots, Engineers and Human Factors Specialists within the FAA Aircraft Certification Offices as part of their review and approval process.

SC-234, Portable Electronic Devices (PEDs), is working to publish industry-accepted guidance and best practices for determining aircraft PED tolerance through a safety risk assessment (SRA) process to supersede RTCA DO-294C. The new document will be titled Guidance for the Use of Portable Electronic Devices (PEDs) On Board Aircraft. The group is also working to revise DO-307, Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance, to be consistent with the safety risk assessment process and existing HIRF requirements. Both documents will be coordinated with EUROCAE WG-99, Portable Electronic Devices, to ensure interoperable policy as it relates to expanding passenger PED use on aircraft.

SC-235, Non-Rechargeable Lithium Batteries, is revising RTCA DO-227, Minimum Operational Performance Standard for Lithium Batteries, to incorporate new technology and lessons learned covering non-rechargeable lithium battery technology and the use of non-rechargeable lithium batteries. The revised guidance will address the design, testing and validation of these batteries and systems.

SC-236, Standards for Wireless Avionics Intra-Communication System (WAIC) within 4200-4400 MHz, is developing the MOPS for Wireless Equipment to allow a WAIC system to share the band with Radio Altimeters and other WAIC systems. This Committee will operate in coordination with EUROCAE WG-96, “Wireless On Board Avionics Network,” and the new standard will be issued jointly as a technically equivalent document. The goal is for the new MOPS to be incorporated into a Technical Standard Order providing the basis for the FAA and user community to accomplish procedural planning, investment analysis and architectural decision making.
The TOC provides an open venue for the FAA and those who operate in the National Airspace System (NAS) to work in partnership to identify and resolve near-term, tactical issues affecting the efficiency of the NAS, and to recommend resolutions to those issues and challenges. In 2016, the TOC delivered recommendations to the FAA on improving planning and execution of Airport Construction, criteria to cancel unnecessary flight procedures, provided input to the Northern California Noise Initiative Plan, reviewed the operational impacts of a Ligado Network (formerly Lightsquared) proposal and made recommendations on improving graphical depictions of Temporary Flight Restrictions.

**Tactical Operations Committee**

- **Bryan Quigley**  
  United Airlines, Inc.  
  (Co-Chair)
- **Dale Wright**  
  National Air Traffic Controllers Association  
  (Co-Chair)
- **Elizabeth “Lynn” Ray**  
  Federal Aviation Administration  
  (Designated Federal Officer)
- **Stacy Bechdolt**  
  Regional Airline Association
- **Bruce Decleene**  
  Federal Aviation Administration
- **Mark Hopkins**  
  Delta Air Lines, Inc.
- **Margaret Jenny**  
  RTCA, Inc.
- **Christian Kast**  
  Airlines for America/UPS
- **Joe Miceli**  
  Airline Dispatchers Federation
- **Doug Molin**  
  The MITRE Corporation
- **Bill Murphy**  
  International Air Transport Association
- **Chris Oswald**  
  Airports Council International
- **Darrell Pennington**  
  Air Line Pilots Association International
- **Bart Roberts**  
  JetBlue Airways
- **Melissa Rudinger**  
  Aircraft Owners and Pilots Association
- **Dan Smiley**  
  Federal Aviation Administration
- **Edwin Solley**  
  Southwest Airlines
- **Brian Will**  
  American Airlines, Inc.
- **Heidi Williams**  
  National Business Aviation Association
35 Countries where members Operate
20+ Global Industry Sectors represented
10,000+ Aviation Industry experts spanning the globe

GLOBAL VIEWS

Guidance

RTCA Committees delivered recommendations covering issues ranging from comprehensive technical performance standards to investment priorities for NextGen and solutions to tactical barriers. The development of these wide-ranging products was accomplished through the hard work and dedication of the committee leadership and volunteers.
# 2016 RTCA Documents

## Airborne Selective Calling Equipment

<table>
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<tr>
<th>RTCA Document</th>
<th>Title</th>
<th>Prepared By</th>
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<tr>
<td>DO-93A</td>
<td>Minimum Operational Performance Standards (MOPS) for Airborne Selective Calling Equipment</td>
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## Communications

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<td>DO-353A</td>
<td>Interoperability Requirements Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard)</td>
<td>SC-214</td>
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<tr>
<td>DO-352A</td>
<td>Interoperability Requirements Standard for Baseline 2 ATS Data Communications, FANS 1/A Accommodation (FANS 1/A - Baseline 2 Interop Standard)</td>
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<tr>
<td>DO-351A Vol. I and II</td>
<td>Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard)</td>
<td>SC-214</td>
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<tr>
<td>DO-350A Vol. I and II</td>
<td>Safety and Performance Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 SPR Standard)</td>
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<tr>
<td>DO-262B Change 1 to Appendix D</td>
<td>Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)</td>
<td>SC-222</td>
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## Radar

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## Security

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<td>DO-230G</td>
<td>Standards for Airport Security Access Control System</td>
<td>SC-224</td>
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## Unmanned Aircraft Systems (UAS)

<table>
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<th>RTCA Document</th>
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<th>Prepared By</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO-362</td>
<td>Command and Control (C2) Data Link Minimum Operational Performance Standards (MOPS) (Terrestrial)</td>
<td>SC-228</td>
</tr>
</tbody>
</table>
RTCA Outreach

Amplifying the Message

RTCA leadership and volunteers are respected players in the broader global aviation industry. Whether through participation in ICAO groups, recurring coordination with our European standards partner, EUROCAE, or in articles and speeches, RTCA’s message is routinely amplified. And what we say is respected by the global leaders in aviation. A few examples of our 2016 outreach follow:

Laying the foundations for NextGen

FAA’s Air Traffic Organization’s Chief Operating Officer, Teri Bristol, wrote an article in CANSO’s AirSpace Journal about the modernization of the US airspace. She explained the RTCA NextGen Advisory Committee and the progress they’ve made to achieve a safer, more seamless and efficient, global airspace system.

SC-214/WG-78 Committee Members Recognized

RTCA President Margaret Jenny stands alongside SC-214 Co-Chair Jerome Condis of Airbus SAS, as he is presented the first ever Global Harmonisation Award during the EUROCAE Symposium. This award was presented to SC-214/WG-78, Standards for Air Traffic Data Communication Services, for their commitment and outstanding contributions to advancing safety and efficiency in aviation.
RTCA Outreach

**RTCA Participates in the Integrated Communications, Navigation and Surveillance (ICNS) Conference**

Paul Prisaznuk (SAE), Lou Volchansky (FAA), Al Secen (RTCA) Anna von Groote (EUROCAE), Chris Dalton (ICAO), and Sasho Neshevski (Eurocontrol) presented a panel discussion on International Standards Development, moderated by RTCA’s Al Secen and EUROCAE’s Anna von Groote.

**RTCA Presents at ATCA**

RTCA President Margaret Jenny presented on a panel, “An Enterprise Architecture and its Budget: Never the Twain Shall Meet?” at the Air Traffic Control Association’s 61st Annual Conference and Exposition. Moderated by Rich Golaszewski of GRA, Incorporated, other panel members included Elizabeth “Lynn” Ray of the FAA, Melissa Rudinger of AOPA, and Victoria Wassmer of the FAA.

**RTCA-EUROCAE Coordination Meeting**

RTCA and EUROCAE officials met in Boston MA, hosted by The MITRE Corporation, to exchange information on activities from 2016 and plans for 2017. This annual meeting allowed the organizations to identify areas of mutual cooperation to advance the cause of global aviation interoperability and standards development.

**UTM Convention 2016**

RTCA President Margaret Jenny moderated a panel at the 2016 Unmanned Aircraft System Traffic Management (UTM) Convention about the progress, priorities and next steps of the Drone Advisory Committee. The panel included Martin Gomez of Facebook, Howard Kass of American Airlines, Victoria Wassmer, Acting Deputy Administrator of the FAA, and Matt Zuccaro of Helicopter Association International. The Convention also included additional expert panelists and keynote briefings on collaboration to rework the global airspace.
An Update from the NextGen Advisory Committee: Unique Venue for Public/Private Collaboration

The FAA-Industry Joint Analysis Team: Taking Collaboration to the Next Level to Measure Benefits of NextGen

Making Top Priorities a Reality (From Surface to Metroplex to Controller-Pilot Data Communications and Beyond)

Integrating Unmanned Aircraft Systems into the NAS – Performance Standards, Performance-based Regulations

Tackling Tactical Operational Challenges in the NAS

International Harmonization – Initiatives Underway to Ensure Safe and Seamless Global Operations

Challenges and Opportunities of the Increasingly Sophisticated and Integrated Cockpit

Conversation on FAA Reauthorization: Outlook for What’s Ahead

NAS NAV Strategy, Delivering Incremental Benefits: From Ground-based to Flight deck-based Traffic Flow Management Capabilities

Recognition of Excellence: Annual Awards Luncheon

THANK YOU TO OUR SPONSORS:
With nearly 300 attendees, the 2016 RTCA Global Aviation Symposium marked another year of peak attendance celebrating the work of RTCA volunteers and committees over the last year. The 2016 Symposium featured more than 60 panelists in 12 sessions on topics in the aviation industry, highlighting the remarkable collaboration that is the hallmark of RTCA’s committees and the aviation community.
Highlighting the Dedication of RTCA Volunteers

RTCA honors its volunteers yearly during its Annual Symposium for their achievements that span the aviation spectrum, from policy to procedure and technology. The work of these individuals and their respective committees has helped to cement RTCA’s place as a key driver of collaboration between the public sector and the aviation industry.

PRESIDENT’S AWARD

This prestigious award is given only on special occasions to an outstanding leader who is deemed by the RTCA president to have gone above and beyond in helping RTCA achieve its goals.

This year’s awardee was Michael G. Whitaker, Deputy Administrator Chief NextGen officer, of the Federal Aviation Administration, for his leadership in reaching out to industry to seek input on key NextGen implementation challenges and for incorporating RTCA, the aviation industry, and the NAC’s recommendations into FAA plans for the NextGen project.

Mike worked with his leadership across the agency to accept those recommendations, incorporate them into the plan, and deliver on the commitments.

— Margaret Jenny
ACHIEVEMENT AWARD

The RTCA Achievement Award is the organization’s highest annual honor, recognizing those who have made the most significant contributions to RTCA’s mission and the aviation community over the last year. Each year, the RTCA Policy Board selects a recipient who is to be honored at the Symposium.

This year’s Achievement Award winner was Ed Waggoner, Ph.D., Director of the Integrated Systems Research Office, of the National Aeronautics and Space Administration. Waggoner is responsible for the overall planning, management and evaluation of the directorate’s efforts to conduct integrated, system-level research on promising vehicle and operational technologies.

I want to thank the FAA and RTCA for giving us the opportunity to focus [on] the work that we had the capabilities to do. We had the budget and we knew what needed to be done, but the FAA and RTCA gave us the forum to hear from industry and other government agencies about where we need to focus our efforts.

— Ed Waggoner

WILLIAM E. JACKSON AWARD

The William E. Jackson Award is given to an outstanding graduate student in the field of aviation electronics and telecommunications as a memorial to William E. Jackson, who was an enthusiastic supporter of student engineers.

This year’s recipient was Kenneth Chircop, Ph.D., lecturer at the University of Malta. Chircop graduated from University of Malta in 2004 with a degree in electrical engineering. After conducting research in avionics systems at Cranfield University in the United Kingdom, he then spent four years working as an engineer at Hunt Engineering Ltd. In 2008, Chircop returned to Malta to work on the European Commission flagship project, Clean Sky. Chircop received his Ph.D. from the University of Malta in 2014.

The work for which I am being recognized today started in 2009 through my involvement in European-funded projects, primarily Clean Sky. The 1.6 billion Euro initiative in which the University of Malta was tasked to develop, is a trajectory optimization tool.

— Kenneth Chircop
OUTSTANDING LEADER AWARDS

The RTCA Outstanding Leader Award recognizes the added demands placed on the RTCA Committee Chairs and other RTCA participants who serve in leadership roles, to ensure that their respective Committee publishes high-quality documents by agreed-to dates.

Dr. Bryan E. Barmore  
National Aeronautics and Space Administration

Joseph Bertapelle  
JetBlue Airways

Carmen Bonillo-Martinez  
European Aviation Safety Agency

Sophie Bousquet  
Airbus

Jackie Bower  
Jeppesen

Randall Burdette  
Virginia Department of Aviation

Mike Burski  
formerly of Federal Aviation Administration

John R. Dermody, P.E.  
Federal Aviation Administration

Britta Eilmus  
Avitech International Corporation

Paul Freeman  
Harris Corporation

Brian Gilbert  
The Boeing Company

Michael Gordon-Smith, Ph.D.  
Esterline CMC Electronics

Mark Hopkins  
Delta Air Lines, Inc.

John H. Kasten  
formerly of Jeppesen

Dr. E. F. Charles LaBerge  
EFC LaBerge Engineering & Analysis, LLC

Robert G. Lamond, Jr.  
National Business Aviation Association

Ian Levitt  
Federal Aviation Administration

Melissa McCaffrey  
Aircraft Owners and Pilots Association

Paul McDuffee  
Insitu, Inc.

Barry J. Miller  
Federal Aviation Administration

Glenn Morse  
United Airlines, Inc.

Chris Oswald  
Airports Council International-North America

Michael Perrizo  
Air Wisconsin

Alexandre Petrovsky  
EUROCONTROL

Susan Pfingstler  
Federal Aviation Administration

Trent Prange  
Federal Aviation Administration

Christian Pschierer  
Jeppesen

Philip Santos  
FedEx Express

Gary A. Smith  
Honeywell International, Inc.

Stephanie Smith  
Garmin, Ltd.

Captain Rocky Stone  
United Airlines, Inc.

Lesley A. Weitz  
The MITRE Corporation

Scott Wilson  
EUROCONTROL
SIGNIFICANT CONTRIBUTOR AWARDS

The RTCA Significant Contributor Award recognizes individuals for very important and noteworthy contributions to their respective Special Committees.

Geetisri Baishya
Honeywell International, Inc.

Anthony J. Barber
Bombardier Aerospace

Randall Bone
The MITRE Corporation

Erik Borgstrom
Element Materials Technology

Joseph M. Bracken
AvMet Applications

Jonathan M. Branker
Federal Aviation Administration

Lee Merry Brown
Landrum & Brown

J. William Carson
The MITRE Corporation

Charles Chambers
formerly of National Safe Skies Alliance

Nico de Gelder, M.Sc.
National Aerospace Laboratory NLR

Rune Duke
Aircraft Owners and Pilots Association

David J. Elliott
The MITRE Corporation

John Ferrara
John Ferrara Consulting

Maxime Haroch
Airbus Helicopter

Dr. Jun Han
Rockwell Collins, Inc.

Jim Hatlestad
The Boeing Company

Douglas Havens
The MITRE Corporation

Jean-Etienne Hiolle
Thales

Michael W. Hooper
Iridium Satellite, LLC

James Klopfenstein
Rockwell Collins, Inc.

Brock Lascara
The MITRE Corporation

Johnny Marques
Embraer S.A.

Stephen Moody
Jeppesen

Patrick J. Mulqueen, Jr.
Federal Aviation Administration

David Nakamura
Advanced PBN Solutions/SAIC

Anja Reinicke
Lufthansa Systems

Scott R. Roesch
Honeywell International, Inc.

Thomas Schanne
Airbus Helicopter

Taji Shafaat
The Boeing Company

Chris Shehi
Honeywell International, Inc.

David Siewert
Federal Aviation Administration

Felix Turcios
Rockwell Collins, Inc.

Sam Van der Stricht
EUROCONTROL

Paul Von Hoene
Federal Aviation Administration
Total Members = 601

- **31%** Non-U.S. Based
- **61%** U.S. Based
- **6%** Academic
- **2%** U.S. Government

Membership Growth Chart 2006-2016

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RTCA Membership

CGH Technologies, Inc.
CiES Inc
Cignus Consulting LLC
City of Chicago
City of Houston, Texas
Civil Aviation Authority of Israel
Civil Aviation Authority of New Zealand
Civil Aviation Authority of Singapore
Civil Aviation Bureau of Japan
Civil Aviation Flight University of China
Civil Aviation University of China
Civil Aviation, MOTC, Chinese Taipei
Clairus LLC
Cobham Aerospace Communications
College Edouard-Montpetit - Ecole Nationale D'Aerotechnique
Comant Industries, Inc.
CommutAir (Champlain Enterprises)
Compass Airlines, Inc.
Compass Engineering
Concepts Beyond
Consunova, Inc.
Continental Airlines Inc.
Contour-NIIRS Ltd. No
Controls and Data Services
Cool City Electronics, Inc.
Cooper Antennas Ltd.
Crane Aerospace & Electronics
Cranfield University
Crown Consulting Inc
CSSI, Inc.
CUONICS GmbH

cobuck

Dallas/Fort Worth International Airport
Dassault Falcon Jet Corporation
Dautec GmbH
DCS Consulting LLC
Defence Equipment & Support (UK MoD)
Defence Materiel Organisation
Defence Science Technology Laboratory (DSTL)
Defense Concept Associates, Inc.
Delta Air Lines, Inc.
Delta Engineering Corporation
Dentons Aviation Practice
Denver International Airport

Department of National Defence of Canada
Design Assurance
DevCom Ltd (DevCom spol. s r.o.)
Discover Technology International Inc.
DJI
DME Corporation
DNB Engineering, Inc.

DRONAMICS
DWE Aero LLC
Dynamic Aerospace, Inc.
Dynamic Analytical Solutions, LLC

Echodyne Corp
Ecole Nationale De L Aviation Civile (ENAC)
Ecole Polytechnique de Montreal
e-Infochips Inc.
Elbit Systems Ltd.
Electronic Design Office Schlehaus
Electronic Navigation Research Institute
Electronics and Telecommunications Research Institute
Electronics Test Centre
Element Materials Technology Minneapolis Inc
ELTA
Embedded Office GmbH & Co KG
EMBRAER
Embry-Riddle Aeronautical University
EMC-Testcenter Zurich AG
Empire Airlines
EMT Ingenieurgesellschaft Dipl.-Ing.
Hartmut Euer mbH
Endeavor Air (9E)
Engage Technology Limited
Engility Corporation
Engineer for Safety Limited
Engineered Power USA
ENSCO - Avionics
Envoy Air
ES3
Esterline CMC Electronics
EuroAvionics GmbH
EUROCAE
Eurofins Product Service GmbH

European Aviation Safety Agency
European GNSS Agency (GSA)
European Satellites Services Provider
e-volo GmbH
Exonetik Inc.
ExpressJet Airlines
Extreme Engineering Solutions

F

Facebook
Fareast Huaqiang Navigation and Position Co., Ltd
Fastpilot, Inc.
Federal Aviation Administration
Federal Communications Commission
Federal Express Corporation
Feiji Consulting, LLC
Ferrell and Associates Consulting, Inc.
FLARM Technology AG
FlightTech Systems Pte Ltd
FlightOps Consulting LLC
Foliage, Inc.
ForeFlight, LLC
Fortiss GmbH
Four Corners Environmental, Inc.
FreeFlight Systems
Freewave Technologies, Inc.
Frecuencia Ltd.
Frequentis USA, Inc.

G

Gables Engineering, Inc.
Garmin Ltd.
GE Aviation Systems LLC
Gelwicks Engineering and Certification Services, LLC
General Atomics Aeronautical Systems, Inc.
General Aviation Manufacturers Association
General Dynamics Mission Systems
General Mitchell International Airport
George Mason University
Georgia Tech Research Institute
Georgian Aerospace Group, Inc.
German Aerospace Center - Deutsches Zentrum fur Luft und Raumfahrt
Geyser-Telecom Ltd.
Gilbert E. Boen Consulting
Gillespie Avionics Limited
Globatrac, LLC
GMV (Spain)
Gogo Inc.
GoJet Airlines LLC
Google, Inc.
GPSat Systems Australia Pty Ltd
Grand Canyon Airlines
Great Lakes Aviation, Ltd.
GS Aero
Gulfstream Aerospace Corporation

International Civil Aviation Organization (ICAO)
International Federation of Air Traffic Controllers’ Associations (IFATCA)
Intersky
Intertek Testing Services NA - Grand Rapids
MI Aerospace EMC Testing Group
Iridium Satellite LLC
Iris Automation Inc
Isavia ohf
Island Air

Jacobs Technology
Japan Aerospace Exploration Agency
Japan International Transport Institute, USA (JITI)
Japan Radio Air Navigation Systems Association
Jazz Aviation
Jeppesen
JeSTAR Associates
JetBlue Airways
Jetcraft Avionics LLC
JMA Solutions LLC
Joby Aviation
John Ferrara Consulting
Jupiter Avionics Corporation

Kaigai Corporation
Kapik, Inc.
Karya Sistem
Kearfott Corporation Guidance and Navigation Division
Kellington Law Group PC
Kent State University-Aeronautics
Kiwiitalia Ltd.
KNMI
Kollsman, Inc.
Kopp Glass
Korea Aerospace University
Korea Institute of Aviation Safety Technology (KIAT)
Kuerzi Avionics AG
Kutta Technologies
Kymeta Corporation

L
L2 Consulting Services, Inc.
L-3 Communications
Landrum & Brown, Inc.
Latitude Engineering, LLC
LC Peru
Leidos
LeighFisher Inc.
Lexavia Integrated Systems Inc.
Ligado Networks
Lockheed Martin Corporation
LORD Corporation
Los Angeles World Airports (LAX, LA/ONT, Van Nuys Airport)
LS Technologies, LLC
Lufthansa Systems FlightNav

M
M42 Technologies
Mannarino Systems & Software Inc.
MAP Aircraft Projects AS
Marinvent Corporation
Marshall Aerospace and Defence Group
Martin Aircraft Company Limited
Massachusetts Port Authority
Matternet, Inc.
McCarran International Airport
Meggitt Aircraft Braking Systems
Memscape
Mesa Airlines
Metron Aviation, Inc.
Metropolitan Airports Commission
Metropolitan Washington Airports Authority
MGL Avionics
MICAVIONICS GmbH
Micom Consulting Ltd.
MicroPilot
Microturbo
Mid Atlantic Aviation Partnership (MAAP) - Virginia Tech
Mid-Continent Instruments and Avionics
MIT Lincoln Laboratory
Mitsubishi Heavy Industries Aerospace Systems Corp.
MOASOFT Corporation
Moog
Mooney International
RTCA Membership

Mosaic ATM, Inc.
MV Designlabs
My-konsult Teknik AB

N
N.O.I.S.E. (The National Association to Insure a Sound Controlled Environment)
Nanjing University of Aeronautics & Astronautics
NASA
Nasteks, Inc.
National Air Carrier Association
National Air Traffic Controllers Association (NATCA)
National Air Transportation Association (NATA)
National Association of State Aviation Officials
National Business Aviation Association (NBAA)
National Geospatial-Intelligence Agency
National Institute for Aviation Research (NIAR) at Wichita State University
NATO AEW&C PROGRAMME MANAGEMENT AGENCY (NAPMA)
NAV Canada
NAVBLUE - AN AIRBUS COMPANY
NEC Corporation, Air Traffic Control Systems Division
NEC Corporation, Radio Applications Division
Netjets Association of Shared Aircraft Pilots (NJASAP)
New England Airlines
New Mexico State University Physical Science Aerospace & Autonomous Systems Laboratory
NextGen Air Transportation Consortium
NG Aviation SE
NIIAO (Institute of Aircraft Equipment)
Nil Software Corp.
NOAA Environmental Satellite and Information Service (NESSIS), SARSAT Program
Noblis, Inc.
NORTH Flight Data Systems, LLC
Northeast UAS Airspace Integration Research Alliance, Inc. d/b/a NUAIR Alliance
Northern Plains UAS Test Site (NPUASTS)
Northrop Grumman Corporation
Nova Engineering Services Pte Ltd
NPP CRTS LLC
Nu-Approach Ltd.

O
Ohio University - Avionics Engineering Center
Open Flight Solutions
Open Network Solutions, Inc
Orolia SAS
Orschel Products LLC
PAL-V Europe N.V.
Panasonic Avionics Corporation
Pariani Di Ricci Mariangela & C. SAS
Passur Aerospace, Inc.
Peckham Technology Inc.
Phasor Solutions Ltd
PHI Associates
Physical Optics Corporation
Piedmont Airlines, Inc.
PIT-RADWAR S.A.
Porkfly Aerospace LLC
Port Authority of New York & New Jersey
Port of Portland
Port of Seattle
Porter Aerospace
Porter Airlines
Pragmatic, Inc.
Precision Hawk USA, Inc
Predesa, LLC
Professional Aviation Safety Specialists, AFL-CIO (PASS)
Project Management Enterprises Inc.
PSA Airlines

Q
Qualcomm Technologies, Inc.
Queensland University of Technology (QUT)

R
RCubed Engineering, LLC.
R.A. Miller Industries, Inc. DBA RAMI
Radiant Power Corporation
Radiometrics Midwest Corporation
Ravn Alaska
Raytheon Company
RDRTec, Inc.
Real Time Consulting
Redak Consulting GmbH
Regional Airline Association
Regulus Group, LLC
Reno-Tahoe Airport Authority
Republic Airways Holdings
Research Design Lab NAVIS
Research Integrations Incorporated
Richland Technologies LLC
RightHand Technologies, Inc.
Rockwell Collins CETC Avionics Co., Ltd. (RCCAC)
Rockwell Collins, Inc.
Rossell Techsys - Engineering Division
Rotorcraft Systems Engineering and Simulation Center at the University of Alabama in Huntsville
Royal New Zealand Air Force
Saab AB
Saab Sensis Corporation
Safe Supportable Solutions Ltd
Safety Analytical Technologies, Inc.
Safran Electronics & Defense
Saft zero
Sagem Avionics, Inc.
Sagitech Corporation
SAIC
Saint-Gobain Aerospace PPL
San Francisco International Airport
Sandel Avionics, Inc.
Sandia Aerospace
Seaborne Airlines
Seamatica Aerospace Limited
Securaplane Technologies, Inc.
Security101
Select Controls Inc
SELEX Sistemi Integrati, Inc.
Sensor Systems, Inc.
Septentrio Satellite Navigation
SESAR Joint Undertaking
Shanghai Aircraft Airworthiness Certification Center of CAAC
Sharper Shape Inc.
Shuttle America
Sierra Nevada Corporation
Sikorsky Aircraft
Silver Airways
SitaOnAir
Sky Way Consulting, LLC
SkyCircuits Ltd
Skyguide
Skylark Drone Research
Skymantics
SkyWest Airlines
Smartport Technology Co., Ltd
SmartSky Networks, LLC
Smithsonian Institution Libraries
SOAR Oregon
Soaring Society of America
Society of Japanese Aerospace Companies
Solars, Inc.
Southwest Airlines
Southwest Airlines Pilots’ Association
Southwest Research Institute Defense & Intelligence Solutions Division
Spectrum EMC Consulting, LLC
SPP Canada Aircraft Inc.
SRC, Inc.
Stanford University
State Research Institute of Aviation Systems (GosNIIAS)
S-TEC Corporation
Stilwell Baker Inc.
STM A.S (Defense Technologies Engineering and Trade Inc.
Supervan Systems Ltd
Surf Air
Swedish Defence Materiel Administration
Synopsys, Inc
Systems Consultants Services Ltd

TAG Aviation (Geneve Airport, Switzerland)
TAI - Turkish Aerospace Industries Inc.
TALUS Atomics Corporation DBA TELE-WORX
Techair Ltd.
Technische Universitaet Muenchen - Institute of Flight System Dynamics
Technology Providers, Inc.
TechSAT GmbH
Tecnobit
Tek Fusion Global, Inc.
Tekever Ltd
Teledyne Controls Division
Telegena
Telecommunications Corporation
Tel-Instrument Electronics
Thales

THALES CETC AVIONICS
The Aerospace Corporation
The Boeing Company
The Fuller Company
The Johns Hopkins University
The MITRE Corporation
The Ohio State University
The Padina Group
The Second Research Institute, Civil Aviation Administration of China
Thompson Aerospace
Thrane & Thrane A/S
Timat Ltd.
TKM Inc.
Trans States Holdings Group
Transport Canada
Transportation Security Administration
Trig Avionics Limited
Trimble Military and Advanced Systems (Trimble MAS)
Triumph Group, Inc.
Tucson Embedded Systems, Inc.
TÜV AUSTRIA SERVICES GMBH
TÜV SUD America, Inc.

U
U.S. Air Force
U.S. Army
U.S. Coast Guard, ALC, ESD, Tech Pubs
U.S. Crest Group
U.S. Dept. of Agriculture Forest Service
U.S. Navy
U.S. Technical
UAC-Integration Center
Ukrainian Helicopters Aviation Private Joint-Stock Company
Ultralife Corporation
UMS Skeldar AG
Underwriters Laboratories Inc.
Unite Alliance
United Airlines, Inc.
United Parcel Service
United Technologies Corporation
Universal Avionics Systems Corporation
University Corporation for Atmospheric Research
University of Idaho
University of Kansas

University of Malta
University of North Dakota
University of Oklahoma - Center for Applied Research and Development
University of Tulsa, Dept. of Electrical and Computer Engineering
University Research Foundation
US Airways

V
Veracity Engineering LLC
VEROCEL, Inc.
Virgin America
Virginia Department of Aviation
volans-i, Inc.
Volpe National Transportation Systems Center

W
Washington University in Saint Louis
Waxwing Avionics Research and Product Development Private Limited
WheelTug plc
William E. Payne & Associates, Inc.
WiMAX Forum
Wind River Systems, Inc.
WOLF Industrial Systems, Inc.
Worldwide Integrated Flight Support Corp. (WIFS)
WS Technologies Inc.

X
XCET Electronic Technologies Service Co, Ltd
Xtreme-EDA Corporation

Y
Young Engineering Services LLC
Yulista Aviation, Inc.

Z
Zee. Aero
Zodiac Aerospace
Zodiac Inflight Innovations
Hal Moses
Congratulations on your retirement!