Chaired by Intel CEO Brian Krzanich, members of the Drone Advisory Committee (DAC) convened in Reno, NV, on January 31st to consider three tasks aimed at gaining a consensus-based set of resolutions for issues regarding the efficiency and safety of integrating UAS into the NAS, and to develop recommendations to address those issues and challenges. Hosted by Reno-Tahoe Airport and the University of Nevada, continued on page 3
RTCA COMMITTEES COLLABORATE TO RESPOND TO FAA TASKING ON LIGADO NETWORKS PROPOSAL

RTCA’s Special Committee SC-159, Navigation Equipment Using the Global Navigation Satellite System (GNSS), and the Tactical Operations Committee (TOC), provided a review and commented on Ligado’s proposal for use of the GPS adjacent band for non-space, commercial applications. The proposal seeks to determine a site-by-site peak power output that ensures GPS reception for aircraft using certified avionics when they are 250 feet or more laterally from, or 30 feet or more above, a Ligado transmitter antenna. The Ligado proposal refers to the cylinders bounded 250 feet around and 30 feet above its antenna as a standoff cylinder. SC-159 provided a technical review while the TOC provide an operational impact assessment.

SC-159’s Working Group 6 (WG-6), which focuses on GPS Interference, conducted the technical review. Comments from WG-6 were compiled and considered. Ligado, who participates with standing members on both SC-159 and WG-6, provided subject matter expertise and addressed WG-6 comments. On comments where consensus was not reached, the differing opinions were documented. The SC-159 report was approved during a virtual plenary on December 13, 2016, and the response was presented to the Program Management Committee in December 2016.

In parallel, the TOC’s evaluation of the Ligado Proposal focused on the operational impact of the proposed standoff cylinders where access to GPS signals would not be guaranteed. A Task Group under the TOC held a series of discussions, also including Ligado as Subject Matter Experts. On December 13, 2016, the TOC approved a report which compiled operator’s comments and concerns regarding the proposal. The comments emphasized the impact of these cylinders on certain flight operations, particularly helicopters and unmanned vehicles. The TOC also commended Ligado for their engagement with the FAA and industry.

The SC-159 and TOC reviews are posted for the public on the RTCA website. Visit the TOC and SC-159 Committee webpages for more information.
Reno, the meeting brought a diverse set of stakeholders together to begin the hard work of forging consensus on the best way to integrate drones into the world’s safest airspace.

Chaired by Intel CEO Brian Krzanich, and Designated Federal Official and Acting FAA Deputy Administrator Victoria Wassmer, the RTCA Federal Advisory Committee reached consensus on task statements for two of its subgroups.

The first group will develop recommendations on the relative roles and responsibilities of the Federal, State, and Local governments for regulating certain UAS operations in low-altitude airspace as compared to the Federal Government’s exclusive role and responsibility for regulating all aspects of manned aircraft operations.

The second group will develop recommendations on UAS operations and missions beyond those currently permitted, and will define all necessary activities for the industry to gain access to the airspace. These recommendations should lead to achieving these additional operations within the next 24 months through a risk-based approach to gaining operational approval and certification based on FAA regulations and guidance.

A third draft task statement was presented to the DAC by the FAA, requesting industry recommendations for options on how to fund the full complement of activities and services required both by government and industry to safely integrate UAS operations into the National Airspace System (NAS) over the long term. During the meeting, the FAA directed the DAC to pay attention to the following questions:

- What is being paid for, how much will the initial costs be, and in what time frame will the resources and funds be needed?
- Who should pay for what?
- What kinds of funding mechanisms can be used?

The DAC agreed to launch a third task group to tackle the funding topic. All three draft statements will be sent to the FAA, who will respond with official task statements to RTCA. The FAA will compose the final task statement on funding, considering the issues discussed during the DAC meeting. Work will begin immediately on these tasks. Each group will provide interim recommendations to the DAC in May, and final reports to the DAC at its October meeting.

The DAC tasked the DAC Subcommittee to develop a set of basic tenets, that will serve as a foundation for the work of the DAC and guide its development of recommendations.

The next meeting of the DAC will be held on May 3rd, 2017 in Washington, DC, with the location to be determined. Visit www.rtca.org for more information.
NEW MEMBERS

Amazon Prime Air
Washington, DC USA
Sean Cassidy
Amazon Prime Air is a delivery system from Amazon designed to safely get packages to customers in 30 minutes or less, using unmanned aerial vehicles, also known as drones. Amazon Prime Air has great potential to enhance the services they already provide to millions of customers by providing rapid parcel delivery that will also increase the overall safety and efficiency of the transportation system.

Aircraft Systems & Manufacturing, Inc.
Georgetown, Texas USA
Daniel Googins
Aircraft Systems & Manufacturing, Inc. (ASM) is a Texas-based company with an international reach founded in 1987 and has been in continuous operation for 29 years, offering:
- Engineering Services (STC Design Packages, Aircraft-Specific Engineering, Digital Aircraft Surveys, On-Site Installation Support, Aircraft Manual Preparation) and Certification Services (Staff of FAA Designee, including DER’s, DAR and DMIR, FAA STC’s and Approvals, International STC’s, Approvals and Familiarizations).

Daedalean, Ltd.
Zurich, SWITZERLAND
Simon Kaiser
Daedalean is a Zurich start-up company certified to build an airworthy autopilot that can also pass the exams for human pilots.

Drone Defense Systems, LLC
Daytona Beach, Florida USA
Sotirios Kaminis
Drone Defense Systems, LLC is a designer and manufacturer of drone detection and countermeasure systems.

Gelwicks Engineering and Certification Services, LLC
Williamsport, Maryland USA
Chris Gelwicks
Gelwicks Engineering provides aviation modification/integration engineering and aircraft certification services.

Kopp Glass
Pittsburg, Pennsylvania USA
Justine Galbraith
Kopp Glass is the worldwide leader in hand-molded, technical glass manufacturing. For 90 years, they have developed unique glass solutions for technical, industrial, and commercial applications. The company specializes in custom, small lot glass manufacturing and offers an expansive portfolio of glass compositions that feature transmission properties from the ultraviolet (UV), to visible, to IR wavelengths.

Korea Advanced Institute of Science and Technology (Unmanned Systems Research Group-USRG)
Daejeon, REPUBLIC OF KOREA
Hyunchul Sim
KAIST-USRG focuses on the research and development of highly advanced autonomous aerial robots by combining various principles of control theory, aerospace engineering, and computer science.

Mitsubishi Heavy Industries Aerospace Systems Corp.
Nagoya, JAPAN
Hiroyuki Kakamu
As a leader in the aerospace industry, Mitsubishi Heavy Industries, Ltd. (MHI Japan) conducts research and development by applying best-of-class technologies. With the creation of the new environmentally friendly Mitsubishi Regional Jet, MHI Japan is taking things to a new level and is still consistently winning customer service awards for the MU-2 Turboprop which was first delivered in the 1960’s.

Mitsubishi Heavy Industries America, Inc. supports aircraft and aerospace efforts including the MU-2 and MU-300 at a long-time authorized Mitsubishi Service Center, Intercontinental Jet Service Corp. in Tulsa, Oklahoma, where they specialize in heavy structural repairs, modifications, avionics upgrades, and major inspections.

MHI Japan has also expanded its operations in commercial aircraft, collaborating with some of the biggest names in the world, including Boeing (on both the 777 and the 787 Dreamliner) and Bombardier, Inc. (on the Bombardier Global Express).

Porkfly Aerospace, LLC
Bethlehem, Pennsylvania USA
Earl Kinsley
Porkfly Aerospace, LLC is an engineering consulting firm focused on the commercial avionics and aircraft electronics market. The company provides expertise in design, development, and qualification of a variety of electrical and electronic products for business jets and general aviation aircraft, including air data instruments, engine data acquisition units, fuel gauging systems, and aircraft power distribution.

Supervan Systems, Ltd.
Decatur, Texas USA
Samuel Bishop
Supervan Systems, Ltd. developed and holds STC for the Honeywell engine conversion on the Cessna Caravan.
University Research Foundation
Greenbelt, Maryland USA
Roger Pierson
The University Research Foundation (URF) provides unique technical expertise across a broad range of research, development and technical support programs. URF is incorporated as a not-for-profit foundation and was established by the University of Maryland in 1981 to conduct proprietary programs over a wide range of cutting-edge technologies.

URF has developed unique technical capabilities that are used to transition ideas from laboratory concepts to marketable products. URF employees have been the authors of nearly 200 technical papers and nearly two dozen patents.

Electro-optic accomplishments include the development of a vehicle mounted sniper detection system, an amphibious assault threat locator system, special test equipment to determine in a laboratory the effectiveness of flare countermeasures against air-to-air and surface-to-air missiles, and a computer simulation to evaluate the performance of missile attack warning systems.

URF’s Maryland Advanced Development Laboratory (MADL) Division has been a leader in developing advanced avionics concepts for commercial aviation over a decade. Accomplishments in this area include the development of enhanced vision system, a synthetic vision system, a computerized co-pilot, a low-cost head-up display (HUD), and an advanced data fusion processor (ADFP) used to receive, distribute, and manage data from various equipment.

URF owns and operates general aviation test aircraft based at Fort Meade Tipton Airport. These aircraft are configured as needed for flight experimentation. These aircraft have been used for missile emulation, Navy Shipboard Countermeasure tests, missile seeker testing, electro-optic tests, advanced data links, flight performance/human factors evaluation, environmental sampling, and several avionics development projects.

University of Oklahoma - Center for Applied Research and Development (CARD)
Norman, Oklahoma USA
James Grimsley
The University of Oklahoma Center for Applied Research and Development (CARD) was created to pursue new Research and Development (R&D) opportunities that complement the existing OU campus’ strengths in basic research and outreach via the addition of an organization that focuses on applied R&D across all disciplines.

CARD is an administrative framework that enables industry partners and federal and state mission agencies to collaborate with the university on projects that fall within the applied versus basic research and development framework. CARD augments academic research capabilities with a staff of non-faculty researchers and professionals across multiple disciplines.

Worldwide Certification Services
Glendale, Arizona USA
Marty Gasiorowski

Worldwide Integrated Flight Support Corp. (WIFS)
Tinley Park, Illinois USA
Dave Knerr
Worldwide Integrated Flight Support Corp. (WIFS) provides a comprehensive suite of customized flight operation services and IT applications to airline, military, and corporate aviation operators.

WIFS specializes in all aspects of flight deck operations such as avionics, navigation databases, and new technology. They keep close tabs on the latest Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) requirements to ensure that their customers are informed and equipped. They also specialize in building customized flight training programs and manuals for today’s hottest topics: Future Air Navigation Systems/Controller-Pilot Data Link Communications (FANS/CPDLC), Extended Twin-engine Operations (ETOPS), Reduced Vertical Separation Minimum (RVSM), Automatic Dependent Surveillance – Broadcast (ADS-B) and Required Navigation Performance (RNP).
TACTICAL OPERATIONS COMMITTEE TO MEET IN OKLAHOMA CITY

The next Tactical Operations Committee (TOC) meeting will be hosted by the FAA at the Mike Monroney Aeronautical Center in Oklahoma City, Oklahoma, on March 1-2. The first day will feature a tour of the many FAA organizations based in OKC that are critical to NAS operations including Flight Procedures, Notice to Airmen (NOTAMs), Flight Inspection, Simulators, Controller Training and Flight Standards.

During the TOC meeting, the committee will showcase recommendations relating to the FAA’s Concept of Operations for Performance Based Navigation (PBN) Route Structure. The proposed recommendations will address criteria for deciding where structure is required, perspective on how to conduct point-to-point operations, and input on the implementation process. Three Task Groups focused on route structure at high altitudes (above Flight Level 180), low altitude (below FL180), and Alaska, have been working for nearly a year to compile their report.

For additional information about the Committee or the upcoming meeting, please visit the TOC webpage.
The NextGen Advisory Committee (NAC) will meet on February 22nd under the leadership of Chairman Dave Bronczek, President & COO of Fed Ex Corporation. Victoria Wassmer, FAA Acting Deputy Administrator, serves as the Designated Federal Official for the 37-Member Committee that is working on collaboration between the FAA and the industry in establishing priorities to implement NextGen capabilities.

The Committee will hear reports from Four Priority Teams working on implementations of DataComm, Multiple Runway Operations, Performance Based Navigation and Surface and Data Management. Related to this effort, the Joint Analysis Team that is assessing performance improvements attributable to the implementation of select NextGen capabilities will report on Wake Recategorization at Indianapolis International Airport and fuel impacts related to implementation of the North Texas Metroplex initiative.

The meeting will also include an interim report from the Enhanced Surveillance Task Group that is evaluating the needs and benefits of enhanced surveillance for oceanic airspace controlled by the FAA. The Committee will receive briefings and discuss FAA’s NextGen Plan and equipage plans from several air carriers, as well as the avionics industry supply chain to support NextGen equipage.

For more information on the NAC and the upcoming meeting being hosted by The MITRE Corporation in McLean, Virginia see the NAC Page.
Aeronautical Data

DO-364, Minimum Aviation System Performance Standards (MASPS) for Aeronautical Information/Meteorological Data Link Services
Issued 12-15-2016 | Prepared by SC-206

The purpose of this document is to provide Minimum Aviation System Performance Standards (MASPS) for Aeronautical Information (AI) and Meteorological (MET) Data Link Services systems. It provides guidance on system characteristics and allocation of requirements that support data link services. This guidance material recommends minimum acceptable criteria for authorizing/approving the use of AI and MET Data Link Services systems when authorization/approvals are required to show compliance to civil regulations. This guidance is intended to be useful to designers, manufacturers, installers, service providers, regulators, and users of AI and MET Data Link Services systems.

The requirements contained in this document are necessary to provide adequate assurance that AI and MET Data Link Services systems will function in an acceptable manner. Compliance with this standard is recommended as one means of assuring that AI and MET Data Link Services systems perform satisfactorily under all conditions, normally encountered in aeronautical operations.

Global Positioning System (GPS)

DO-229E, Minimum Operational Performance Standards for Global Positioning System/Satellite-Based Augmentation System Airborne Equipment
Issued 12-15-2016 | Prepared by SC-159

The changes related to the Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment Systems, published by RTCA on December 13, 2006 as RTCA DO-229D, and the Change 1 for RTCA DO-229D are contained herein as RTCA DO-229E. This new version has been produced to introduce new PRN codes to manage the existing and planned evolutions of Satellite-Based Augmentation System (SBAS) around the world. On very specific cases, clarifications of a requirement and addition of a new requirement have been introduced.

Modifications in this new version of DO-229 include, but are not limited to:

- Correcting typographical and paragraph reference errors.
- Adding clarifying text where issues have been raised, or where clarification is needed, to enhance understanding, including IPP computation clarifications and the possibility to enable graceful degradation to RAIM/FDE upon SBAS UNHEALTHY designation.
- Modifying table A-1 to reflect the addition of 20 PRNs and updating other paragraphs in Appendix A, where there is relation with the number of PRNs.
- Modifying Appendix T assumptions and GEO bias tools to reflect the addition of 20 PRNs.
- Adding a new requirement to prevent the use of the Navigation Message Correction Table and added associated verification.

A new tool is also available for use with DO-229E. FAA Technical Standard Order (TSO) TSO-C145e/C146e references this standard.

DO-229E, GEO Bias Tool
Issued 12-15-2016 | Prepared by SC-159

The GEO Bias Tool is a MATLAB script. It is intended to be used by the manufacturer to demonstrate that their GNSS receiver is compliant with the GEO Bias requirements in DO-229E, as described in section 2.1.4.1.5. Appendix T in DO-229E, provides a description of this tool and associated test procedures.
Portable Electronic Devices

DO-363, Guidance for the Development of Portable Electronic Devices (PED) Tolerance for Civil Aircraft
Issued 12-15-2016 | Prepared by SC-234

Previous RTCA reports on aircraft interference from PEDs have emphasized risk assessments and then recommended restrictions on the use of PEDs on board the aircraft. This report departs from the earlier RTCA reports, and is directed to aircraft design recommendations that lead to aircraft tolerance to both intentional RF transmissions and spurious RF emissions from PEDs.

There are two aspects to the aircraft design recommendations in this report. One aspect defines aircraft system and equipment RF susceptibility qualification recommendations that provide tolerance to RF from intentionally transmitting PEDs. This is commonly referred to as protection from PED back door coupling. The recommendations closely follow existing practices for aircraft system high intensity radiated field (HIRF) protection. Acceptable test approaches for verifying the aircraft system RF susceptibility qualification are defined.

The second aspect defines acceptable interference path loss (IPL) between aircraft radio receivers and PEDs that emit spurious RF. This is commonly referred to as protection from PED front door coupling. Extensive analysis of measured PED spurious emissions was performed previously so that the interference path loss targets are based on statistics of actual PED emissions rather than regulatory specifications. Interference path loss test methods are defined.

This report also defines recommended approaches for demonstrating tolerance with aircraft design to meet regulatory requirements including aspects of aircraft alteration and continued airworthiness.

This report is intended to supersede previous applicable guideline documents, RTCA DO-294 and EUROCAE ED-130. All propositions defined are intended to be in line with the Revision of RTCA DO-307A/ED-239.

DO-307A, Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance
Issued 12-15-2016 | Prepared by SC-234

This report addresses aircraft design and certification to tolerate operation of PEDs. Previous RTCA reports on aircraft interference from PEDs have emphasized risk assessments and then recommended restrictions on the use of PEDs on aircraft. This report departs from the earlier RTCA reports, and is directed to aircraft design recommendations that lead to aircraft tolerance to both intentional RF transmissions and spurious RF emissions from PEDs.

There are two aspects to the aircraft design recommendations in this report. One aspect defines aircraft system and equipment RF susceptibility qualification recommendations that provide tolerance to RF from intentionally transmitting PEDs. This is commonly referred to as protection from PED back door coupling. The recommendations closely follow existing practices for aircraft system high intensity radiated field (HIRF) protection. Acceptable test approaches for verifying the aircraft system RF susceptibility qualification are defined.

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This report also defines recommended approaches for demonstrating compliance with aircraft design certification regulations.

For additional information and to order documents, visit RTCA’s store at www.rtca.org/store_list.asp. RTCA Members may download electronic documents at no cost and qualify for a 60% discount on paper documents.
DO-307A, Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance

DO-229E, Minimum Operational Performance Standards for Global Positioning System/Satellite-Based Augmentation System Airborne Equipment
SC-206 held their most recent Plenary and Sub-Group (SG) working sessions at RTCA in December 2016.

SG7, Wind Information Guidance, under the leadership of Co-Chairs Ernie Dash (AvMet) and Michael McPartland (MIT/LL), completed work for Final Review And Comment (FRAC) and approved the release of the document for FRAC. The FRAC resolution is scheduled for March and will be presented to the Program Management Committee in June.

SC-206’s other two SGs are working on Minimum Operational Performance Standard (MOPS) for Eddy Dissipation Rate (EDR) with a September delivery date and revising the Flight Information Services-Broadcast (FIS-B) with Universal Access Minimum Operational Performance Standard (MOPS), expecting a December delivery date.

SC-222 met jointly with WG-82, led by Armin Schlereth (DFS GmbH), for completion of a Final Review And Comment (FRAC) resolution on DO-343A, Minimum Aviation System Performance Standard for AMS(R)S Data and Voice Communications Supporting Required Communications Performance (RCP) and Required Surveillance Performance (RSP), and DO-262B, Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS). These documents are being forwarded for approval by the Program Management Committee and the EUROCAE Council in March.
The work of Special Committee 159, Navigation Equipment Using the Global Navigation Satellite System (GNSS), led by Co-Chairs Chris Hegarty and George Ligler, has enabled major improvements to the safety of the US airspace. Among their many accomplishments, Chris and George are members of the Program Management Committee (PMC), which provides oversight to the work of all RTCA Special Committees.

Chris started volunteering for RTCA in 1992 with SC-159. At the time, he was encouraged by his employer, The MITRE Corporation, to participate in the work of RTCA’s Special Committees and eventually worked his way into leadership positions. He noted that of his work with SC-159, developing the specification for a new GPS signal was among his favorite and most impactful effort with RTCA. “The one [tasking] I had the most fun with was when the Department of Transportation asked RTCA to develop the specification for the third civilian signal that’s broadcast by the GPS satellites,” Chris said. “Twelve of the thirty-one GPS satellites are now broadcasting this new signal to civilians, and that was something that RTCA actually helped design.”

That sense of satisfaction and camaraderie was reflected in George’s comments about RTCA’s Special Committees as well. “The impact of SC-159 has been huge in terms of equipage in our fleet,” he said. “So when you look back and realize you’re part of it, you can take tremendous satisfaction from knowing what the impact of everyone’s work is.”

And the story isn’t over yet. Chris explained that their work continues on a number of fronts. “Integration of drones into civilian airspace is one of the most challenging things that RTCA is working on now,” he said. “There’s a Committee working on this and it’s one of the hardest jobs of any of our committees. I’m excited about our next generation of GPS standards as well. We’re hoping to go from what you see on commercial aircraft today to ones in the future that will ideally track navigation satellites from any country.”

Despite their individual contributions to RTCA, both Chris and George gave the most praise to their colleagues on the PMC and in Special Committees 159, 186 and 228. “The two things that excite me the most about RTCA are the people and their impact,” George said. “We establish a great camaraderie within the Special Committees and it’s a really wonderful experience to work with such good people and to learn from them. It’s extremely gratifying.”

“Leaders like Chris and George are the reason the FAA and industry continue to rely on RTCA to solve some of aviation’s toughest challenges,” said RTCA President Margaret Jenny. “We are fortunate to have them leading our committees.”

Dr. Christopher J. Hegarty is the Director for CNS Engineering & Spectrum at The MITRE Corporation, where he has worked mainly on aviation applications of GNSS since 1992. He received B.S. and M.S. degrees in Electrical Engineering from WPI and a Doctor of Science degree in EE from The George Washington University. He is currently the Chair of the Program Management Committee and is Co-Chair of SC-159. He is co-author of the textbook, Understanding GPS: Principles and Applications, 2nd Ed, and co-editor of Artech House’s GNSS Technology and Applications Series. He served as President of the U.S. Institute of Navigation (ION) in 2008, and is a Fellow of both the ION and IEEE.

Dr. George Ligler, as an engineering executive at Texas Instruments and Burroughs, and later as a consultant to Project Management Enterprises, Inc. (PMEI), has participated in aviation activities since the late 1970’s and on RTCA committees since 1990. George is a long-time member of RTCA’s Program Management Committee and is also a member of both the NextGen Advisory Committee Subcommittee and Plenary leadership for the Industry’s/FAA’s Equip 2020 initiative related to ADS-B out equipage. George is Co-Chair of SC-159, a former Co-Chair of SC-228, and has been active in SC-186 since its inception. George was awarded the 2006 RTCA Achievement Award for his contributions to ADS-B and Satellite-Based Navigation System Initiatives. Apart from his work in aviation, George has provided consulting services in the computer and telecommunications systems industries to over 40 clients on three continents. He has also provided pro bono services through four Panels and Committees of the National Academies of Sciences, Engineering, and Medicine, as well as to Georgia Tech and, as a Special Government Employee, for the U.S. Secretary of Commerce. On February 8th of this year, George was elected to membership in the National Academy of Engineering “For leadership and engineering innovation in specifying and implementing complex computer-based systems for aviation and the U.S. Census.”

George holds a B.S. degree in Mathematics from Furman University and Masters and Doctorate degrees in Computer Science from Oxford University, where his studies were supported by a Rhodes Scholarship.
RTCA, Inc. has teamed up with The MITRE Aviation Institute to offer high quality and relevant training for the aviation industry in understanding the requirements and parameters for avionics software development necessary to obtain FAA certification.

The two world class organizations are using their collective experience and expertise to provide training on the new standards and recommended practices contained in the DO-178C, Software Considerations in Airborne Systems and Equipment Certification.

In addition to the comprehensive course manual developed by the experts at The MITRE Aviation Institute, each training course attendee will receive the latest standards developed over a six-year period by RTCA Special Committee 205.

The course is led by instructors who will provide a thorough understanding of the requirements and the applicability of DO-178C; the fundamental techniques of software development considerations in airborne systems and equipment certification; and an introduction and overview of Software Tool Qualification Considerations, Formal Methods Supplement to DO-178C, Model-Based Development and Verification Supplement to DO-178C, and Object Oriented Technology and Related Techniques Supplement to DO-178C.

As an adjunct to DO-178C, this course will provide the background and scope on the four documents supporting DO-178C:

- DO-330, Software Tool Qualification Considerations
- DO-331, Model-Based Development and Verification Supplement to DO-178C and DO-278A
- DO-332, Object-Oriented Technology and Related Techniques Supplement to DO-178C and DO-278A
- DO-333, Formal Methods Supplement to DO-178C and DO-278A

Attendees will receive detailed instruction on DO-331 covering the objectives, activities, explanatory text and software life cycle data that should be applied when model-based development and verification are used as part of the software life cycle.

In addition, the training will cover the systems requirements linkage to the DO-178C and Supplement processes through an explanation of the interface to ARP 4754A, Guidelines for Development of Civil Aircraft and Systems.

*Unless otherwise noted, all training courses will take place at RTCA Headquarters, located conveniently in downtown Washington, DC. For additional information, please visit www.rtca.org or email training@rtca.org.
DO-160G, ENVIRONMENTAL CONDITIONS AND TEST PROCEDURES FOR AIRBORNE EQUIPMENT, TRAINING COURSE

March 14-17 at WSU
June 6-9 at RTCA
September 11-14 at WSU
December 12-15 at RTCA

RTCA in partnership with Wichita State University's National Institute for Aviation Research (WSU-NIAR), offers high quality training covering RTCA's DO-160G, Environmental Conditions and Test Procedures for Airborne Equipment. The course will provide an understanding of the use of DO-160G and how it fits in with the greater picture of requirements, design, certification and TSOs.

Course participants will gain a clear and relevant understanding of the applicable FAA regulations, advisory material, certification procedures, design approaches/trade-offs, inspection and conformity requirements, as well as details of the necessary parts of a test plan, test report, compliance plan and compliance report. A strong focus is placed on the reduction of risk, cost and schedule throughout the design/certification process, by use of targeted design and increased first-pass success on design and testing. In addition to a comprehensive course manual, each training course attendee will receive a copy of RTCA's DO-160G, supporting material, and will participate in real-world exercises applying the knowledge learned from the class.

DO-254, DESIGN ASSURANCE GUIDANCE FOR AIRBORNE ELECTRONIC HARDWARE, TRAINING COURSE

April 10-12 at RTCA
September 11-13 at RTCA
December 18-20 at RTCA

RTCA is hosting a three-day training course, tailored specifically to design/verification engineers and project/certification managers requiring DO-254 compliance.

This three-day course will:

- Provide an overview and application of RTCA DO-254, as defined by current FAA and EASA guidance in airborne electronic systems.
- Describe how to apply the DO-254 lifecycle and supporting processes; understand system safety assessments and the design assurance level (DAL); and set up a project correctly through proper planning and standards.
- Present techniques and writing requirements for electronic hardware, and how to optimize requirements for verification processes.
- Describe how to efficiently and effectively verify requirements with simulation and hardware tests.
- Address specific considerations for programmable logic devices (PLDs) such as FPGA/ASIC versus all electronics; commercial off-the-shelf (COTS) components usage; and tool assessment and qualification.

*Unless otherwise noted, all training courses will take place at RTCA Headquarters, located conveniently in downtown Washington, DC. For additional information, please visit www.rtca.org or email training@rtca.org.

SC-224 met at RTCA to continue work on DO-230H, *Standards for Airport Security Access Control System*, to update the Credentialing, Access Control Systems, and Communications sections. Final Review And Comment (FRAC) release is scheduled for March 2017. The Committee also approved a revised Terms of Reference (TOR) to add a DO-230I revision to include possible biometrics and other technology updates.
Tackling the Hottest Topics in Aviation

- **NextGen Advisory Committee:** NAC members examine the FAA-Industry collaborative efforts to implement NextGen and evaluate the benefits.

- **Drone Advisory Committee:** DAC members share an insiders perspective of the operational policy issues, introducing innovative technology into the air transportation system.

- **UAS EX COMM:** Members of multiple agencies discuss coordination, addressing issues associated with integrating drones into the airspace.

- **Implementing NextGen Priorities:** FAA and Industry leaders discuss the status and future of the Four Focus Areas of NextGen: DataComm, Multiple Runway Operations, Performance Based Navigation, Surface and Data Sharing.

- **Aircraft Time, Speed, Spacing:** Experts with diverse views discuss how we will evolve to fully integrated management of aircraft time, speed and spacing, using ground and cockpit-based capabilities.

- **ADS-B:** Operators, suppliers, regulators, and air navigation service providers examine where we are on meeting the US 2020 deadline, global applications and enhanced surveillance in oceanic and remote airspace.

- **The Environment and NextGen:** Experts from FAA, operators, airports and airport communities discuss the benefits and challenges associated with NextGen capabilities.

- **Comprehensive FAA Bill:** Aviation leaders discuss the FAA Reauthorization – congressional actions and the FAA, NextGen and aviation infrastructure.

- **Equipping for the Future:** Global leaders explore the comprehensive global standards under development by RTCA Special Committees.

- **Cybersecurity:** Authorities discuss ways to mitigate potential threats to the continued safety and security of air transportation.

- **Commercial Space:** Those involved in this burgeoning industry tackle what is needed from the FAA and the aviation community to address the emerging growth of this unique user of the National Airspace System.
STANDARDS OF NAVIGATION PERFORMANCE

SC-227 met at RTCA in Washington, DC and is tasked with creating a revision to DO-257A, *Minimum Operational Performance Standards for the Depiction of Navigational Information on Electronic Maps*. The revision will include facilitating the information from Performance Based Navigation (PBN) on electronic maps. The goal of the Committee is to align the update of DO-257A so it is consistent with DO-236C, DO-236C Change 1 and DO-238B.

This was the first Plenary of SC-227 since Mike Cramer became Chair of the Committee in September 2016, and Dave Nakamura stepped down as Chair after many years of work supporting SC-227 and RTCA standards development.

During the Plenary, change proposals to the current document were reviewed and dispositioned. Additionally, working groups met to continue discussions to update DO-257A to prepare for a Final Review And Comment period which is expected to happen in the latter half of 2017.

406 MHZ EMERGENCY LOCATOR TRANSMITTERS (ELTS)

SC-229 met jointly with EUROCAE Working Group (WG)-98 in Fort Lauderdale, Florida, hosted by ACR Electronics. While there, a tour of the ACR Electronics facility was offered to the Committee Members.

SC-229 WG-98 received reports on the continuing work by ICAO, COSPAS-SARSAT, and other industry groups, working to align the updated standard with new technologies. The revision of RTCA/DO-204A and EUROCAE/ED-62A to version B will produce a technically equivalent specification for Emergency Locator Transmitters at 406 MHz.

The Joint Committees plan to have the document ready for Final Review And Comment, held concurrently with the EUROCAE Open Comment, in September 2017.
STAFF SPOTLIGHT: CLAUDIA CHAUDHARI

In November 2016, Claudia moved from Grand Rapids, MI, to Washington, DC, to begin work as an RTCA Program Director for several Special Committees including SC-217, Aeronautical Databases; SC-223, Internet Protocol Suites (IPS) and AeroMACS; and SC-227, Standards of Navigation Performance. Among other taskings and responsibilities, these committees are working to revise standards to support future air traffic management requirements of NextGen and SESAR, as well as develop multiple standards that are intended for designers, manufacturers and installers of avionics equipment; airspace managers and service providers; and the users of these navigation systems for world-wide operations.

Most recently, Claudia has transitioned to manage the RTCA Drone Advisory Committee Subcommittee (DACSC). Members on this Committee work with the Federal Aviation Administration to identify and propose actions affecting the efficiency and safety of integrating unmanned aerial vehicles into the National Airspace System (NAS).

“We are pleased to have Claudia at RTCA,” stated RTCA President Margaret Jenny. “She has made tremendous strides managing the committees, and plays a vital role in the organization.”

In her short time with the RTCA Committees, Claudia says she has enjoyed working closely with the FAA and the key decision-makers to develop an open-avenue of communication between the Administration and aviation industry partners. In particular, she says she is passionate about the effective integration of UAS into the NAS and hopes to continue contributing to the aviation industry into the future.

Before coming to RTCA, Claudia worked in General Electric’s Aviation Division, working as both a Certification Representative, dealing with regulatory compliance for DO-178B for the company’s flight management systems, and a Software Program Manager for navigation and guidance for FMS. Claudia graduated from James Madison University in 2007 with a Master’s degree in Computer Science Information Security. She was also a Ph.D. candidate at Kansas State University until 2010, but continues her research in Emergent Behavior in Swarms of Autonomous Robots.

I am passionate about the effective integration of UAS into the NAS and hope to continue contributing to the aviation industry into the future.
SC-236 met at Texas A&M University, hosted by Aerospace Vehicle Systems Institute (AVSI) in College Station, Texas. The Committee is working to create a joint standard with EUROCAE Working Group (WG)-96 to define the Minimum Operational Performance Standard (MOPS) to use Wireless Avionic Intra-Communication in the 4200-4400 MHz band.

During the plenary, Sub-Working Group (SWG)-3, which is responsible for the security requirements for WAIC, reported on the work being done by SC-216, Aeronautical Security Systems, to lay the framework for the security requirements in the new WAIC MOPS. (SWG)-1 continued discussions on interference scenarios that need to be addressed in the MOPS and how those scenarios relate to the Concept of Operations (CONOPS) of installing WAIC systems on aircraft.

After the joint plenary, WG-96 met to finalize their Process Specification for the Wireless On-Board Avionics Networks (WOBAN) which will enter its public comment phase for EUROCAE in early 2017. EUROCAE is releasing the WOBAN specification independent of the joint work on the MOPS, as the activity was already being finalized prior to the setup of SC-236.

SC-236 and WG-96 are on track to deliver the new MOPS to the Program Management Committee for approval in 2019.
PMC ADDRESSES FULL AGENDA

The Program Management Committee (PMC) approved the following documents:

- **DO-363, Guidance for the Development of Portable Electronic Devices (PED) Tolerance for Civil Aircraft**, was prepared by SC-234 and determines industry accepted guidance and best practices for determining aircraft PED tolerance through a safety risk assessment process.

- **DO-364, Minimum Aviation System Performance Standards (MASPS) for Aeronautical Information/Meteorological Data Link Services**, was prepared by SC-206 and developed to define system requirements that increase flight safety and efficiency through the transmission of meteorological and aircraft parameters to enable wake vortex, ATM, and weather applications, as described in RTCA DO-339.

- **DO-307A, Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance**, was prepared by SC-234, and was revised to be consistent with the existing HIRF requirements and incorporate lessons learned during application of the existing requirements in DO-307.

- **DO-229E, Minimum Operational Performance Standards (MOPS) for Global Positioning System/Satellite-Based Augmentation System Airborne Equipment**, was prepared by SC-159 and produced to introduce new PRN codes to manage the existing and planned evolutions of SBAS around the world.

The PMC also approved revised TORs for the following committees:


- **SC-186, Automatic Dependent Surveillance Broadcast (ADS-B)** – A revised TOR adds new Secretary Michael Garcia from Aireon, LLC.

- **SC-206, Aeronautical Information Services (AIS) and Meteorological Data Link Services** – A revised TOR accounts for the completion of MASPS, and changed the delivery date for the soon to be document, *Guidance for the Usage of Data Linked Forecast and Current Wind Information in Air Traffic Management Operations*.

- **SC-213, Enhanced Flight Vision Systems/Synthetic Vision Systems** – The PMC approved an adjustment of the Vision Systems for Takeoff from a MASPS to an SPR and the creation of a new MASPS for Synthetic Vision Systems for Attitude Awareness to address CAST SE 200 vs. revising the current MASPS. The PMC also approved an adjustment of dates for the three committee deliverables.

- **SC-216, Aeronautical Systems Security** – The revised TOR adds new Secretary Siobhan Nyikos from The Boeing Company.

- **SC-222, Internet Protocol Suite (IPS) and AeroMACS** – The revised TOR adds new Secretary Dongsong Zeng from The MITRE Corporation; requests to clean up the wording to include more specifics about the added IPS deliverables; and a new delivery date of December 2019 vs. December 2018 for MOPS for the IPS used in Aviation A-G Communication System.


- **SC-225, Rechargeable Lithium Batteries and Battery Systems** – The PMC approved a revised TOR with completion of DO-311A in April 2017 vs. late 2016.

Finally, the PMC approved proposed changes to the MOPS/MASPS Drafting Guides with follow-on activity to reach out to all SC’s for possible input. The PMC approved Clay Barber, Garmin, as the Chair of the trial run Cross Cutting Committee (CCC), with other members for the CCC still being coordinated. To close out the meeting, the PMC received a summary of the PBN Time, Speed, Spacing Task Group Final Report from Co-Chair Dan Allen of FedEx Express.

The next PMC meeting is scheduled for March 21 at RTCA.
CALENDAR OF EVENTS

February

February 6-10
SC-216, Aeronautical Systems Security
Hosted by Honeywell International
Phoenix, AZ

February 7
SC-225, Rechargeable Lithium Batteries and Battery Systems Virtual

February 7-9
SC-233, Addressing Human Factors/Pilot Interface Issues for Avionics
Hosted by RTCA
Washington, DC

February 27-March 2
SC-217, Aeronautical Databases
Hosted by Airbus
Toulouse, France

February 28-March 2
SC-223, Internet Protocol Suite (IPS) and AeroMACS
Hosted by RTCA
Washington, DC

March

March 7
SC-222, AMS(R)S Virtual

March 8
SC-230, Airborne Weather Detection Systems Virtual

March 13-17
SC-159, Navigation Equipment Using the Global Navigation Satellite System (GNSS)
Hosted by RTCA
Washington, DC

March 13-17
SC-206, Aeronautical Information and Meteorological Data Link Services
Hosted by National Institute of Aerospace (NIA)
Hampton, VA

March 14-17
DO-160G Training: Track A&B
Hosted by Wichita State University
Wichita, KS

March 20-24
SC-227, Standards of Navigation Performance
Hosted by RTCA
Washington, DC

March 21-23
SC-235, Non-Rechargeable Lithium Batteries
Hosted by RTCA
Washington, DC

March 23
SC-224, Airport Security Access Control Systems
Hosted by RTCA
Washington, DC

March 27-31
SC-216, Aeronautical Systems Security Hosted by EUROCONTROL
Brussels, Belgium

March 28-30
DO-178C Training
Hosted by RTCA
Washington, DC

March 31
Supplements to DO-178C Training
Hosted by RTCA
Washington, DC

April

April 27
SC-135, Environmental Testing
Hosted by RTCA
Washington, DC

April 18
SC-225, Rechargeable Lithium Batteries and Battery Systems Virtual

April 27-28
EUROCAE Symposium & 54th General Assembly
Hosted by EUROCAE
London, United Kingdom

UPCOMING EVENTS

February 22
NAC, NextGen Advisory Committee
Hosted by The MITRE Corporation
Mclean, VA

March 2
TOC, Tactical Operations Committee
Hosted by FAA
Oklahoma City, OK

March 21
PMC, Program Management Committee
Hosted by RTCA
Washington, DC