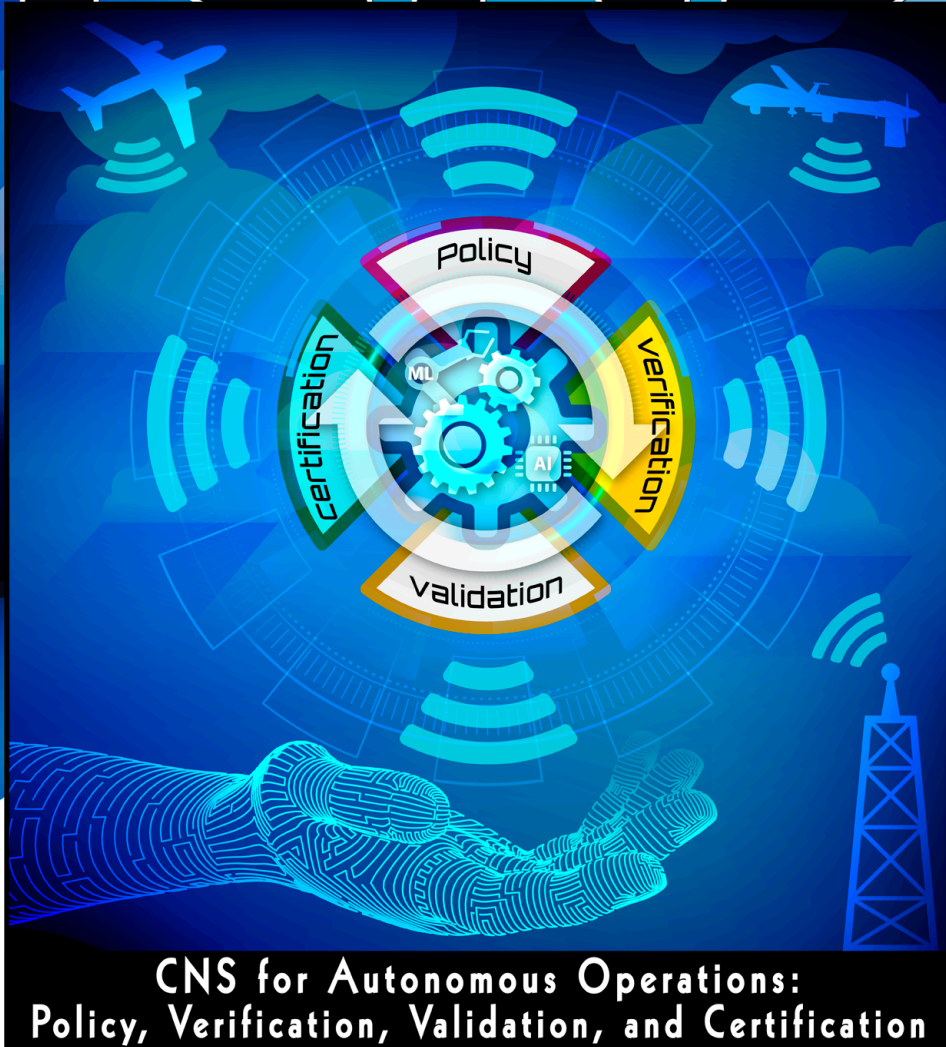


# ICNS



CNS for Autonomous Operations:  
Policy, Verification, Validation, and Certification

April 5-7, 2022

• Westin Washington Dulles Airport, Herndon, Virginia • [i-cns.org](http://i-cns.org) •

# ICNS 2022 Conference

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**Welcome to Our 22nd  
Integrated Communications,  
Navigation and Surveillance  
Systems (ICNS) Conference.  
Thanks so much for joining us!**

ICNS started in 2001 as a NASA workshop in Cleveland, Ohio during the onset of NextGen in the U.S., but it didn't stop there. The ICNS Conference has grown into a premier international aviation conference on communications, navigation, and surveillance (CNS) and air traffic management (ATM). It provides a forum for thought leaders, policymakers, researchers, and other technical experts from government, industry, and academia around the world to address significant challenges of new entrants and new types of operations, while ensuring the safety, sustainability, and efficiency of air traffic management. We bring people together, we keep the community informed, and we recognize the best.

2020 marked a 20-year anniversary milestone in the history of ICNS. Due to COVID-19, both 2020 and 2021 conferences were held virtually. However, nothing can replace the in-person connection! We are excited about being able to hold the 2022 conference in person, together with a virtual platform to accommodate participants who cannot attend in-person. The conference theme this year is "CNS for Autonomous Operations: Policy, Verification, Validation and Certification."

This conference offers plenaries, technical presentations, awards, and many networking opportunities to address critical issues and grow the knowledge base. Visionary leaders from EUROCAE, FAA, NASA and UT-Austin will give four keynotes on standards, research, certification, and mobility for new entrants. Prof. Clarke will give an inspirational talk to engage students and young professionals. The five plenaries include topics on global harmonization, spectrum, advanced air mobility, advanced CNS-technologies, and trajectory-based operations (TBO). Reflecting the call for global interoperability and harmonization and the

objective to expand the ICNS community, the TBO panel represents a pioneering session with a majority of the panelists from the Asian Pacific region. Our workshop is on "Remote ID Rule for Drones" while our technical program has more than 75 outstanding technical papers/presentations, grouped under six tracks.

Many thanks to our generous sponsors who have enabled us to provide complementary registration for to all our plenary sessions again this year. Sincere thanks to the ICNS Executive Planning Committee and all the volunteers who worked many extra, long hours to make this year's hybrid event possible, and to all the plenary chairs, panelists, and authors who will share their insights and updates with us!

Enjoy the conference! Again, thank you so much for participating in ICNS 2022!

**Sherry Yang**  
ICNS 2022  
Conference General Chair

## Conference General Chair



### **Sherry Yang, Boeing**

Sherry Yang is manager of Airspace Operational Efficiency (AOE) at Boeing Research & Technology (BR&T) in Fairfax, Virginia. She is responsible for executing AOE's missions and collaborating with government agencies and industry partners for advanced technology development in the areas of autonomous operations (AO), trajectory-based operations (TBO), artificial intelligence and machine learning (AI/ML), air traffic management (ATM), and advanced air mobility (AAM)/urban air mobility (UAM). Working across technologies and businesses, Yang facilitates public and private partnerships to develop and evaluate new technologies and operation concepts for the aviation ecosystem. Yang is heavily engaged with government,

industry, and academia technical committees. She is an associate fellow of American Institute of Aeronautics and Astronautics (AIAA), a technical advisor to the ICC AIA Member of the ICAO Information Management Panel, and a member of AIA, ATCA, and CANSO.

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## Technical Program Chairs



### **Prof. Dr. Ir. Erik Theunissen**

Prof. Theunissen has been active in the field of avionics for over 30 years. He is a member of the AIAA/IEEE Digital Avionics Technical Committee and RTCA Special Committee 228. Since 2003 he is a professor (part-time) at the Netherlands Defence Academy (NLDA). The company ISD, which he founded in 1988, has designed synthetic vision systems for Rockwell Collins that have been flight-tested in the Boeing 727 from the FAA, the Boeing 737-900 Technology Demonstrator, the NASA Boeing 757 ARIES, and several other test aircraft). Since 2008 he has been involved in the design and evaluation of Detect and Avoid systems for unmanned aircraft, and since 2010 his company ISD is involved in the design of the GA-ASI

Conflict Prediction and Display System (CPDS). Between 2014 and 2018 he supported flight testing of CPDS, a prototype self-separation system, at NASA Armstrong. For his research, he has received over 20 international awards among which two times the MITRE-sponsored David Lubkowski Award for Best of Conference.



### **Dr. Jonathan Lee, US DOT, Volpe Center**

Dr. Jonathan Lee has 20 years of experience in the aviation field. He is currently the senior project lead in Air Traffic Control Concepts and Systems. Prior to that, he was the chief of the Aircraft Wake and Weather Division. Dr. Lee has worked on projects sponsored by the Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA). His areas of research include air traffic management (ATM) concepts and systems research and development; human-system integration; National Airspace System (NAS) modeling, simulation, and optimization; and performance evaluation and assessment of the NAS. Some of the projects he has been involved in include FAA Tailored Arrivals, FAA Remote

Tower, the NASA NextGen ATM-Airportal, NASA Virtual Airspace Modeling and Simulation, and the NASA Detroit Deicing Decision Support Tool. He holds a patent on modeling deicing process on airport surface.



## Plenary Program Chairs



### **Brent Phillips, FAA**

Brent Phillips is a senior systems engineer with the Federal Aviation Administration's NextGen Organization and the U.S. panel member to the International Civil Aviation Organization (ICAO) Communications Panel. Mr. Phillips is also the program co-lead for the joint FAA/SESAR Future Communications Infrastructure Study including the development of the Aeronautical Mobile Airport Communications System (AeroMACS) and the Next Generation SATCOM Systems. He is currently leading the internet protocol suite (IPS) standards development for aviation use in the FAA. He is also serving as the communications lead on the NAS Enterprise Architecture Roadmap Team.

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### **Dr. Nikos Fistas, EUROCONTROL**

Dr. Nikos Fistas has been with EUROCONTROL for over 25 years leading development activities for new aviation communication systems starting from investigations and leading to definition and standardization of datalinks for communication (terrestrial and SATCOM based) as well as for surveillance purposes. Since 2020, he is the datalink manager, overseeing the agency's activities to support the deployment and operations of CPDLC in Europe. Before this, he oversaw the agency's activities relating to the future aeronautical communication infrastructure (FCI), leading the development of AeroMACS, LDACS and SATCOM systems. In the context of SESAR, he was responsible for supporting the various COM solutions and

led the relevant international coordination aspects with ICAO and the U.S. FAA under Coordination Plan 4.4. Nikos is representing EUROCONTROL in various international standardization groups, such as ICAO, EUROCAE, RTCA, AEEC and ETSI, covering data-link aspects. He currently leads the ICAO Communication Panel Project Team SATCOM, which is tasked to update the ICAO SATCOM provisions (SARPs and Manual).

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### **Lance Sherry, George Mason University**

Lance Sherry is an associate professor of systems engineering and operations research at George Mason University. Dr. Sherry also serves as the director of the Center for Air Transportation Systems Research at George Mason University. Dr. Sherry has over 30 years of experience in the aviation industry serving as a flight-test engineer, flight control engineer, system engineer, lead system architect, program manager, strategic planning and business development. Dr. Sherry served as a fellow at RAND Corporation 1999-2001. He has published over 100 papers and journal articles, holds several patents, and has received awards for his work.

# ICNS 2022 Agenda

## CNS for Autonomous Operations: Policy, Verification, Validation, and Certification

(All times and programming are subject to change. Please visit <http://i-cns.org> for the latest updates.)

Time	Tuesday, 5 April	Wednesday, 6 April	Thursday, 7 April
7:00 - 8:30		Networking & Breakfast	
		Virtual Networking Hosted by Nikos Fistas, EUROCONTROL	
		Sponsor Communications	
8:30 - 12:00	<b>Plenary Program</b>		
	Conference Welcome and Introductions Sherry Yang (Boeing), Conference General Chair 8:30 - 8:40		
	<b>Opening Keynote:</b> <b>Anna Von Groot</b> Director General, EUROCAE "CNS and Spectrum developments in European and International Standardization" 8:40 - 9:00	<b>Conference Keynote:</b> <b>Robert Pearce</b> NASA Associate Administrator for the Aeronautics Research Mission Directorate 8:40 - 9:00	<b>Plenary V: Multi-Regional TBO Demonstration</b>  <b>Chair:</b> Diana Liang, Enterprise Portfolio Manager, FAA  <b>Panel Members:</b> Nabil Sandhu, FAA, USA Amornrat Jirattigalachote, AEROTHAI, Thailand Wei Sean Ho, CAAS, Singapore Yukio Imada, JCAB, Japan  8:40-9:50
	<b>Plenary I: Global Harmonization</b>  <b>Co-Chairs:</b> <b>Paul Bosman</b> , Head of Infrastructure Division, Network Manager Directorate, EUROCONTROL <b>Rob Hunt</b> , Director, PMO Integrated Services & Analysis, FAA  <b>Panel Members:</b> <b>Diana Liang</b> , Enterprise Portfolio Manager, FAA, "Vision of the NAS Future" <b>Marouan Chida</b> , Head of Digital Transformation & Innovation, SESAR Joint undertaking, "European ATM Strategy" <b>Steve Bradford</b> , Chief Scientist for Architecture and NextGen Development, FAA, "US Communication Strategy" <b>Jacky Pouzet</b> , Head of Communication and Frequency Coordination, EUROCONTROL, "Future Communications Infrastructure (FCI) European Planning" <b>Andrew Onken</b> , Communications Architect, Collins Aerospace, "Connected Ecosystem" <b>Gareth Lawton</b> , Product Manager of ATC Solutions, SITA, "Enabling Collaboration for Optimisation"  9:00 - 10:30	<b>Plenary III: International Aspects of Advanced Air Mobility</b>  <b>Co-Chairs:</b> <b>Steve Bradford</b> , Chief Scientist for Architecture and NextGen Development, FAA <b>Davis Hackenberg</b> , Advanced Air Mobility Mission Integration Manager, NASA  <b>Panel Members:</b> <b>Davis Hackenberg</b> , Advanced Air Mobility Mission Integration Manager, NASA, "NASA AAM International talk overview" <b>Gary Cutts</b> , Future Flight Challenge Director, UK Research and Innovation, "A Novel Approach to Air Mobility" <b>Erick Corona</b> , Director of Prod. Mgmt. & UAS Ops Engineering, Visk Aero, "The Case for Advanced Air Mobility - Beginning with the Current NAS and Beyond" <b>Thomas Prevot</b> , Air Taxi Product Lead, Joby Aviation  9:00 - 10:20	
	<b>Social &amp; Coffee Break</b> 10:30 - 11:00	<b>Social &amp; Coffee Break</b> 10:20 - 10:40	<b>Social &amp; Coffee Break</b> 9:50 - 10:10
	<b>Plenary II</b> Aviation Spectrum : How does aviation navigate through a constantly changing spectrum environment?  <b>Chair:</b> <b>Andrew Roy</b> , Director of Engineering Services Aviation Spectrum Resources (ASRI)  <b>Panel Members:</b> <b>Claude Pichavant</b> , Executive Expert Communication, Navigation, Surveillance, Cockpit and Platforms, Airbus, "How to build CNS systems for the future RF environment" <b>Loftr Jónasson</b> , Chief CNSS (CNS and Spectrum), ICAO, "How to regulate CNS systems for the future RF environment" <b>Noppadol Pringvanich</b> , Head ATM Engineering & Aviation Radio Spectrum, IATA, "How to operate aircraft in the future RF environment"  11:00 - 12:00	<b>Plenary IV: Future I-CNS Emerging Technologies to Support ATM</b>  <b>Co-Chairs:</b> <b>Bob Lee</b> : Owner & Principal Consultant, GX Consulting <b>Rainer Koll</b> : Senior Advisor, Stellar Solutions  <b>Panel Members:</b> <b>Bob Lee</b> , "Introductions and Opening Remarks" <b>Michelle Cady</b> , Program Manager, FAA NextGen, "Connected Aircraft concept - A performance-based approach" <b>Jerry Hancock</b> , Director, Aviation Cybersecurity, INMARSAT, "Orchestrating change for future aviation communication Systems" <b>Rainer Koll</b> , Senior FAA Advisor, Stellar Solutions, "Emerging Space-Based Systems for ATM Communications"  10:40 - 11:45	<b>Workshop: Remote ID Rule for Drones: Which Technology Makes the Most Sense?</b>  <b>Chair:</b> Dr. Lance Sherry, Center for Air Transportation Research, George Mason University  <b>Panel Members:</b> <b>Greg Deeds</b> , Technology Exploration Group Inc. <b>Mark Nichols</b> , Spanalytics Inc. <b>Gregory Tangonan</b> , Ateneo Innovation Center <b>Christian Ramsey</b> , uAvionix <b>Tim Bagnall</b> , Mosaic-ATM  10:10 - 11:40
		<b>AWARDS CEREMONY</b>	
		<b>ICNS Champion Awards</b> <b>AIAA Sustained Service Award</b> 11:45 - 12:05	<b>Best Paper Awards</b> <b>DASC 2022 Presentation</b> 11:40 - 12:00
12:00 to 13:00 PM		Networking & Lunch (in-person)	
		Virtual Networking Hosted by Nikos Fistas, EUROCONTROL	
		Sponsor Communications	
13:00 – 17:30	<b>Technical Program</b>		
	Chaired by Prof. Dr. Ir. Erik Theunissen and Dr. Jonathan Lee		
	<b>Parallel Sessions</b> <b>Four 30-minute Technical Presentations</b>	<b>Parallel Sessions</b> <b>Four 30-minute Technical Presentations</b>	<b>Parallel Sessions</b> <b>Four 30-minute Technical Presentations</b>
	<b>Social &amp; Coffee Break</b>	<b>Social &amp; Coffee Break</b>	<b>Social &amp; Coffee Break</b>
	<b>Parallel Sessions</b> <b>Four 30-minute Technical Presentations</b>	<b>Parallel Sessions</b> <b>Four 30-minute Technical Presentations</b>	<b>Parallel Sessions</b> <b>Four 30-minute Technical Presentations</b>
17:30 - 19:30	<b>Evening Program</b>		
	<b>Sponsors &amp; Exhibitors Reception</b> 17:30-18:00  <b>Evening Keynote: Certifying Advanced Technology Products</b> 18:00 – 18:45  <b>Dr. Michael Romanowski</b> Director, Policy & Innovation Division of FAA	<b>Evening Keynote: Towards Increasingly Autonomous Aircraft-enabled Mobility</b>  <b>Dr. John-Paul Clarke</b> Professor and Ernest Cockrell, Jr. Memorial Chair in Engineering, University of Texas at Austin  (Speech at 18:00 and Dinner follows)	



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## DAY 1 • ICNS 2022 • April 5th

### Opening Keynote: “CNS and Spectrum Developments in European and International Standardization”



#### **Anna Von Groote, Director General, EUROCAE**

Anna von Groote joined the EUROCAE Secretariat in 2011 and was appointed EUROCAE Director General in February 2022. Before joining EUROCAE, she worked at the European Committee for Standardization (CEN) since 2006, where she assumed responsibilities for the organization's work program in different sectors. In her role as program manager at CEN, she was responsible amongst others for the aerospace and air traffic management sector. Anna holds a master's degree in European Studies from the Centre for European Integration Studies / University of Bonn (Germany) and a Master of Laws LLM in technology and intellectual property law from the University of Liverpool (UK).

### Plenary I: Global Harmonization

Global Harmonization and effectively integrating new technologies and business needs in an ever-evolving world: How do we globally and regionally integrate new technologies, different business needs, and non-traditional aviation actors into aviation operations and ATM services? What are the latest plans of the various states, ANSPs, industry members, and other organizations to integrate new technologies and collaborate with each other to promote global interoperability and address airspace user needs? What are the key challenges we must address and opportunities we should capitalize upon to support the growing demands of the flying public and enable new business opportunities? In particular, what is the vision and enabling strategies to further take advantage of a digitized world and evolve the way information is generated, shared, used, and disseminated to make real-time ATM business decisions—within and across regions, across different decision nodes (e.g., flight deck, airspace user ground-based systems, ANSP ground systems), and across different actors (ANSPs, airspace users, industry).

#### Co-chairs:



#### **Paul Bosman**, Head of Infrastructure Division, Network Manager Directorate, EUROCONTROL

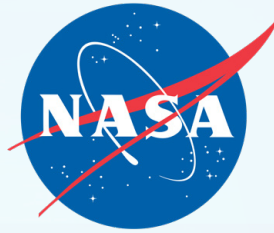
Paul Bosman has been with EUROCONTROL for nearly 30 years, working in many different technical and managerial positions in different locations. He is currently the head of the Network Manager - Infrastructure Division. He is responsible for planning, deploying, and monitoring European infrastructure and aiming to digitise the SES European Sky through activities such as CNS, information management, AI and overall resilience (cyber, interference), as well managing major pan-European common services such as ARTAS/SDDS/SASS-C, EAD, NewPENS and air-ground datalink common procurement.



#### **Rob Hunt**, Director, PMO Integrated Services & Analysis, FAA

Robert (Rob) Hunt was permanently installed as the director, Integrated Services and Analysis, on September 13, 2020, in the FAA's Program Management Organization (PMO). In this role, he is responsible for leading a directorate charged with overseeing and enabling key enterprise level functions across the FAA's PMO, including integrated resource management, acquisition support, program health management, and planning, analysis and integration of PMO programs into the National Airspace System (NAS). With over 900 employees and a multi-billion-dollar annual budget, the PMO is responsible for developing business solutions, procuring technologies, and implementing programs that enable NextGen benefits and sustainment of NAS and mission support systems for airspace users.





NASA's Glenn Research Center started the ICNS Conference in 2001 to enable a forum for national and international discussion and collaboration towards the goal of a future integrated, highly efficient, capable, and secure CNS infrastructure for the nation and the world and provide input to NASA's aeronautical CNS R&D program.

NASA Glenn has performed research and development in aeronautical communications, navigation, surveillance and information technologies for the national airspace system (NAS) for more than 20 years, building on more than 40 years of experience in advanced communications systems research and development: The Emmy award-winning Communications Technology Satellite, CTS (1976), the Advanced Communications Technology Satellite, ACTS (1993-2003), technologies for space missions and infrastructure such as the Cassini mission, TDRSS, and International Space Station, and many others.

NASA Glenn's accomplishments in aeronautical CNS includes: the demonstration of the first networked broadband airborne satellite communications; development, testing, and demonstration of the Aeronautical Mobile Airport Communications System (AeroMACS) airport surface wireless communications network; next generation network protocol standards for secure mobile networks; satellite-based distribution of aviation weather information; spectrum allocations for future ground and air-mobile aviation communications; future global aviation communications under the EUROCONTROL/ FAA Future Communications Study; next-generation mobile communications network architecture for aviation; advanced simulation capabilities for NASA's Shadow Mode Assessment using Realistic Technologies for the National Airspace System (SMART NAS) project; and development and testing of the first prototype L-Band/C-Band UAS control and non-payload communications radio.

NASA Glenn has unique research facilities enabling development and testing of next-generation secure wireless aeronautical mobile communications and network standards and extensive modeling and simulation and system analysis capabilities covering all aspects of communications, navigation, surveillance, and information. A staff of over 30 experienced CNS research engineers are engaged in the development of the nation's next-generation CNS infrastructure, in collaboration with government, academic and industrial partners.

[www.nasa.gov](http://www.nasa.gov)

## Plenary I: Global Harmonization—continued

### Panel Members:

**DAY 1 • ICNS 2022 • April 5th**



**Diana Liang**, Enterprise Portfolio Manager, FAA, “Vision of the NAS Future”

Diana Liang works in the FAA NextGen organization. Ms. Liang has successfully provided direction and oversight on the development and fielding of many of the FAA's NextGen programs and enabling technologies. In each of her previous roles she has promoted NextGen CNS programs. As acting chief for the NAS Architecture, she helped to manage the FAA's overall plan for the transition to and implementation of the NextGen systems including the SWIM and Datacom Programs. Ms. Liang, as Enterprise Portfolio Manager, helps to prioritize all NextGen research and development activities with the FAA from a funding and schedule perspective to help the NAS recognize many of the planned performance improvements. This has included strong support for enterprise CNS research. Ms. Liang is the U.S. nominated panel member to the ICAO Information Management Panel (IMP) leading the development of SWIM, information services guidance, and air-ground SWIM.



**Marouan Chida**, Head of Digital Transformation & Innovation, SESAR Joint undertaking, “European ATM Strategy”

Marouan CHIDA is the head of Digital Transformation & Innovation in SESAR, the European ATM modernisation program. He oversees the strategic research and is leading the digitalisation of aviation together with its related technological innovations (ATM/UTM, CNS, avionics, autonomy, artificial intelligence, connectivity). He is experienced in advanced ATM concepts, avionics and ground systems, involved in technology and architecture development across the SESAR programme. Before joining the SJU, Marouan worked for AIRBUS, where he led ATM & avionics development teams. He graduated from the Ecole Nationale de l'Aviation Civile (ENAC), the French school of civil aviation, where he achieved an engineering degree in civil aviation as well as a master's degree in air-ground collaborative systems engineering.



**Steve Bradford**, Chief Scientist for Architecture and NextGen Development, FAA, “US Communication Strategy”

Steven W. Bradford is the Federal Aviation Administration's (FAA) chief scientific and technical advisor for architecture and Next Generation Air Transportation System (NextGen) Development. He is the chairman of the Technical Review Board, which monitors technical decisions, related investments, and the enterprise architecture. Mr. Bradford works with elements of the FAA to develop midterm plans and five-year budget requests to implement NextGen. He is the FAA's lead for the FAA/NASA Research Transition Team process that supports collaboration between the FAA and NAS on ATM-related activities.



**Jacky Pouzet**, Head of Communication and Frequency Coordination at EUROCONTROL, “Future Communications Infrastructure (FCI) European Planning”

Jacky Pouzet has been head of ATM Communication and Frequency Coordination at EUROCONTROL since 2011. Before that he was the ATM Communication domain manager. He has an Industrial background (aircraft manufacturer) has a Master of Science from École d'Ingénieurs en Chimie et Sciences du Numérique (CPE), Lyon, France. He is a member of the EUROCONTROL ICAO Communication Panel and chairman of the EUROCONTROL Communication Steering Group. Major recent achievements: radio frequency function, network security and mobility, IP protocol, VoIP, PENS, 8.33, spectrum policy, future communication technology, datalink.



**Gareth Lawton**, Product Manager of ATC Solutions, SITA, “Enabling Collaboration for Optimisation”

For more than 20 years, Gareth has been delivering solutions for leading organizations with the aviation industry. This has included ANSPs, airports, AUs, ground handlers, established industry players, aviation start-ups and now a CSP. The solutions Gareth has worked on have been varied, including new ATC functions, ATFCM tools, aircraft boarding methods, datalink implementations, trajectory-based operations, flexible use of airspace tools, post-operational analysis, FOD detection, controller workload prediction, airfield collaboration tools and many others. This background provides him with a good overview of the industry and allows him to empathize with many of aviation's stakeholders. Gareth is now helping SITA to develop new CNS services to support the future needs of aviation.

# AIRBUS

Airbus is a leader in designing, manufacturing and delivering aerospace products, services and solutions to customers worldwide. With over 130,000 employees and as the largest aeronautics and space company in Europe and a worldwide leader, Airbus is at the forefront of the aviation industry. We build the most innovative commercial aircraft and consistently capture about half of all commercial airliner orders. Thanks to our deep understanding of changing market needs, customer focus and technological innovation, we offer products that connect people and places via air and space. The company's product line of passenger aircraft is characterized by the highest standards of comfort, unrivalled economics, and versatility with a commitment to progressively reduce emissions. Airbus' A320 family is the undisputed leader in the single-aisle category, now joined by the A220 family, while the twin-engine A330 family can cover long-range requirements. The double-deck A380 is the largest Airbus aircraft and introduced key innovations now embedded in the latest generation of aircraft. The A350 epitomizes Airbus' five decades of experience and expertise in shaping the future of air travel.

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Honeywell Aerospace products and services are found on virtually every commercial, defense and space aircraft in the world. With an unmatched heritage of innovation that spans more than a century, our aim is to solve the greatest challenges CEOs, pilots, operators, passengers, finance, maintenance, and cabin crews face -- and transform the way we all fly. We deliver improved fuel-efficiency, more direct and on-time flights, safer and more comfortable travel and better flight planning and traffic management. We do this through one of the industry's broadest and most advanced portfolios including world-class engines, cockpits, cabin design, wireless connectivity, and enterprise performance management services -- even for emerging market segments like flying taxis, while providing world-class customer service, repairs, and technical support.

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## DAY 1 • ICNS 2022 • April 5th

### Plenary II: Aviation Spectrum: How Does Aviation Navigate Through a Constantly Changing Spectrum Environment?

With multiple external spectrum issues impacting aviation systems and operations, the panel will explore what this means for aviation manufacturers, operators, and regulators with respect to future CNS systems. This will include what other changes might we expect, and how aviation might change or adapt to these circumstances.

#### Chair:



**Andrew Roy**, Director of Engineering Services Aviation Spectrum Resources (ASRI)

Andrew Roy is the director of Engineering Services at Aviation Spectrum Resources, Inc. (ASRI), acting as the focal point for US airlines and other commercial aviation operators on spectrum engineering and regulatory considerations. He is vice chairman of the ICAO Frequency Spectrum Management Panel and is a member of the U.S. Department of Commerce's Spectrum Management Advisory Committee. Roy is a veteran of the UK Royal Air Force with a background in RF battlespace management. He earned his master's degree in systems engineering from Loughborough University and is a chartered engineer at the UK Institute of Engineering and Technology.

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#### Panel Members:



**Claude Pichavant**, Executive Expert Communication, Navigation, Surveillance, Cockpit and Platforms, Airbus, "How to Build CNS Systems for the Future RF Environment"

Claude Pichavant has an extensive career in the field of civil airborne communications and surveillance systems with over 35 years' experience on all Airbus aircraft models. Claude has been actively involved in the international standards for commercial aviation, representing Airbus at the ARINC-AEEC-SAE (Aeronautical Radio, Incorporated- Airlines Electronic Engineering Committee- Society of Automotive Engineers), as well as at EUROCAE and RTCA (Radio Technical Commission for Aeronautics). Since 2007, his representation of the air transport industry has enabled him to further develop solid working relationships with Single European

Sky ATM Research ( SESAR), the International Civil Aviation Organization (ICAO), and the International Telecommunications Union (ITU) Radio Communication Sector through participation to two World Radio Conferences. Claude is also an active member and contributor of the International Coordinating Council of Aerospace Industries Associations (ICCAIA) and has thus contributed to the 2015 High-Level Safety Conference on the Global Flight Tracking topic, and still contributing to the ICAO Frequency Spectrum Management Panel (FSMP) and to the Global Aeronautical Distress and Safety System GADSS Advisory Group as ICCAIA advisor.





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L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet customers mission-critical needs. We provide advanced defense and commercial technologies across air, land, sea space and cyber domains. We bring speed, innovation, and flawless execution together with our commitment to make the world more secure.

L3Harris plays a critical role in air traffic management through enterprise managed services, surveillance technologies for aircraft monitoring and airport operations and optimization solutions to make flight more safe, secure, and efficient.

We provide safety-critical, highly available and highly secure managed infrastructure services and solutions to deliver mission-critical communications, surveillance and enterprise information management capabilities for aviation, defense, and security customers.

[www.l3harris.com/atm](http://www.l3harris.com/atm)

# MITRE

MITRE's mission-driven teams are dedicated to solving problems for a safer world. Through public-private partnerships, as well as the operation of federally funded R&D centers, we work across government to tackle challenges to the safety, stability, and well-being of our nation.

MITRE operates the Center for Advanced Aviation System Development, which has supported the FAA for more than 60 years. In addition, MITRE provides technical expertise to various international civil aviation authorities, airport operators, airlines, and other aviation organizations in air traffic management systems engineering, aviation operations, airspace design, and systems automation and integration.

Learn more at [www.mitre.org](http://www.mitre.org).

## Plenary II: Aviation Spectrum: How Does Aviation Navigate Through a Constantly Changing Spectrum Environment?

**DAY 1 • ICNS 2022 • April 5th**

### Panel Members—continued:



**Loftur Jónasson, Chief CNSS (CNS and Spectrum), ICAO, “How to Regulate CNS Systems for the Future RF Environment”**

Loftur Jónasson is chief of CNSS (CNS & Spectrum) as well as secretary of the Frequency Spectrum Management Panel (FSMP) of ICAO's Air Navigation Commission. Loftur joined ICAO in 2007, major responsibilities being Standards and Recommended Practices (SARPs) for aeronautical Communication, Navigation and Surveillance (CNS) systems, and aeronautical frequency spectrum management as well as representation of ICAO and aeronautical interests at the ITU World Radiocommunication Conferences and other international radio regulatory fora. As an electrical engineer (telecommunications), since 1992 he has worked mainly in the field of aeronautical and maritime radio and telecommunications. His background, in addition to aeronautical communications systems, includes a variety of maritime tasks, including being the project lead for the development and rollout of one of the world's first marine vessel tracking systems, long before this became an international standard, at that time tracking a fleet of over 2000 ships through automatic position reporting by means of multiple routes, including VHF and satellite.



**Noppadol Pringvanich, Head ATM Engineering & Aviation Radio Spectrum, IATA, “How to Operate Aircraft in the Future RF Environment”**

Noppadol Pringvanich is the global head of Air Traffic Management Engineering and Aviation Radio Spectrum for International Air Transport Association (IATA). He is responsible for all developments of IATA's global policy/strategy and airlines positions relating to aviation frequency spectrum and all aircraft avionics and related infrastructure. Noppadol is the co-chair of ICAO Communications Panel and has served as IATA-nominated panel member for numerous ICAO technical panels including Navigation, Surveillance and Frequency Spectrum Management. He also headed IATA delegation in global International Telecommunication Union (ITU) conferences and meetings. Prior to IATA, Noppadol served as the chief of ICAO Asia Pacific Regional Sub-Office in Beijing where he managed strategic directions and led all daily operations of the ICAO office. Noppadol also served as director of Airspace and Flight Procedure Department at AEROTHAI, Thailand, where he was responsible for all airspace improvement projects, both domestical and international, and the corporate master planning of the ANSP's communication, navigation, surveillance and air traffic management infrastructures. Noppadol received his Master of Science in electrical engineering from Stanford University, USA.

## Sponsors and Exhibitors Reception

### Evening Keynote: “Certifying Advanced Technology Products”



**Dr. Michael Romanowski, Director, Policy & Innovation Division of FAA**

Dr. Michael Romanowski is the Federal Aviation Administration's (FAA) director of Policy & Innovation in the Aircraft Certification (AIR) Service. In this role, he provides executive direction in support of aerospace innovation, by seeking out the best solutions for the organization that will drive outcomes, anticipating key changes in the market, and mobilizing teams around the change to develop a clear pathway to certification for all aerospace products. He also provides direction in the development and maintenance of AIR regulations, guidance and directives, research, and development activities for AIR, and maintains and manages the Chief Scientific and Technical Advisor program, as well as fleet safety studies and evaluation of overall fleet safety needs.



At Mosaic ATM, we believe that air transportation and applications of related technologies are essential to human imagination, bringing the world together in positive ways, and providing economic engines that better people's lives.

Formed in 2004, during the 100th year of powered flight, the mission of Mosaic ATM is to continue aviation progress through its second century by designing and developing the systems necessary to increase air transportation capacity and efficiency while maintaining the highest possible levels of safety and security.

Through advanced research, user-centered design, development, and software system prototyping, combined with a thorough understanding of air transportation operations, Mosaic ATM provides system solutions to achieve the mission.

[www.mosaicatm.com](http://www.mosaicatm.com)



Aviation Spectrum Resources, Inc. (ASRI) is responsible for managing the Aeronautical Enroute Spectrum in the United States through the ASRI Ground Station Administration Service. The VHF and HF frequencies assigned in this protected aeronautical safety spectrum are used by aircraft for the safety and regularity of flight, with ASRI coordinating and licensing of over 5000 stations across the United States.

ASRI is an experienced team with many decades of collective knowledge in frequency management and spectrum coordination. Led by Company President Kris Hutchison, ASRI's staff have a wide range of expertise to help its customers with frequency assignment, international licensing, interference mitigation, engineering analysis, spectrum regulations, and federal and UN agency engagement. ASRI's frequency management functions are owned by the aviation user community of the United States and have been providing assurance and safety for all aviation radio users since 1929.

[www.asri.aero](http://www.asri.aero)

## DAY 2 • ICNS 2022 • April 6th

### Conference Keynote: “NASA’s Aeronautics Research Portfolio and Strategic Direction”



#### **Robert Pearce, NASA Associate Administrator for the Aeronautics Research Mission Directorate**

Robert A. Pearce is the associate administrator for NASA Aeronautics Research Mission Directorate (ARMD). Pearce manages the agency's aeronautics research portfolio and guides its strategic direction, including research in quiet supersonic flight over land, urban air mobility, autonomy, highly efficient advanced air vehicle concepts, electrified aircraft propulsion, advanced materials, airspace operations and safety, integration and flight demonstrations of aviation systems, and the nurturing and development of transformative concepts for aviation.

### Plenary III: International Aspects of Advanced Air Mobility

The vision of Advanced Air Mobility (AAM) is to provide an ecosystem of safe, sustainable, affordable, and automated air transportation for passengers and cargo capable in urban and rural environments. Leaders from government and industry will provide insights and updates on AAM development and harmonized approaches to AAM.

#### **Co-chairs:**



#### **Steve Bradford, Chief Scientist for Architecture and NextGen Development, FAA**

Steven W. Bradford is the Federal Aviation Administration's (FAA) chief scientific and technical advisor for architecture and Next Generation Air Transportation System (NextGen) Development. He is the chairman of the Technical Review Board, which monitors technical decisions, related investments, and the enterprise architecture. Mr. Bradford works with elements of the FAA to develop midterm plans and five-year budget requests to implement NextGen. He is the FAA's lead for the FAA/NASA Research Transition Team process that supports collaboration between the FAA and NAS on ATM-related activities.

He also has a leading role in NextGen's international engagement activities with SESAR Joint Undertaking, and has led several co-operative international efforts with EUROCONTROL. He was a member of the International Civil Aviation Organization's (ICAO) technical team that authored the Global Air Navigation Plan, the past U.S. panel member to the ICAO Air Traffic Management Requirements and Performance Panel, and the chairman of the Global Air Navigation Plan Study Group responsible for managing all updates to that plan.



#### **Davis Hackenberg, Advanced Air Mobility Mission Integration Manager, NASA**

Davis Hackenberg is currently serving the NASA Aeronautics Research Mission Directorate (ARMD) as the Advanced Air Mobility (AAM) Mission Integration Manager. He performs his duties from NASA Headquarters in Washington DC. Mission Integration Manager duties for AAM include strategic mission planning and leading the development and implementation of the AAM mission spanning all relevant ARMD project and center research activities with the goal of implementing the NASA AAM investment strategy in a manner that accelerates AAM. Davis is responsible for strategic and technical management, including integration with multiple government agencies ensuring that the products of this effort are relevant and will be utilized

by all customers and stakeholders. Davis received his bachelor's degree in mechanical engineering and master's degree in system engineering from Pennsylvania State University.



# FREQUENTIS

Frequentis USA, Inc. located in Columbia, Maryland, develops, delivers, and supports communication and information solutions for FAA, DoD, NASA, and state and local 9-1-1 agencies. Key success factors for Frequentis are:

- Highly innovative solutions deploying leading-edge technologies
- User workflow optimization via context-of-use centered design
- Bridging legacy and emerging communications technologies via networked solutions
- Commitment to delivery on time and in budget via close partnership and tight collaboration with our customers

Frequentis ATM applications include:

- ATC Voice-over-IP communications systems and networks
- TM-grade networks via Software Defined Networking (SDN)
- Remote Tower Camera Systems
- UAS – ATC communications solutions
- ATC Electronic Flight Strip Systems
- Tower automation applications including ATIS, Data Link terminals, NavAids monitoring, AFTN and AMHS
- Aeronautical information management (AIM) systems and AMHS networks
- System wide information management (SWIM) network nodes, and SWIM-enabled applications
- Multi-lateration Systems

[www.frequentis.com](http://www.frequentis.com)



# inmarsat

Inmarsat, the leading provider of mobile satellite communications for aviation, has been delivering secure connectivity to the cockpit for 30 years. SB-S, our next generation communications platform, offers global, high-speed IP connectivity for digital aircraft communications. Always on and always secure, it delivers a new world of applications to bring operational and safety benefits for airlines and airspace authorities. SB-S also delivers Iris, an air traffic modernisation programme to enable continental satellite datalink communications over Europe. ANSPs can rely on Iris' secure datalink to increase ATM efficiency, relieve air traffic controller workload and enhance flight safety. Our newest connectivity solution, Inmarsat Velaris, is a ground-breaking new offering for uncrewed aerial vehicles. Leveraging our experience working with ANSPs, Velaris will help safely integrate drones into managed airspace and allow them to fly beyond visual line of sight, unlocking new benefits for business and society while making our skies cleaner and greener.

[www.inmarsat.com](http://www.inmarsat.com)

## Plenary III: International Aspects of Advanced Air Mobility—continued

DAY 2 • ICNS 2022 • April 6th

### Panel Members:



#### **Davis Hackenberg**, Advanced Air Mobility Mission Integration Manager, NASA, “NASA AAM International Talk Overview”

Davis Hackenberg is currently serving the NASA Aeronautics Research Mission Directorate (ARMD) as the Advanced Air Mobility (AAM) Mission Integration Manager. He performs his duties from NASA Headquarters in Washington DC. Mission Integration Manager duties for AAM include strategic mission planning and leading the development and implementation of the AAM mission spanning all relevant ARMD project and center research activities with the goal of implementing the NASA AAM investment strategy in a manner that accelerates AAM. Davis is responsible for strategic and technical management, including integration with multiple government agencies ensuring that the products of this effort are relevant and will be utilized by all customers and stakeholders. Davis received his bachelor's degree in mechanical engineering and master's degree in system engineering from Pennsylvania State University.



#### **Gary Cutts**, Future Flight Challenge Director, UK Research and Innovation, “A Novel Approach to Air Mobility”

Gary Cutts is the director of ISCF Future Flight Challenge and has 30 years' experience in the Aviation industry, mainly working on complex engineering systems, but with experience in business development, customer consultancy and services creation. He has held many global engineering, executive leadership positions in Rolls-Royce working across the product lifecycle including creating the system design function and leading the digital transformation of Engineering for the group. He has also been a board member at the Centre for Modelling and Simulation. Gary is now leading the UK government's Future Flight Innovation Program working across government and industry to create innovative new aviation systems. Gary's passion is to bring teams together to challenge the status quo and drive step changes in both the technology and business thinking to transform the aviation industry.



#### **Erick Corona**, Director of Prod. Mgmt. & UAS Ops Engineering, Wisk Aero, “The Case for Advanced Air Mobility – Beginning with the Current NAS and Beyond”

Erick Corona is the director of Product Management and Unmanned Air System Operations at Wisk Aero LLC., a company focused on addressing congestion by deploying self-driving electric vertical-take-off and landing (eVTOL) aircraft. Working at the intersection of aeronautics, robotics, telecommunications, and battery technology, the company aims to deliver a safe, sustainable, affordable, and beyond-cool means of urban transportation. Before Wisk, as director of Products at C3.ai, Erick led the development of AI-capable Predictive Maintenance solutions now deployed within DoD. Prior assignments include management, flight test, and engineering design positions at Boeing and GE Aircraft Engines. Erick also led the adoption of data-driven infrastructure asset management efforts at Pacific Gas and Electric. Erick holds a Bachelor of Science in mechanical electrical engineering from the ITESM (Mexico), a Master of Science in aeronautical engineering from the University of Washington. He is also a graduate of the MIT Leaders for Global Operations (LGO) Program, where he earned a Master of Science (S.M.) in engineering systems and a Master of Business Administration from the Sloan School of Business.



#### **Thomas Prevot**, Air Taxi Product Lead, Joby Aviation

Dr. Thomas (Tom) Prevot is the air taxi product lead at Joby Aviation. He and his team are developing the air taxi service for the future Joby network of electric Vertical Take-Off and Landing (eVTOL) aircraft. Tom joined Joby in January 2021, after having been the director of engineering for Airspace Systems at Uber Elevate since 2017. Prior to joining Uber, Tom was with NASA Ames Research Center for more than 20 years. Tom is passionate about developing and evaluating future concepts and technologies for the air transportation system. He has published over 100 conference and journal papers.

## Bronze Sponsors



LS Technologies (LST) brings together the industry's most innovative minds to create, manage, and deploy strategy and technology that keeps our National Airspace System (NAS) safe. We pride ourselves on our commitment to creating a trusted partnership with our customers to achieve their mission. Our core portfolios span our customer's technical and service needs, and our employees bring depth and breadth of experience from both government and industry to support program needs. We specialize in IT Modernization & Service Integration, Mission Critical Operations, Digital Transformation & Advanced Technologies, Cybersecurity Solutions, and Program Engagement Services.

LST's 20-year history of listening and interpreting our clients' needs ensures alignment through a deep understanding of the federal government's political, operational, and technical environments. Our most important asset, our team, includes over 400 individuals in 32 states and the District of Columbia, with headquarters in Washington, DC.

For more information, visit: [lstechllc.com](http://lstechllc.com)



# Stellar

## SOLUTIONS

For more information, visit: [www.stellarsolutions.com](http://www.stellarsolutions.com)

## DAY 2 • ICNS 2022 • April 6th

### Plenary IV: Future I-CNS Emerging Technologies to Support ATM

The demand for information to improve operations is increasing across aviation stakeholders. Anticipated fleet growth (delayed by COVID-19) of air transport aircraft and the growth of emerging airspace users are fueling this demand. Additionally, ANSPs around the globe envision new traffic management concepts to accommodate the demand for access to airspace. Information centrality is seen as a key element of this future environment. Come see what technologies are in the future to meet this demand and a framework toward capitalizing on new space-based communication technologies.

#### Co-chairs:



#### **Bob Lee, Owner & Principal Consultant, GXA Consulting**

Bob Lee is owner and principal consultant at GXA Consulting LLC and has 40 years of experience in the development of electronic systems with most of that time focused on aviation solutions for commercial and business aircraft. He is currently engaged in helping clients in the areas of performance-based communications systems, and traffic management concepts for emerging airspace users. Previously, Bob spent over 30 years at Collins working in a wide range of roles including systems engineering, program management, and developing business and technology strategies for their commercial businesses. His background extends across multiple product areas including communication, navigation and surveillance systems, air-to-ground communications, and various flight deck systems. Bob is a regular contributor to industry activities at Aerospace Industries

Association, EUROCONTROL, RTCA, ICCAIA and ICAO. He is the past chair of the CNS/ATM committee at ICCAIA.



#### **Rainer Koll, Senior Advisor, Stellar Solutions**

Rainer J. Koll has over 30 years technical and executive management experience in aerospace industries. During that time, advancement of the aviation communications state-of-the-art has been at the heart of his career. Working as engineering group leader and director at Inmarsat and ICO Global Communications, he was responsible for the Classic Aero Satcom and Next Generation Satellite System (NGSS) developments. As managing director and VP of Thales Avionics Ltd. (UK), Rainer J Koll chaired the Honeywell/Thales executive committee that managed the joint SATCOM business. He also launched the developments of Thales's TopFlight SATCOM. From 2010 to 2016, R J Koll was chief executive of Stellar Solutions Aerospace Ltd. He is now senior advisor at Stellar Solutions Inc. and currently focuses on supporting the FAA on NGSS SATCOM Performance Class B standardization tasks at ICAO, RTCA and AEEC. Koll is a fellow of the Royal Aeronautical Society and an accomplished private pilot.

#### Panel Members:



#### **Bob Lee, "Introductions and Opening Remarks"**

Bob Lee is owner and principal consultant at GXA Consulting LLC and has 40 years of experience in the development of electronic systems with most of that time focused on aviation solutions for commercial and business aircraft. He is currently engaged in helping clients in the areas of performance-based communications systems, and traffic management concepts for emerging airspace users. Previously, Bob spent over 30 years at Collins working in a wide range of roles including systems engineering, program management, and developing business and technology strategies for their commercial businesses. His background extends across multiple product areas including communication, navigation and surveillance systems, air-to-ground

communications, and various flight deck systems. Bob is a regular contributor to industry activities at Aerospace Industries Association, EUROCONTROL, RTCA, ICCAIA and ICAO. He is the past chair of the CNS/ATM committee at ICCAIA.





The purpose of the American Institute of Aeronautics and Astronautics Digital Avionics Technical Committee (DATC) is to provide a forum for the exchange of new knowledge in digital avionics among professionals and students in the fields of commercial, military and general aviation and space applications.

The DATC serves the needs and professional interests of AIAA members and promotes through progressive projects and meetings their contributions and achievements in the arts, sciences and technology of aeronautics and astronautics.

The AIAA Digital Avionics Technical Committee cosponsors two technical conferences, the Digital Avionics Systems Conference (DASC) and the Integrated Communication, Navigation and Surveillance (ICNS) Conference.

If you are interested in joining the AIAA DATC, we are always looking for new, motivated members. Please visit our website for contact information:

[aiaadatc.org](http://aiaadatc.org)



#### **The Institute of Electrical and Electronics Engineers (IEEE)**

The IEEE is the world's largest technical society, bringing members access to the industry's most essential technical information, networking opportunities, career development tools, and many other exclusive benefits. Through its global membership, the IEEE is a leading authority on areas ranging from aerospace systems, computers and telecommunications to biomedical engineering, electric power and consumer electronics among others.

To foster an interest in the engineering profession, the IEEE also serves student members in colleges and universities around the world. Other important constituencies include prospective members and organizations that purchase IEEE products and participate in conferences or other IEEE programs.

#### **Aerospace & Electronics Systems Society (AESS)**

AESS is one of 45 technical societies and councils within IEEE. Members of AESS are interested in the design, integration, test, and analysis of large, complex systems consisting of major subsystems that contain dissimilar electronic devices. Most of our members work on sensor systems (radar, sonar, optics, and navigation), communications systems, command and control centers, avionics, space systems, military systems, digital signal processing simulators, and software development. Some members work on robotics, energy, and transportation systems.

AESS is the only professional society addressing total integrated electronic systems and the enabling technologies. AESS pioneered large-scale integrated interoperable systems. AESS is the sponsor/cosponsor of 15 conferences a year including ICNS.

The AESS is proud to be a sponsor of the ICNS Conference with our partner the DATC. Besides the ICNS Conference, we also partner on the Digital Avionics Systems Conference (DASC) and look forward to the long-term growth of the ICNS Conference.

[ieee-aess.org](http://ieee-aess.org)

## Plenary IV: Future I-CNS Emerging Technologies to Support ATM

**DAY 2 • ICNS 2022 • April 6th**

### Panel Members—continued:



#### **Michelle Cady, Program Manager/Aerospace Engineer, FAA, “Connected Aircraft Concept – A Performance-based Approach”**

Michelle Cady is the FAA project manager for the Connected Aircraft program. As part of the Advanced Concepts Branch in the FAA's NextGen Technology Development and Prototyping Division, she is responsible for the planning, coordination, validation, and development activities associated with Connected Aircraft in the FAA. Ms. Cady leads the development of FAA Connected Aircraft Concept of Operations and is a technical advisor on the ICAO Air Traffic Management Requirements and Performance Panel (ATMRPP), contributing to the development of the Global Connected Aircraft Concept. She also leads the coordination of Connected

Aircraft activities to ensure alignment of policies, standards, technology, and operations across the FAA. As part of her role to accelerate adoption of the Connected Aircraft, she works closely with FAA, NASA, and industry research, demonstration, and flight test teams to identify use cases to align the business case and technology. Ms. Cady has been with the FAA since 2016 and has been working towards bringing the latest technological innovations into the FAA, including the integration of operations above FL600 (Upper Class E Traffic Management [ETM]) and development of an “app store” prototype to house FAA applications. She graduated from University of Maryland with a Bachelor of Science in aerospace engineering and Master of Science in engineering project management.



#### **Jerry Hancock, Director, Aviation Cybersecurity, INMARSAT, “Orchestrating Change for Future Aviation Communication Systems”**

Jerry has worked in the aviation industry for the past two decades, focusing on cybersecurity solutions for ground and air-ground data connectivity and aviation systems. He is currently Director of Aviation Cybersecurity at Inmarsat, where he has spent the last 5 years ensuring the integration of security of Inmarsat aviation solutions for commercial and uncrewed aircraft. Prior to Inmarsat, Jerry worked at the Federal Aviation Administration for 15 years supporting various programs, including the FAA telecommunications Infrastructure (FTI), cybersecurity protections of FAA networks, and future cybersecurity architecture and planning of FAA NextGen programs. With a passion for helping guide future regulations and standards, Jerry actively participates

in multiple industry groups and organizations to support the future development and integration of information security throughout the end-to-end aviation ecosystem for both commercial and uncrewed civil aviation.



#### **Rainer Koll, Senior FAA Advisor, Stellar Solutions, “Emerging Space-Based Systems for ATM Communications”**

Rainer J. Koll has over 30 years technical and executive management experience in aerospace industries. During that time, advancement of the aviation communications state-of-the-art has been at the heart of his career. Working as engineering group leader and director at Inmarsat and ICO Global Communications, he was responsible for the Classic Aero Satcom and Next Generation Satellite System (NGSS) developments. As managing director and VP of Thales Avionics Ltd. (UK), Rainer J Koll chaired the Honeywell/Thales executive committee that managed the joint SATCOM business. He also launched the developments of Thales's TopFlight SATCOM. From 2010 to 2016, R J Koll was chief executive of Stellar Solutions Aerospace Ltd. He is now senior advisor at Stellar Solutions Inc. and currently focuses on supporting the FAA on NGSS SATCOM Performance Class B

standardization tasks at ICAO, RTCA and AEEC. Koll is a fellow of the Royal Aeronautical Society and an accomplished private pilot.

## Co-Sponsor

EUROCONTROL is a **civil-military, intergovernmental organisation**, with 41 European Member States and two Comprehensive Agreement States:

Together with our partners, we are committed to supporting European aviation and building a single, high-performance, pan-European sky, supporting ICAO both regionally and globally.

We are at the core of European air traffic management (ATM) operations.

- Our **Network Manager**, operating under a mandate from the European Commission, works with stakeholders to operate and improve the European ATM network's performance.
- Our **Maastricht Upper Area Control Centre (MUAC)** – Europe's only truly cross-border air navigation service provider – handles flights in the busy and complex upper airspace of Belgium, Luxembourg, the Netherlands and northern Germany.
- We collect **route charges and other air navigation charges** on behalf of our Member States. This highly efficient and cost-effective service is greatly appreciated by airspace users.

We work closely with the European Commission, the SESAR Joint Undertaking, the SESAR Deployment Manager, EASA and industry partners to ensure that European ATM is able to meet the Single European Sky's performance targets as well as future challenges.

Our areas of activities include:

- designing and implementing innovative methodologies to cope with high traffic growth
- optimising the European aviation CNS (communications, navigation, surveillance) infrastructure
- integrating new entrants into the ATM network (e.g. drones operating at low level as well as space operations)
- helping with commercial space operation
- digitalising aviation and supporting the uptake of new technologies (artificial intelligence, for example)
- assessing and monitoring ATM performance
- monitoring and mitigating aviation's environmental impact
- enhancing safety and security, with a focus on cybersecurity.



To ensure the safe, secure and efficient deployment of new ATM solutions, we also provide technical specifications and guidelines for the ATM network. We are deeply involved in the design and implementation of global and European ATM standardisation strategies.

[www.eurocontrol.int](http://www.eurocontrol.int)

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## **Awards Ceremony**

**ICNS Champion Awards** by Art Tank, AIAA DATC Chair

**AIAA Sustained Service Award** by Tom Smith, AIAA Fellow

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## **Evening Keynote: “Towards Increasingly Autonomous Aircraft-enabled Mobility”**



### **Dr. John-Paul Clarke, Professor and Ernest Cockrell, Jr. Memorial**

Dr. John-Paul Clarke is a professor of Aerospace Engineering and Engineering Mechanics at The University of Texas at Austin, where he holds the Ernest Cockrell Jr. Memorial Chair in Engineering. Previously, he was a faculty member at the Georgia Institute of Technology and the Massachusetts Institute of Technology (MIT); Vice President of Strategic Technologies at United Technologies Corporation (now Raytheon); and a researcher at Boeing and NASA JPL.

Prof. Clarke is an expert in the development and use of stochastic models and optimization algorithms to improve the efficiency and robustness of complex systems, with a particular focus on aviation. For example, his work has led to the development of the world's first fully autopilot-coupled continuous descent arrival procedure to be used in daily operations; airline schedules that are “robust” to poor weather and/or aircraft failures; and a state-of-the art algorithm to maximize the likelihood of success for a portfolio of research and development projects (or financial assets) with uncertain future performance and schedule.

***Speech at 6 p.m. and dinner included.***



## DAY 3 • ICNS 2022 • April 7th

### Plenary V: Multi-Regional TBO Demonstration

The ICAO Global Trajectory Based Operation (TBO) concept describes the exchange of trajectory information across the planning, sharing, and execution phases of trajectory-based operations. Those operations are anticipated to be enabled by technologies such as Connected Aircraft and capabilities such as Flight and Flow Information for a Collaborative Environment (FF-ICE). Panel members will share their perspective on how a Multi-Regional TBO demonstration would be conducted in their FIRs and regions; and discuss related validation activities and the gathering of lessons learned to mature the TBO concept. Panel members will also address potential challenges that will need to be addressed through policy mechanisms and airspace design to deliver TBO.

#### Chair:



#### **Diana Liang, Enterprise Portfolio Manager, FAA**

Diana Liang works in the FAA NextGen organization, Ms. Liang has successfully provided direction and oversight on the development and fielding of many of the FAA's NextGen programs and enabling technologies. In each of her previous roles she has promoted NextGen CNS programs. As acting chief for the NAS Architecture, she helped to manage the FAA's overall plan for the transition to and implementation of the NextGen systems including the SWIM and Datacom Programs. Ms. Liang, as Enterprise Portfolio Manager, helps to prioritize all NextGen research and development activities with the FAA from a funding and schedule perspective to help the NAS recognize many of the planned performance improvements. This has included strong support for enterprise CNS research. Ms. Liang is the U.S. nominated panel member to the ICAO Information Management Panel (IMP) leading the development of SWIM, information services guidance, and air-ground SWIM.

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#### Panel Members:



#### **Nabil Sandhu, FAA, USA**

Nabil Sandhu is a project manager in the Federal Aviation Administration's (FAA) NextGen and Technology Development and Prototyping Division (ANG-C5). He is currently managing the Multi Regional Trajectory Based Operations Demonstration (MR TBO) in addition to other research projects in the areas of unmanned aerial systems (UAS) evaluation and artificial intelligence and machine learning (AI/ML) applications to legacy separation systems. Mr. Sandhu has extensive experience in project management, development and reengineering of business processes including development and coordination of program tactical and strategic initiatives, development and tracking of financial artifacts, and management of programmatic functions. Mr. Sandhu holds a Master of Science in systems engineering from George Mason University and a Master of Business Administration from The George Washington University.



#### **Amornrat Jirattigalachote, AEROTHAI, Thailand**

Dr. Amornrat Jirattigalachote is currently working for AEROTHAI in the position of strategic planning manager (engineering). Since 2013, she has been responsible for strategic planning as well as conducting study and analysis on new technologies and engineering systems for AEROTHAI. Her focus is on modernization planning related to future air navigation concepts such as SWIM (System-Wide Information Management), FF-ICE (Flight and Flow Information for a Collaborative Environment), and TBO (trajectory-based operation). At the global level, she is a member of ICAO Global Air Navigation Plan Study Group (GANP SG) responsible for developing Global Air Navigation Plan, especially Aviation System Block Upgrades (ASBU). At the regional level, she is presently a co-chair of ICAO Asia/Pacific SWIM Task Force. At the sub-regional level, she is part of the team developing ASEAN (Association of Southeast Asian Nations) ANS (Air Navigation Service) Master Plan being implemented under ASEAN Transport Strategic Plan 2016-2025.

### Panel Members—continued:



#### **Wei Sean Ho, CAAS, Singapore**

As the deputy director of ATM Integration and Capability Experimentation at the Civil Aviation Authority of Singapore (CAAS), Wei Sean Ho oversees the technical and operational participation of CAAS in the development of seamless ATM plans, in collaboration with ANSPs and international organizations. His focus is on forging international and regional partnerships to ensure the foundations of mid to long-term interoperable ATM solutions, benefitting network-centric traffic flows and management, are laid out. In addition, he is working on developing innovation gates to verify the potential and value of research and development activities for cross-boundary and cross-regional capabilities.

Throughout his career, Wei Sean has undertaken roles in research and development, project management, system engineering, platform, and system integration. Prior to joining CAAS, he was with the defense industry advancing technology development and forming partnerships with the research community. Early in his career, he was focused on the acquisition and upgrading of naval platforms, and integration of complex systems.

He holds a Bachelor of Science in electrical and electronic engineering from the Tokyo Institute of Technology in Japan, and a Master of Business Administration from the Nanyang Technological University in Singapore.



#### **Yukio Imada, JCAB, Japan**

Yukio Imada is the special assistant to the director Air Navigation Services Planning Division Air Navigation Services Department, Civil Aviation Bureau Ministry of Land, Infrastructure, Transport and Tourism, Japan. He is currently working in the Air Traffic Management Working Group in the framework of Collaborative Actions for Renovation of Air Traffic Systems (CARATS). Mr. Imada has extensive experience in air traffic management. Prior to the special assistant position he worked as an air traffic management officer at the Air Traffic Management Center, CAB, MLIT, Japan. While in that job he worked on air traffic flow management and air space management. Mr. Imada has air traffic controller (ATC) qualifications for enroute airspace and oceanic ATC with data link.

## DAY 3 • ICNS 2022 • April 7th

### Workshop: Remote ID Rule for Drones: Which Technology Makes the Most Sense?

To accommodate the exponential growth in commercial drone operations, regulatory agencies are moving forward on “remote ID” rules. These rules (e.g., FAA Part 89) will enable drone operations to be fully integrated into U.S. airspace while promoting safety and security. Part 89 requires virtually all types of commercial drones to broadcast remote ID messages via unlicensed radio frequencies that will be compatible with personal wireless devices and subject to the Federal Communications Commission’s (“FCC”) radio-frequency equipment rules. Compliance with the rule requires standards bodies (e.g., ASTM) and manufacturers to make complex tradeoffs between performance, cost, accessibility, security, and safety. This workshop will explore the complex design space and educate decision-makers and engineers on the implementation options for the Remote ID rule.

#### Chair:



**Dr. Lance Sherry**, Center for Air Transportation Research,  
George Mason University

Lance Sherry is an associate professor of systems engineering and operations research at George Mason University. Dr. Sherry also serves as the director of the Center for Air Transportation Systems Research at George Mason University. Dr. Sherry has over 30 years of experience in the aviation industry serving as a flight-test engineer, flight control engineer, system engineer, lead system architect, program manager, strategic planning, and business development. Dr. Sherry served as a fellow at RAND Corporation 1999-2001. He has published over 100 papers and journal articles, holds several patents, and has received awards for his work.

Dr. Sherry is a graduate of Brown University with a Bachelor of Science in electrical engineering, and he holds both a Master of Science and a doctorate in industrial and system engineering from Arizona State University.

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#### Panel Members:

**Greg Deeds**, Technology Exploration Group, Inc, Regulations/Standards

**Mark Nichols**, Spanalytics Inc., Remote ID: Bluetooth

**Gregory Tangonan**, Ateneo Innovation Center, Remote ID: LoRa-WAN

**Christian Ramsey**, uAvionix, Remote ID: ADS-B

**Tim Bagnall**, Mosaic-ATM, Detect & Avoid with Remote ID

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### Awards Ceremony

#### Best Paper Awards

**Professional Awards** by Dr. Erick Theunissen, Technical Program Chair

**Student Paper Awards** by Dr. Lance Sherry, Student Activity Chair

**DASC 2022 Presentation** by Dr. Terry Morris, General Conference Chair of DASC 2022

# Technical Session Track Overview

## Track 1 – Traffic Management

Co-Chairs

**Bernd Korn**, German Aerospace Center (DLR)

**Ralf Mayer**, MITRE

In this track, sessions will address developments in Air Traffic Management (ATM), UAS Traffic Management (UTM) and Space Traffic Management (STM). Topics such as Upper Class E Traffic Management, the impact of airspace restrictions on critical UAM trip-related parameters and autonomous and cooperative trajectory planning for Free Route Airspace (FRA) operation are part of this track.

## Track 2 – Artificial Intelligence and Machine Learning

Co-Chairs

**Rainer Koelle**, Eurocontrol

**Matthew Moser**, Boeing

In this track, sessions will address developments in Artificial Intelligence and Machine Learning. Topics include robustness of ML against adversarial attacks, technological and regulatory challenges associated with the use of AI/ML, certifiable architectures based on Artificial Intelligence (AI) and the development of ML models to detect anomalous patterns.

## Track 3 – Operational Efficiency

Co-Chairs

**Rafael Apaza**, NASA Glenn Research Center

**Dr. Dongsong Zeng**, MITRE

In this track, sessions will address developments in Operational Efficiency (Airspace, Airport, Airspace Users, Airplane and Air Traffic Systems) and Contingency Management. Topics include resilience measurement in the ATM context, capacity estimation in the TMA and congestion prediction.

## Track 4 – Communications and Cybersecurity

Chairs

**Kevin Clark**, Volpe

In this track, sessions will address developments in data- and voice Communications and cybersecurity. Topic include encryption of ADS-B, L-band Digital Aeronautical Communication System (LDACS) security and utilization of 5G networks.

## Track 5 – Surveillance and Spectrum Management

Co-Chairs

**Brent Phillips**, Federal Aviation Administration (FAA)

**Michael Schnell**, German Aerospace Center (DLR)

In this track, sessions will address developments in Surveillance Systems, Situational Awareness and spectrum management. Topics include autonomous spectrum allocation and improved use of DME channels to provide more room in the L-band.

## Track 6 – Special Topics

Co-Chairs

**Paul Prisaznuk**, SAE/ITC

**Fred Wieland**, Mosaic ATM

In this track, sessions will address developments in Aviation Sustainability (Environment, Economy and Society), Unmanned Aircraft Systems (UAS) operating Beyond Visual Line Of Sight (BVLOS) and sub-system performance estimation through drone-based flight testing.

# Technical Program & Sessions Overview

		TRACK 1 Traffic Management	TRACK 2 Artificial Intelligence and Machine Learning	TRACK 3 Operational Efficiency	TRACK 4 Communications and Cybersecurity	TRACK 5 Surveillance and Spectrum Management	TRACK 6 Special Topics
<b>Tuesday April 5th</b>	13:00			A <b>Contingency Management</b> Madhu Niraula <i>Rivanna BC</i>	C <b>UAS DataComm</b> Jerry Hancock <i>Rivanna G</i>	A <b>Spectrum Management</b> Michael Schnell / Brent Phillips <i>Rivanna EF</i>	A <b>Sustainability and UTM</b> Paul Prisaznuk <i>Rivanna A</i>
	15:30	B <b>Flow Management</b> Brian Stein <i>Rivanna EF</i>	B <b>Learning and Decision Making</b> Dieter Eier Kevin Niewoehner <i>Rivanna A</i>	B <b>Operational Efficiency I</b> Anuja Verma <i>Rivanna BC</i>	B <b>LDACS Transition Concepts</b> Radu F. Babiceanu <i>Rivanna G</i>		
<b>Wednesday April 6th</b>	13:00	C <b>UAM</b> Joonas Lieb <i>Rivanna BC</i>	C <b>AI/ML Applications and Assurance</b> Kevin Niewoehner Leila Riberio <i>Rivanna A</i>	D <b>Operational Efficiency II</b> Dongsong Zeng <i>Rivanna G</i>		B <b>Situation Awareness and Surveillance</b> Ann Tedford <i>Rivanna EF</i>	
	15:30		A <b>AI/ML for ATM Industry</b> Leila Riberio Arman Izadi <i>Rivanna A</i>	C <b>Operational Efficiency III</b> William Symionow <i>Rivanna BC</i>	D <b>DataComm Modeling</b> Jonathan Graefe <i>Rivanna G</i>		B <b>UAS BVLOS</b> Fred Wieland <i>Rivanna EF</i>
<b>Thursday April 7th</b>	13:00	A <b>Airspace Efficiency</b> Tom Becher <i>Rivanna A</i>			A <b>Cybersecurity Analysis</b> Jerry Hancock <i>Rivanna G</i>	C <b>ADS-B</b> Izabela Gheorghisor <i>Rivanna EF</i>	C <b>Performance Estimation through Flight Testing</b> Adrian Solomon <i>Rivanna BC</i>
	15:30	D <b>RPAS Integration</b> Gunnar Schwach <i>Rivanna A</i>				D <b>Surveillance for Drones</b> Leila Ribeiro <i>Rivanna BC</i>	

Rivanna A  
Rivanna BC  
Rivanna EF  
Rivanna G



# Technical Sessions

Rivanna G

**Tuesday, April 5, 2022**

**Track 4: Communications and Cyber Security**

**Track Chair: Kevin Clark, Volpe National Transportation Center**

**Session C: DataComm Modeling**

**Chair: Jonathan Graefe, Collins-IMF**

1:00 PM	4C1	Methodology for Selection of Optimal C2 Radio for BVLOS UAS Applications	Sharath Kumar	L3Harris
1:30 PM	4C2	An Integrated Simulation Platform for the Analysis of UAS BVLOS Operations Supported by 4G/5G Communications	Adrian Solomon	Thales
2:00 PM	4C3	Paving the Way Towards a Comprehensive UTM Infrastructure by Evaluating Novel D2X Systems for UAVs in Test Flights	Joonas Lieb	German Aerospace Center (DLR)
2:30 PM	4C4	Enabling UAS Data Link Support for Air Traffic Management	Frank O'Connor	Airtel
<b>3:00 PM</b>	<b>Coffee/Networking Break (Rivanna Prefunction Area)</b>			

**Track 4: Communications and Cyber Security**

**Track Chair: Kevin Clark, Volpe National Transportation Center**

**Session B: LDACS Transition Concepts**

**Chair: Radu F. Babiceanu, German Aerospace Center (DLR)**

3:30 PM	4B1	On the Application of Beamforming in LDACS	Ayten Gurbuz	German Aerospace Center (DLR)
4:00 PM	4B2	LDACS Broadcast Digital Voice - Concept and Expected Performance	Thomas Graupl	German Aerospace Center (DLR)
4:30 PM	4B3	Improving Usable LDACS Data Rate via Certificate Validity Optimization	Thomas Ewert	German Aerospace Center (DLR)

**Wednesday, April 6, 2022**

**Track 3: Operational Efficiency**

**Track Chairs: Rafael Apaza, NASA Glenn Research Center, and Dongsong Zeng, the MITRE Corporation**

**Session D: Operational Efficiency III**

**Chair: Dongsong Zeng, the MITRE Corporation**

1:00 PM	3D1	A Chance-Constrained Optimization Approach for Air Traffic Flow Management under Capacity Uncertainty	Abdelghani Fadil	School of Electronics and Information Engineering, Beihang University
1:30 PM	3D2	An Adaptive Capacity Estimation Method for Terminal Airspace Operation	Minghui Chu	School of Electronics and Information Engineering, Beihang University
2:00 PM	3D3	Improvements in Operational Efficiency at Airports Using LTE Networks for Communications	Wolfgang Kampichler	Frequentis AG
<b>3:00 PM</b>	<b>Coffee/Networking Break (Rivanna Prefunction Area)</b>			

**Track 4: Communications and Cyber Security**

**Track Chair: Kevin Clark, Volpe National Transportation Center**

**Session D: UAS DataComm**

**Chair: Chiemi Wehrung, VOLPE Center**

3:30 PM	4D1	Mitigation of Sequence Inversion in AFDX Based on Time-triggered Scheduling	Lan Ma	School of Air Traffic Management, Civil Aviation University of China
4:00 PM	4D2	Rapid Prototyping for a Future Aeronautical Mobile Communications System Using Software Defined Radio	Kazuyuki Morioka	Electronic Navigation Research Institute
4:30 PM	4D3	Kernel Density Estimation for the Detection and Synchronization of Interfered Mode S / ADS-B Preamble	Francois Le Neindre	Thales SIX GTS France
5:00 PM	4D4	Measurement and Modeling of Low-Altitude Air-Ground Channels in Two Frequency Bands	Nathan Stofik	University of South Carolina

# Technical Sessions

Rivanna G				
Thursday, April 7, 2022				
Track 4: Communications and Cyber Security				
Track Chair: Kevin Clark, Volpe National Transportation Center				
Session A: Cybersecurity Analysis				
Chair: Jerry Hancock, INMARSAT				
1:00 PM	4A1	Robust Satellite Image Classification with Bayesian Deep Learning	Yutian Pang	Arizona State University
1:30 PM	4A2	An Information Entropy and Ensemble Learning Approach for DrDoS Detection Within Aviation Networks	Huw Whitworth	Cranfield University
2:00 PM	4A3	Systematic Evaluation of Cybersecurity Risks in the Urban Air Mobility Operational Environment	Addam Jordan	CNA Corporation
2:30 PM	4A4	Cybersecurity And Interoperability Of Aviation Safety Service Ecosystem	Madhu Niraula	Collins Aerospace
3:00 PM	Coffee/Networking Break (Rivanna Prefunction Area)			
Rivanna EF				
Tuesday, April 5, 2022				
Track 5: Surveillance and Spectrum Management				
Track Chairs: Michael Schnell, German Aerospace Center (DLR) and Brent Phillips, Federal Aviation Administration (FAA)				
Session A: Spectrum Management				
Chair: Michael Schnell, German Aerospace Center (DLR) and Brent Phillips, Federal Aviation Administration (FAA)				
1:00 PM				
1:30 PM	5A1	Efficient Spectrum Management Practices for the Aviation Industry	Declan Byrne	AeroMACS - WiMAX Forum
2:00 PM	5A3	Developing High Accuracy DME with SFOL Pulse Through Power Amplifier Predistortion	Euiho Kim	Hongik University
2:30 PM	5A4	Optimizing the Use of DME Channels: Can We Enable a Transition to a More Integrated CNS?	Ihor Skyrda	EUROCONTROL
3:00 PM	Coffee/Networking Break (Rivanna Prefunction Area)			
Track 1: Traffic Management				
Chair: BrndKorn, German Aerospace Center (DLR) and Ralf Mayer, the MITRE Corporation				
Session B: Flow Management				
Chair: Brian Stein, the MITRE Corporation				
3:30 PM	1B1	Leveraging Business Intelligence to Analyze the FAA's Plan for Future TFM	Laurie Calzadilla	The MITRE Corporation
4:00 PM	1B2	Flight Object Management Capability: Foundation for Flight Information Management Strategy	David William	Skymantic, LLC
4:30 PM	1B3	Autonomous and Cooperative Trajectory Planning Based on Traffic Complexity Awareness	Yi Zhou	Nanjing University of Aeronautics and Astronautics
5:00 PM	1D3	Communication Latency and Loss for Integrated IFR RPAS Movements in the TMA	Juergen Teutsch	Royal Netherlands Aerospace Centre (NLR)

# Technical Sessions

Rivanna EF

**Wednesday, April 6, 2022**

**Track 5: Surveillance and Spectrum Management**

**Track Chairs: Michael Schnell, German Aerospace Center (DLR) and Brent Phillips, Federal Aviation Administration (FAA)**

**Session B: Situation Awareness and Surveillance**

**Chair: Ann Tedford, Situation Awareness and Surveillance**

1:00 PM	5B1	Evaluation of MTARSI2 Dataset for Aircraft Type Recognition in Remote Sensing Images	Dina Hejji	University of Sharjah
1:30 PM	5A2	The Importance of Reliable Command & Control Links to Safety Critical UAS Integration	Cyriel Kronenburg	uAvionix
2:00 PM	5B2	The Benefits of a Networked Distributed Surveillance Architecture Using Both Cooperative and Non-Cooperative Sensing System	Vincent Amuso	L3Harris

**3:00 PM Coffee/Networking Break (Rivanna Prefunction Area)**

**Track 6: Special Topics**

**Chairs: Fred Wieland, Mosaic ATM and Paul Prisaznuk, ARINC**

**Session B: UAS BVLOS**

**Paul Prisaznuk, ARINC**

3:30 PM	6B1	Design of a Local Area Integrated Drone, Aircraft, Vehicle, and Asses Management System	Charlie Wang	Center for Air Transportation Systems Research at George Mason University
4:00 PM	6B2	Heuristics Machine Learning Model to Predict Air Collision Risk for low altitude Unmanned Aircraft Systems (UAS)	Arezou Koohi	The MITRE Cooperation
4:30 PM	6B3	UAS Delivery Multi-rotor Autopilot Based on Ardupilot Framework using S-BUS Protocol	An San Hou	Chang Jung Christian University

**Thursday, April 7, 2022**

**Track 5: Surveillance and Spectrum Management**

**Track Chairs: Michael Schnell, German Aerospace Center (DLR) and Brent Phillips, Federal Aviation Administration (FAA)**

**Session C: ADS-B**

**Chair: Izabela Gheorghisor, the MITRE Corporation**

1:00 PM	5C1	The Use of TISB and FISB UAT Broadcast Services in the Integration of UAS	Cyriel Kronenburg	uAvionix
1:30 PM	5C2	Update Interval Performance and Outlier Exclusion Methods for Aircraft Surveillance Systems	Joseph Canlas	Aireon LLC
2:00 PM	5C3	Statistical Analysis and Flight Route Extraction from Automatic Dependent Surveillance-Broadcast Data	Ivan Ostroumov	National Aviation University
2:30 PM	5C4	Flight Demonstration of an On-Board Tactical Separation System for Small Air Transport Vehicles	Vittorio Di Vito	CIRA, Italian Aerospace Research Centre

**3:00 PM Coffee/Networking Break (Rivanna Prefunction Area)**

# Technical Sessions

## Rivanna A

**Tuesday, April 5, 2022**

### Track 6: Special Topics

**Track Chairs: Fred Wieland, Mosaic TM and Paul Prisaznuk, ARINC**

#### Session A: Sustainability and UTM

**Chair: Fred Wieland, Mosaic TM**

1:00 PM	6A1	Aviation Sustainability Through Hyperspectral Image Analysis Methodology for Aircraft-Induced Clouds	Amy Tal Rose	Center for Air Transportation Systems Research at George Mason University
1:30 PM	6A2	Climate Mitigation and Adaption Using Energy Generating CubeSat as a Tool	Showni Rudra Titli	Ahsanullah University of Science and Technology, Dhaka
2:00 PM	6A3	UAS Medical Delivery in Rural/Mountain Areas under UTM Surveillance	Pei Chi Shao	Chang Jung Christian University

**3:00 PM Coffee/Networking Break (Rivanna Prefunction Area)**

### Track 2: Artificial Intelligence and Machine Learning

**Track Chairs: Matthew Moser, Boeing and Rainer Koelle Eurocontrol**

#### Session B: Learning and Decision Making

**Chairs: Deiter Eier, Frequentis and Kevin Niewoehner, L3Harris**

3:30 PM	2B1	Communication Demand in the National Airspace - a Federated Learning Approach	Nathan Schimpf	University of Louisville
4:00 PM	2B2	Lessons Learned From Human Operator Intervention for AI Navigation and Flight Management Systems	Jomana Bashatah	George Mason University (CATSR)
4:30 PM	2B3	Defining an Initial Classification Scheme for Non-Deterministic AI Technologies	Kanvasi Tejasen	Federal Aviation Administration
5:00 PM	2B4	AI/ML Influences on One Pilot to Many Unmanned Aerial Systems	Robert Gettler	L3Harris Technologies

**Wednesday, April 6, 2022**

### Track 2: Artificial Intelligence and Machine Learning

**Track Chairs: Matthew Moser, Boeing and Rainer Koelle Eurocontrol**

#### Session C: AI/ML Applications and Assurance

**Track Chairs: Kevin Niewoehner, L3Harris and Leila Riberio, the MITRE Corporation**

1:00 PM	2C1	Utilizing Synthetic Data for VV&C of Machine Learning Applications	Kevin Fox	L3Harris Technologies
1:30 PM	2C2	A Review of Kalman Filter with Artificial Intelligence Techniques	Sukkeun Kim	Cranfield University
2:00 PM	2C3	Artificial Intelligence For Unidentified Mode S Registers Decoding	Jaime Lopez-Araquistain Lopez	Eurocontrol
2:30 PM	2C4	Machine Learning Based Visual Navigation System Architecture for AAM Operations with a Discussion on Its Certifiability	Naiara Escudero	Boeing

**3:00 PM Coffee/Networking Break (Rivanna Prefunction Area)**

### Track 2: Artificial Intelligence and Machine Learning

**Track Chairs: Matthew Moser, Boeing and Rainer Koelle Eurocontrol**

#### Session A: AI/ML for ATM Industry

**Chairs: Leila Riberio, the MITRE Corporation and Arman Izadi, Virginia Tech**

3:30 PM	2A1	Leveraging Public Aeronautical Data to Characterize Aircraft Traffic Intent	Andrew Weinert	MIT Lincoln Laboratory
4:00 PM	2A2	Game Theory Augmentation for Performance Based Navigation (PBN) Flight Operation Safety Alerting	Kevin Niewoehner	L3Harris Technologies, Inc.
4:30 PM	2A3	Machine Learning to Support Optimization of ATM-Grade Networks	Richard Bogad	Frequentis AG, Austria
5:00 PM	2A4	Experimental Evaluation of GNSS and IMU Fusion Using Gated Recurrent Unit	Shuoyuan Xu	Cranfield University

# Technical Sessions

## Rivanna A

**Thursday, April 7, 2022**

### Track 1: Traffic Management

**Track Chairs: Bernd Korn, German Aerospace Center (DLR) and Ralf Mayer, MITRE**

#### Session A: Airspace Efficiency

**Chair: Tom Becher, MITRE**

1:00 PM	1A1	Probabilistic Operational Volumes to Enable Risk-based Strategic Deconfliction in Upper Class E	Peter Kuzminski	The MITRE Corporation
1:30 PM	1A2	Evaluation of Air Route Network Congestion Based on Node Importance	Qin Fang	College of Civil Aviation, Nanjing University of Aeronautics and Astronautics
2:00 PM	1A3	Uses of a Cloud-Based Flight Management System to Enhance Airspace Efficiency	Fred Wieland	Mosaic ATM
<b>3:00 PM</b>	<b>Coffee/Networking Break (Rivanna Prefunction Area)</b>			

### Track 1: Traffic Management

**Track Chairs: Bernd Korn, German Aerospace Center (DLR) and Ralf Mayer, MITRE**

#### Session D: RPAS Integration

**Chair: Gunnar Schwoch, German Aerospace Center (DLR)**

3:30 PM	1D1	MALE RPAS Integration into European Airspace: Real-Time Simulation Analysis of Operations with Remain Well Clear	Emmanuel Sunil	The Royal Netherlands Aerospace Centre (NLR)
4:00 PM	1D2	Autonomous RLOS Operations and TBOs Manned Aircraft in Non-Segregated Air Space	John Romero	Aeronautica Civil de Colombia

## Rivanna BC

**Tuesday, April 5, 2022**

### Track 3: Operational Efficiency

**Chairs: Rafael Apaza, NASA Glenn Research Center and Dongsong Zeng, MITRE**

#### Session A: Contingency Management

**Chair: Madhu Niraula, Collins**

1:00 PM	3A1	Modulated Synchronous Taxiing: Mitigating Uncertainties Amid ADS-B Spoofing	Mohd Ruzeiny Kamaruzzaman	Nara Institute of Science and Technology
1:30 PM	3A2	COVID-19 - How to Account for Lack of Demand When Measuring Air Navigation System Resilience	Rainer Koelle	EUROCONTROL
2:00 PM	3A3	Contingency Management Concept Generation for U-space System	Arinc Tutku Altun	Cranfield University
2:30 PM	3A4	RPAS Procedures and Phraseology for Data Link Loss at Airports	Gunnar Schwoch	German Aerospace Center (DLR)
<b>3:00 PM</b>	<b>Coffee/Networking Break (Rivanna Prefunction Area)</b>			

### Track 3: Operational Efficiency

**Chairs: Rafael Apaza, NASA Glenn Research Center and Dongsong Zeng, MITRE**

#### Session B: Operational Efficiency I

**Chair: Anuja Verma, MITRE**

3:30 PM				
4:00 PM	3B2	RNP AR Approach Route Optimization Using a Genetic Algorithm	Daichi Toratani	Electronic Navigation Research Institute
4:30 PM	3B3	Business and Economic Concepts for a Privacy-Preserving Marketplace for ATFM Slots	Eduard Gringinger	Frequentis AG
5:00 PM	3B4	Towards Measuring Operational Efficiency of Trajectory Based Arrival Management	Rainer Koelle	EUROCONTROL



# Technical Sessions

Rivanna BC

**Wednesday, April 6, 2022**

**Track 1: Traffic Management**

**Chair: Bernd Korn, German Aerospace Center (DLR) and Ralf Mayer, MITRE**

**Session C: Operational Efficiency II**

**Chair: William Symionow, MITRE**

1:00 PM	1C1	Impact of Airspace Restrictions on Urban Air Mobility Commuter Demand Potential	Mihir Rimjha	Virginia Tech
1:30 PM	1C2	An Outline of a ConOps for Integration of ATM and Air Transport into Multimodal Transport System for Door-to-Door Travel	Vittorio Di Vito	CIRA, Italian Aerospace Research Center
2:00 PM	1C3	Urban Air Mobility Perspectives over Mid-Term Time Horizon: Main Enabling Technologies Readiness Review	Aniello Menichino	CIRA, Italian Aerospace Research Center
2:30 PM	1C4	Attention Guidance for Tower ATC using Augmented Reality Devices	Juergen Teutsch	Royal Netherlands Aerospace Centre (NLR)
<b>3:00 PM</b>	<b>Coffee/Networking Break (Rivanna Prefunction Area)</b>			

**Track 3: Operational Efficiency**

**Chairs: Rafael Apaza, NASA Glenn Research Center and Dongsong Zeng, MITRE**

**Session C: Operational Efficiency II**

**Chair: Dongsong Zeng, MITRE**

3:30 PM	3C1	A Danzig-Wolfe Decomposition Based Routing Algorithm for Airport Surface Operation	Yi Hui	Civil Aviation University of China
4:00 PM	3C2	Scenario Analysis for Probabilistic Airport Departure Capacity	Minghua Zhang	Beihang University
4:30 PM	3C3	A Data and Model-Driven Approach to Predict Congestion of Departure Traffic at Airport	Simin Wang	Nanjing University of Aeronautics and Astronautics
5:00 PM	3C4	Super Close Runway Operations (SupeRO): A New Concept to Increase Runway Capacity	Franz Knabe	German Aerospace Center (DLR)

**Thursday, April 7, 2022**

**Track 6: Special Topics**

**Chairs: Fred Wieland, Mosaic ATM and Paul Prisaznuk, ARINC**

**Session C: Performance Estimation through Flight Testing**

**Chair: Adrian Solomon, Thales**

1:00 PM	6C1	A Simulation-Based Study on the Impact of Tracking Performance on UTM Flight Safety	Wei Dai	Nanyang Technological University
1:30 PM	6C2	Initial Reliability Assessment of a Commercial-Off-The-Shelf GPS Sensor for Generic UAVs	T. Thanaraj	Air Traffic Management Research Institute, NTU Singapore
2:00 PM	6C3	A Preliminary Study on UAS Vertical NSE Analysis in Urban-Like Environments	Chao Deng	Air Traffic Management Research Institute, Nanyang Technological University
<b>3:00 PM</b>	<b>Coffee/Networking Break (Rivanna Prefunction Area)</b>			

**Track 5: Surveillance and Spectrum Management**

**Track Chairs: Michael Schnell, German Aerospace Center (DLR) and Brent Phillips, Federal Aviation Administration (FAA)**

**Session D: Surveillance for Drones**

**Chair: Leila Zurba Ribeiro, MITRE**

3:30 PM	5D1	A Holistic Approach to Perimeter Surveillance and Situational Awareness	Azmeena Sayeed	OST, Inc.
4:00 PM	5D2	Routing with Privacy for Drone Package Delivery Systems	Max Li	University of Michigan
4:30 PM	5D3	Preliminary Environmental Risk Consideration For Small UAV Ground Risk Mapping	Han Jie Chung	School of Mechanical and Aerospace Engineering, Nanyang Technological University

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