

## Introduction



### **SALVATORE SCIACCHITANO**

Mr. Salvatore Sciacchitano is the President of the Council of the International Civil Aviation Organization (ICAO) since 2020. He graduated in Telecommunications Engineering from the University of Catania and began his career in aviation in 1980, joining the Italian Airworthiness Authority (RAI), serving as Regulation Director in 1992, then as Technical Director and, in 1996, as Director General. He was also Deputy Director General of the Italian Civil Aviation Authority (ENAC) for 11 years. He was entrusted with multiple international mandates, chairing the Permanent Commission of EUROCONTROL, representing Italy in the Management Board of European Aviation Safety Agency (EASA), holding the Vice-Presidency of the EUROCONTROL Provisional Council and coordinating the Italian delegation during ICAO Assemblies. He was appointed Executive Secretary of the European Civil Aviation Conference (ECAC) in 2010. He joined the Italian Delegation on the Council of ICAO in 2019, where he served until assuming his duties as President of the Council.



### **JUAN CARLOS SALAZAR**

Mr. Juan Carlos Salazar is the Secretary General of the International Civil Aviation Organization (ICAO), since 2021. His career in international civil aviation spans over 27 years in various advisory and leadership roles. Prior to his appointment as Secretary General, he served as Director General of Aeronautica Civil of Colombia – Aerocivil. Previously, Mr. Salazar was a Senior Advisor to the UAE General Civil Aviation Authority for 12 years. His professional experience also includes terms as the President of Latin American Civil Aviation Commission, Secretary of the Colombian Civil Aviation Board and Director of its Air Transport Office, Director General of Air Transport at the Colombian Ministry of Transport, Corporate Secretary and Director of the Legal Department of Tampa Cargo. He is a lawyer and has earned advanced degrees from Harvard University (Master in Public Administration) and McGill University (Master in Air and Space Law).



### **MOHAMED KHALIFA RAHMA**

Mr. Mohamed Khalifa Rahma assumed his position as Director, Air Transport Bureau, of the International Civil Aviation Organization (ICAO) in April 2020. Before his appointment, Mr. Rahma was the Regional Director of the ICAO Middle East Regional Office since March 2016. His current work portfolio covers a wide range of global aviation domain including Air Transport, Aviation Security and Facilitation and Environmental protection. He is currently the Secretary of the Council Aviation Recovery Task Force (CART). Prior to Joining ICAO, Mr. Rahma was the Undersecretary of International and Internal Affairs at the Ministry of Civil Aviation of Egypt and previously the advisor to the Egyptian Minister of Civil Aviation. Mr. Rahma was a board member of various companies including Cairo Airport Company, Aerotel Company and EMAC Aqaba Company and chaired many strategic committees under the umbrella of the Ministry of Civil Aviation for special projects. He holds a master's degree in Aviation Management.



### JANE HUPE

Ms. Jane Hupe is the Deputy Director responsible for the Environment programme at International Civil Aviation Organization (ICAO), and serves as the Secretary of the ICAO Council's Committee on Aviation Environmental Protection (CAEP). Ms. Hupe has a vital role in providing leadership for ICAO's efforts to define and promote policies and Standards for environmentally sustainable aviation. Under her leadership, ICAO is prioritizing the work on the feasibility of a long-term global aspirational goal (LTAG) for international aviation. Ms. Hupe was at the forefront of the conceptualization and development of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which was agreed in 2016 as the first global market-based mechanism for any industry sector. Prior to 1998, Ms. Hupe worked as a consultant with ICAO's Technical Cooperation Bureau and for 15 years with the Brazilian Civil Aviation Authorities.

## Chapter 1 – Aviation & Environmental Outlook



### URS ZIEGLER

After having completed his studies in natural sciences, Dr. Urs Ziegler worked in the field of environmental protection for a civil engineering company as well as for more than 10 years for the Swiss Office for Environmental Protection. During this time, he also acquired a masters degree in public administration. In early 2005, he joined the Swiss Federal Office of Civil Aviation as Head of the Office's Environmental Protection Unit. Since then he has also been the Swiss member of ICAO's Committee on Aviation and Environmental Protection CAEP, which he chaired until 2022. He is also chairing the Environmental Forum of the European Civil Aviation Conference ECAC.



### TAN KAH HAN

Mr Tan Kah Han is the Senior Director (Unmanned Systems Group) of the Civil Aviation Authority of Singapore (CAAS). As a member of CAAS' senior management team, his responsibilities include developing safety policy, the development of civil aviation, safety oversight and facilitating the use of unmanned aircraft systems and, future aviation technologies in Singapore. Prior to joining CAAS, he spent 25 years and held many senior appointments in the Republic of Singapore Air Force. He is Singapore member in the ICAO Committee Aviation Environment Protection and the ICAO Flight Ops Panel. Mr. Tan is a pilot and is rated in Airbus A-320 and Boeing B737.



### RICARDO ANTONIO BINOTTO DUPONT

Ricardo Antonio Binotto Dupont is coordinating environmental activities at the Brazilian Civil Aviation Agency (ANAC)'s Office for International Affairs and Environment. He is an ICAO Committee on Aviation Environmental Protection (CAEP) member, representing Brazil. He was Vice-Chair of CAEP from 2020 to 2022.



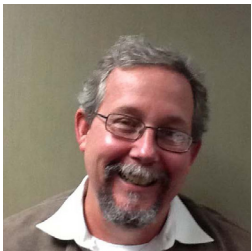
### GREGG G. FLEMING

As the director of U.S.DOT/Volpe's Center for Policy, Planning, and Environment, Gregg G. Fleming has over 30 years of experience in all aspects of transportation-related issues. He has guided the work of numerous multifaceted teams on projects supporting government, industry, and academia, including the Office of the Secretary of Transportation, the United Nations' International Civil Aviation Organization (ICAO), the Federal Aviation Administration (FAA), the Federal Highway Administration (FHWA), the National Park Service, the National Aeronautics and Space Administration, the Environmental Protection Agency, and the National Academy of Sciences



### IVAN DE LÉPINAY

Ivan de Lépinay is a senior expert on noise and standards within EASA's Environment & Sustainability section. He is actively contributing to various projects and standardisation groups aiming at quantifying the environmental impact of aviation and was co-rapporteur of ICAO CAEP's Modelling and Databases Group from 2018 to 2022. Before joining EASA in 2011, he worked for ten years as a consultant in aviation and environment for several European organisations. Ivan holds a degree in civil engineering and applied acoustics and a master's degree in sociology.



### ROGER SCHAUFELE

Roger Schaufele, Jr. is Manager of the U.S. Federal Aviation Administration's Forecasts and Performance Analysis Division in the Office of Aviation Policy and Plans. He oversees the development of the FAA's forecasts of U.S. aviation demand and activity as well as forecasts of demand and activity for individual airports contained in the Terminal Area Forecast (TAF). He has more than 35 years' experience in forecasting aviation demand in various regions of the world. Prior to coming to the FAA, he was Manager of System Forecasts at US Airways. He holds degrees in economics from the University of California, Berkeley and Northwestern University.



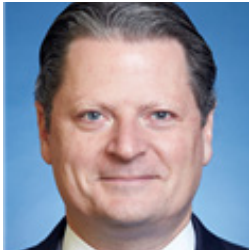
### CLYDE HUTCHINSON

As General Partner at TEAM ABC, Clyde is investing in early-stage startups in sustainable air, land and sea transportation. He has led several international innovation and startup programs such as Propeller Shannon (backed by Boeing), Founder of Viva Air Labs, Latin America's first innovation hub for Aviation (Medellín, Colombia). Experienced mentor/evaluator working with EU commission and other international startup programs. Spent his early career as academic researcher working at University of Cambridge, ZSL/London Zoo, Imperial College and Tokyo University.



### BRIAN MARRINAN

Brian is a General Partner of Team ABC, a specialist VC focused on investing in a future of efficient, emissions free transportation and travel. With a long track record in innovation and entrepreneurship, Brian helped to create one of the world's first Fintech incubators in Boston, USA, 20 years ago, and established the first startup accelerator in Ireland over 15 years ago. He has since developed several corporate and independent programmes, specialising in aviation and travel over the past decade.



### MICHAEL HALABY

Michael Halaby has 20+ years of providing strategic funding advice to C-suite executives in the aviation, automotive and financial institution sectors on accessing the US\$ and international bond, secured bank debt, and regional financing markets. He is Managing Director – Head of Aviation Advisory at MUFG Bank, Ltd. In this capacity, Michael’s role is to build and supervise the Aviation Advisory business for its global aviation partners including lessors, airlines and investors which aims to help its clients raise capital, offer aviation financial consultancy services such as a lease versus buy analysis or fleet financing options and provide advice on ESG strategies. He is an active speaker on ESG.



### CHRISTIAN PHO DUC

Christian Pho Duc is the CTO & Managing Director H2 & PtL Projects at Smartenergy Group AG and the Vice Chair of the Renewable Hydrogen Workstream at Solar Power Europe. He graduated as a Physicist from Munich and Cambridge University. Christian has accumulated 25 years working experience in Semiconductors (Siemens, IBM, G&D, Infineon Technologies), Renewable Energies & Hydrogen (Solyndra, Nanosolar, Smartenergy) and Electric Mobility (Torqeedo) in various management positions. With his multi-national background he speaks fluently German, English, French, Italian and some Spanish.



### LAURENT JOLY

Laurent Joly has been a full professor in fluid mechanics since 2002 and was director of the Aerodynamics, Energetics and Propulsion Department at ISAE-SUPAERO from 2011 to 2019. As Deputy Director of Research, he has been expanding his scientific field to low-emission aircraft design since 2020. He attended the 2020-2021 cycle of the Institut des Hautes Études pour la Science et la Technologie (IHEST), devoted to the use of the scientific method to inform decisions. Laurent Joly is the Director of the Institute for Sustainable Aviation of Toulouse since January 2022.



### TIM RYLEY

Tim Ryley joined Griffith University in 2015 as the inaugural Professor of Aviation. He has over twenty-five years of transport research experience across universities in the UK and Australia, which has typically been industry-linked, transdisciplinary and problem-based. Collaborations have been with a wide range of industry and Government partners, including major airports and airlines. Prof. Ryley’s research has increasingly focused on the environmental aspects of aviation, and he is an internationally leading expert in decarbonising the aviation industry.



### SUZANNE KEARNS

Dr. Kearns is an Associate Professor of Aviation at the University of Waterloo and Founding Director of the Waterloo Institute for Sustainable Aeronautics (WISA). She is an aviation academic, an accomplished educator both in the classroom and through electronic courseware, and a former airplane and helicopter pilot. She is the author or co-author of six books, including the textbook “Fundamentals of International Aviation” which is used around the world in multiple translations.

**DAVID ZINGG**

David Zingg is the University of Toronto Distinguished Professor of Computational Aerodynamics and Sustainable Aviation. His research is concentrated on applying aerodynamic shape optimization to the design of unconventional low-drag aircraft configurations motivated by the need to reduce greenhouse gas emissions from aircraft. He was awarded a prestigious Guggenheim Fellowship in 2004 for research in the design of environmentally friendly aircraft and contributed to the Independent Expert Integrated Technology Goals Assessment and Review for Engines and Aircraft for ICAO in 2017-18.

## Chapter 2 – Aircraft Noise

**JULIEN CAILLET**

Dr. Julien Caillet is an acoustic expert at Airbus Helicopters, also in charge of noise certification activities. He had a PhD on helicopter interior noise diagnosis and modelling in 2006. He has over 20 years of acoustics engineering and project management experience with expertise in developing low noise technology for helicopters. He currently supports UAM acoustics activities within Airbus Group and coordinates research projects on Helicopter & eVTOL Low noise design and acceptance.

**DAVID JOSEPHSON**

David Josephson studied electrical engineering at University of California, Berkeley and worked in systems engineering for airborne geophysical survey 1979-1988. He is a Fellow of the Audio Engineering Society and chairs several standards committees in electroacoustics. In 1988 he founded and continues to head Josephson Engineering, a specialized manufacturer of microphones for sound recording and acoustic analysis. Since 2015 he has focused on aircraft noise and is the noise/acoustics advisor for Joby Aviation, a leading manufacturer of electric VTOL aircraft.

**DAN RUTHERFORD<sup>1</sup>**

Dan Rutherford directs ICCT's aviation and marine programs. In that capacity, he helps national and international regulators develop policies to reduce air pollution and greenhouse gases from planes and ships. He is an internationally recognized expert on measures to promote the fuel efficiency of international transport, to control short-lived climate pollutants, and to phase out the use of fossil fuels. Dan holds a B.A. in Chemistry from the University of Minnesota at Morris and a M.S. and Ph.D. in Environmental Engineering and Science from Stanford University.

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<sup>1</sup> This authors also contributed to Chapter 6 - Climate Change Mitigation : Operations



### ALEXANDRA LOUBEAU

Alexandra Loubeau is a Research Aerospace Engineer at NASA Langley Research Center in Hampton, Virginia (U.S.). She received her M.S. and Ph.D. in Acoustics from The Pennsylvania State University and has been researching sonic boom acoustics since then. As a team co-lead for sonic boom community testing research at NASA, she is involved in the planning, execution, and analysis of experimental, modeling, and psychoacoustics research. She is also a technical advisor to the U.S. FAA in the ICAO CAEP Working Group on noise for the development of standards for supersonic aircraft.



### PIERRE-ELIE NORMAND

Pierre-Elie Normand is Dr Engineer in the Modeling and Tools department of Dassault Aviation Technical Directorate. He has 10 years of experience in Computational Fluid Dynamics development and applications, in particular for unsteady approaches, and novel numerical methods. He received his thesis in applied mathematics on « High order finite element methods for aerodynamics». He is in charge of unsteady turbulence modeling, maintaining in-house CFD code and is in charge of maintaining the far-field propagation code. Within the RUMBLE project, he contributed to sonic boom modelling and assessment activities.



### SANDY RICHARD LIU

Mr. Sandy Liu is an Aerospace Engineer in the Office of Environment and Energy at the Federal Aviation Administration (FAA). He joined the FAA Noise Division in 2000 and is responsible for aircraft environmental noise certification regulations, associated international standards and policy development. Mr. Liu is the United States technical representative on the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP) Working Groups in the development of standards for aircraft, including rotorcraft, subsonic, supersonic and emerging technology aircraft. He is the FAA ASCENT Center of Excellence R&D technical project manager for supersonic aircraft noise reduction and sonic boom mitigation projects and led the Continuous Descent Approach (CDA) procedures implementation project. Mr. Liu previously worked at Bell Helicopter Textron and U.S. Army Aeroflightdynamics Directorate at NASA Ames Research Center. Mr. Liu received his Master of Science degree in Mechanical Design & Engineering from San Francisco State University, CA and his Bachelor of Science degree in Aerospace Engineering from Syracuse University, NY.



### STÉPHANE LEMAIRE

Mr. Stéphane Lemaire is head of the external noise group at Dassault Aviation. He has 24 years of experience in aircraft noise and he is responsible for the noise certification of new Dassault Aviation aircraft. He has been a member of the International Coordinating Council of Aerospace Industries Association (ICCAIA) since 2013, participating to the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP) Working Group 1 (WG1) dealing with aircraft noise topics. Mr. Lemaire graduated from Ecole Polytechnique and Ecole Supérieure de l'Aéronautique in France.



### **VICTOR W. SPARROW**

Victor W. Sparrow is the United Technologies Corporation Professor of Acoustics in the Graduate Program in Acoustics at the Pennsylvania State University. He has been a Penn State faculty member in Acoustics since 1990, and he served as Director of the Program between 2010 and 2021. His research interests include physical acoustics, noise, audio, and the history of acoustics. His most recent research has focused on the sonic boom noise of future civilian supersonic aircraft, and he serves as the Research Focal Point for the United States in the area of sonic booms, under the auspices of ICAO. Dr. Sparrow regularly teaches Penn State courses in the areas of outdoor sound propagation, nonlinear acoustics, computational acoustics, and spatial sound and 3-D audio. He has previously served the Acoustical Society of America in a variety of roles, including as President.

## **Chapter 3 - Local Air Quality**



### **DIDIER HAUGLUSTAINE**

Dr Didier Hauglustaine is a senior researcher at CNRS at the Laboratory for Climate and Environmental Sciences in Gif-sur-Yvette (Paris area) and has 30 years research experience in atmospheric sciences. He works in the field of atmospheric chemistry modelling and climate-chemistry interactions with a focus on tropospheric ozone evolution and the atmospheric nitrogen cycle. He has also been a lead author for three IPCC assessment reports and has authored over 150 publications.



### **RICHARD C. MIAKELYE**

Dr. Richard C. Miakelye is a Vice President, Principal Scientist and Director at Aerodyne Research, Inc. He leads both theoretical numerical modeling and experimental measurement projects to understand the environmental impact of airplanes. He was recognized for contributions to IPCC's 2007 Nobel Peace Prize and to the USEPA 2007 Climate Protection Award. He has been Chair of SAE's E-31 committee on aviation emissions and has served in many roles in support of CAEP and continues to serve with both groups.



### **DANIEL JACOB**

Daniel Jacob was the Senior Aviation Emissions Policy and Research Specialist at the U.S. Federal Aviation Administration Office of Environment and Energy. In his capacity as Program Manager at the FAA, he oversaw projects on non-volatile particulate matter emissions testing, air quality and climate impacts of aviation. He also managed the development of operational benefits-costs analyses tools that incorporate state-of-the-art science to inform policy and decision making. He co-led the Particulate Matter Task Group of the CAEP WG3 during the CAEP/10 and CAEP/11 cycles. He co-lead of Emissions Characterization Task Group of Working Group 3 during CAEP/13 and is a co-rapporteur of the Impacts Sciences Group. He is currently the FAA Senior Representative for South Asia based in New Delhi, India.

**MARTIN PLOHR**

Martin Plohr has been working for more than 20 years as a research engineer in the Engine section of the German Aerospace Center's (DLR) Institute of Propulsion Technology. The focus of his work is placed on the investigation of aero engine performance and emissions, advanced and new concepts and technologies. He is also supporting the German contribution to the ICAO/CAEP process as a member of the CAEP's Working Group 3 (WG3). His doctoral thesis on emissions modelling for advanced aircraft engine combustors was published in 2015. He co-led WG3's Emission Characterization Task Group (ECTG) in the CAEP/12 and the current CAEP/13 cycle.

## Chapter 5 - Climate Change Mitigation: Aircraft Technologies

**BETHAN OWEN**

Dr Bethan Owen has more than 20 years' experience in air quality and climate assessment, with particular expertise in the field of aviation. Principally her experience lies in research projects in the field of emission estimations and predictive modelling in the context of aviation, air quality and climate, providing leadership and support on a number of national and European research projects on aviation and the environment. She is a scientific advisor to the UK government at meetings and on working groups with senior levels of industry and government. Since 2016, Dr Owen has been a co-Rapporteur of the ICAO CAEP international technical emissions working group 3.

**RALPH IOVINELLI**

Mr. Ralph Iovinelli has served as the Manager of the Emissions Division for the United States Federal Aviation Administration's Office of Environment and Energy since 2011. He advises the Executive Director of Environment & Energy (AEE-1) and the Assistant Administrator for Policy, International Affairs, and Environment (APL-1). He represents AEE and the FAA at meetings and on working groups with senior levels of industry and government, which involves coordinating with other relevant FAA offices. Since 2013, he serves as co-Rapporteur of the ICAO CAEP international technical emissions working group 3.

**SUSAN X. YING**

Dr. Ying has devoted over three decades to the aerospace industry, with experience at NASA, Boeing, the Commercial Aircraft Corporation of China, and most recently an electric aircraft start-up, Ampaire. She is the Senior Vice President of Ampaire, responsible for global partnerships. She is also a board member of the Lindbergh Foundation. Dr. Ying is the immediate past President of the International Council of the Aeronautical Sciences (ICAS), serving on the Executive Committee which leads in shaping the agenda of this multinational professional aerospace organization. Dr. Ying is recognized as a Fellow of the AIAA and Fellow of the Royal Aeronautical Society (RAeS). With a deep passion for flight, Dr. Ying holds a Commercial Pilot License and is a FAA-Certified Flight Instructor (CFI). She received her PhD degree in Aeronautics and Astronautics from Stanford University and BS from Cornell University.



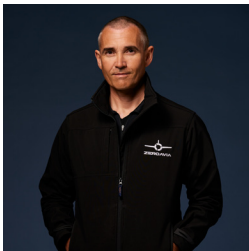
### ROELOF VOS

Dr. ir. Roelof Vos is Assistant Professor at the Aerospace Engineering Faculty of Delft University of Technology. His research is focused on new airplane configurations and technologies to reduce the climate impact of aviation. He leads the research project into the Flying V aircraft. He teaches university courses on Aircraft Design and Aerodynamic Design as well as professional courses on Aerodynamic Design and Hybrid-Electric Aircraft Design. Vos is an Associate Fellow of the American Institute of Aeronautics and Astronautics former secretary of the AIAA Aircraft Design Technical committee. He holds a BSc (2004) and Msc (2005) degree in Aerospace Engineering from Delft University of Technology and a PhD degree from the University of Kansas (2009) under sponsorship of the Fulbright Program.



### GLENN LLEWELLYN

Glenn Llewellyn is Vice President, Zero-Emission Aircraft at Airbus, the world's leading aircraft manufacturer and an international pioneer in the aerospace sector. Glenn is widely recognised as a top-tier thought leader on climate strategy for aviation. Glenn is at the helm of a zero-emission revolution at Airbus with the mission to unite all the ingredients needed to launch the world's first zero-emission commercial aircraft programme, ZEROe. Prior to his current role, Glenn spearheaded the research & technology portfolio dedicated to reducing the climate impact of Airbus products.



### VAL MIFTAKHOV

Val Miftakhov, ZeroAvia Founder and CEO, is a serial cleantech entrepreneur who knows how to scale technology for use by existing transportation industries. Val's previous venture was eMotorWerks. Val held executive business strategy & operations positions at Google, McKinsey & Company, and Nielsen. He launched and managed three startup companies, in all of which he held the CTO positions. Prior to his industry experience, Val was a high energy physics researcher at Stanford Linear Accelerator. Val received his PhD in Physics from Princeton University and his MS in Physics from Moscow Institute of Physics and Technology. He was a two-time winner of the Nationwide Russian Physics Competitions.



### TOM GRUNDY

Tom Grundy is Hybrid Air Vehicles' CEO. Previously Head of Business Management for BAE Systems' Tornado Availability Support Service, Tom holds degrees in Aerospace Engineering and Advanced Systems Engineering, an MBA, and is a Chartered Engineer and a Fellow of the Royal Aeronautical Society.



### SÉBASTIEN BOUGON

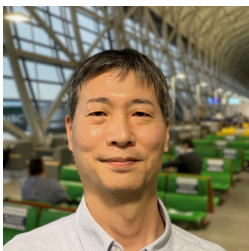
Sébastien Bougon is FLYING WHALES' CEO and founded the company in 2012. After spending eight years in the construction industry and then working on the financing of concessions, he joined the TF1 Group, where he held positions in finance and general management. Sébastien holds a degree in Civil Engineering.

## Chapter 6 - Climate Change Mitigation: Operations



### JONAS VAN DORP

Jonas van Dorp is Head of Aviation Marketing & Development at Groningen Airport Eelde (GRQ). He has a MSc degree of Air Transport Management at Cranfield University. Starting his career as a tour operator and mobility management consultant, Jonas has since 2002 been working for GRQ, specialized on new business and air services development. Regarding innovation and sustainability, Jonas initiated several projects, varying from the Interreg-supported Green Sustainable Airport (GSA) project, NXT Airport and Hydrogen Valley Airport.



### YUKIO NAKATANI

Yukio Nakatani is the General Manager of Technical Headquarters. He was in charge of master planning and development of KIX, and countermeasure project against the settlement of the ground surface. He was also engaged in establishing policy against earthquake and tsunami at the Ministry of Land, Infrastructure, Transport and Tourism of Japan. In 2018, he led recovery from Typhoon Jebi and BCP measures. Since 2021, he has been supervising the Technical Headquarters that deals with matters including environmental initiatives.



### YUKA TAKEUCHI

Yuka Takeuchi joined Kansai Airports as an engineer and was appointed as the Manager of Environment & Master Plan Group. She takes the lead in enhancing the environmental measures of the three airports (Kansai International Airport, Osaka International Airport and Kobe Airport) and is responsible for creating and realizing sustainable master plans. Based on the long-term target of net zero CO<sub>2</sub> emissions by 2050, she is promoting energy conservation, the use of renewable energy and hydrogen, and zero emission vehicles.



### JULIANA SCAVUZZI<sup>2</sup>

Juliana Scavuzzi is the Senior Director, Sustainability, Environmental Protection and Legal Affairs at ACI World. Ms. Scavuzzi is the ACI Observer to the ICAO Committee on Aviation Environmental Protection (CAEP) and Secretary of the ACI World Environment Standing Committee. Ms. Scavuzzi leads international negotiations on environmental matters for ACI World, and leads the team developing technical material to support environmental protection and sustainable development at airports. She was the project director from ACI World of the ROUTES partnership. Ms. Scavuzzi is a lawyer and policy expert with a MSc in Juridical Science and a LLM in Air and Space Law: she has 10+ years of progressively responsible experience in International Aviation and Space Law and policy, of which 7 have been dedicated to environmental protection. She has authored several publications on the subject, including book chapters.

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2 This author also contributed to Chapter 10 - Biodiversity



### VINCENT ETCHEBEHERE

A 16-year veteran of the Group Air France-KLM, Vincent Etchebehere began his career in Stockholm as a business intelligence analyst. He then worked in Paris, then Rome occupying various revenue management positions. Back in Paris, he was performance manager for Europe Area, before becoming chief of staff to the EVP commercial, sales and alliances for the AF-KL Group. In 2016, he was named General Manager Mexico, and in 2018, General Manager for Canada. He took the position of VP Sustainability and new mobilities for Air France in Jul 2020. Vincent is also Vice President of A Tree for You association's Board, a plantation operator that enables individuals and companies to support planting projects around the world; and animator of the Climate Fresk.



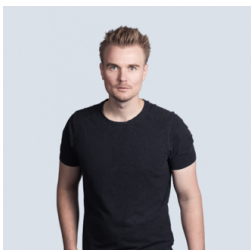
### HEDWIG SIETSMA

Hedwig Sietsma is Director Climate policy at KLM. Her main goal is to reach out to industry and policymakers for more ambitious climate ambitions in the aviation industry. Hedwig is an MSc in Business Administration and worked in the NGO sector before joining KLM 6 years ago. She started as a Corporate Management trainee, and became Unit Manager Preparation & Boarding Intercontinental for almost 3 years after that. Her current position is one that combines her personal values with her career objectives; creating sustainable aviation.



### DAVID BRAIN

David previously has over 25 years extensive experience in ATC, ATM, Project Management and operational analysis. David currently works in the Aviation Sustainability Unit in EUROCONTROL, focusing on reducing the environmental efforts of operations. David co-chaired the European CCO/CDO Taskforce as well as leading several other European operational projects. David is a co-rapporteur of the ICAO-CAEP Airport and Operations Working Group and has previously been responsible for leading the work assessing the global environmental benefits from the planned implementation of ICAO's ASBU framework. David also was responsible for leading the first ever global flight efficiency analysis using a harmonised surveillance data source. David has a private pilot's license, a degree in Geography and a Master's degree in Sustainable Aviation.



### PHILLIP BUCKENDORF

Phillip Buckendorf is Co-founder and CEO at Airspace Intelligence, a software-first aerospace company that helps the world's most complex air operations succeed. The company is navigating and optimizing air traffic for some of the biggest airlines operating in US airspace. Prior to Airspace Intelligence, Phillip designed and deployed predictive systems across autonomous driving, e-commerce and health care.



### **DIVYA SUKUMAR**

As Signol's Behavioral Science Lead, Divya has helped build a brand new app and communication service that nudges airline and shipping captains to save fuel and carbon. Before joining Signol, Divya completed a Ph.D. in Psychology & Law at the University of Warwick. During her studies, she won the Three Minute Thesis Challenge and Psychology Publication Prize. Divya is passionate about understanding what drives people's behavior and how we can nudge them into achieving better life outcomes.



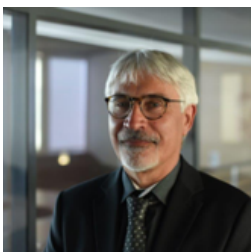
### **DANIEL WHITE**

Dan has been innovating with behavioral science and environmental technologies for the last 15 years, culminating in his position as CEO and co-founder of Signol. An environmental expert, 'street' behavioral scientist and innovator, Dan successfully delivered one of Europe's first field experiments on energy consumption, and founded a behavioral economics consultancy. Working with academic colleagues, he recognized the massive untapped carbon opportunity for behavioral change on fuel efficiency margins in aviation, and more recently maritime, and founded Signol in 2017.



### **ALEXANDRE FERAY**

Alexandre Feray is CEO of Open Airlines. He has 25 years of experience in the Software and Airline Industry, not including his teen years when he invented a programming language that was awarded and commercialized by Apple. He holds an MSc in Engineering and IT from École Centrale Paris and started his career at IBM Thomas J. Watson Research Center in New York, USA. He was the head architect of Air France Operations Control Center's reengineering program and head of Air France Crew Management IT Department. In 2006, he founded OpenAirlines, an innovative company that provides consulting and software solutions to reduce the costs of the airline operations.



### **LAURENT TABERNIER**

Laurent Tabernier led the EUROCONTROL study on Economic tankering. He led the analysis and performance evaluation of the European air traffic management research programme, SESAR, for many years and joined the Aviation Sustainability Unit of EUROCONTROL two years ago, where he conducts studies related to reducing the environmental impact of aviation. He is a senior expert in aviation performance with more than 30 years of experience in international programmes. Laurent holds a Master's degree in Computer Science and Artificial Intelligence from EPITA Paris.



### **ROBIN DERANSY**

Robin Deransy leads the Research and innovation activities of the Aviation Sustainability Unit of EUROCONTROL. Since 2010, Robin is leading studies aimed at ensuring that aviation progresses toward climate neutrality. He promotes and supports projects offering environmental solutions within and outside the SESAR programme. Robin is a member of the ICAO Committee on Aviation Environmental Protection (CAEP); the tools and databases maintained by his team IMPACT, STAPES, Open-ALAQS are recognised and used in the context of the CAEP Modelling and Database Group. Robin holds a degree in software engineering from the Conservatoire National des Arts et Métiers in Paris.



### **M. MUTHUKRISHNAN**

Dr. M. Muthukrishnan, Head - EHS & Sustainability – Airport Sector (C), GMR GROUP, having more than 16 years of experience in EHS & Sustainability Management. He is a Chemical Engineer and have done Doctorate in Chemical Engineering in the stream of Separation Technology at IIT Delhi, India. He is acting Chair of Airport Council International (ACI) Asia Pacific Region – Environment Committee. He is a certified Course Developer of International Civil Aviation Organization (ICAO) and ICAO Safety Management System Professional. Also developed International training program on Leadership in Energy and Environmental Design and Operation of Airport Infrastructure for ICAO.



### **REKIBUDDIN AHMED**

Rekibuddin Ahmed - Manager- Sustainability at Delhi International Airport Limited (DIAL), has more than 12 years of experience in Environment & Sustainability domain. He is currently driving sustainability initiatives at Delhi Airport. Some of the key focus area includes- climate action, green building programs, waste management, sustainability and ESG reporting, green financing, engagement with international associations and government agencies, training and competency development etc. He is representing Asia Pacific Airports as Expert Member in Airport Carbon Accreditation Global Task Force. He has Master of Technology (M. Tech) degree in Energy & Environment Management from Indian Institute of Technology (IIT) Delhi and Master of Science degree in Energy Systems from University of Petroleum and Energy Studies, Dehradun, India. He is a certified Lead Auditor in ISO 14001:2015 and Indian Green Building Council Accredited Professional (IGBC AP).



### **JONATHAN BECK**

Jonathan Beck is the fello'fly project leader since January 2022, and previously was the technical director of the fello'fly demonstrator from 2019 to 2021. Graduated from Supaero engineering school in 2006, Jonathan has been with Airbus since 2010. After contributing to A350 XWB training simulator design, he joined the A330 family flight control design and certification teams. Jonathan is passionate about new technologies and innovation, and endeavors to apply it to aerospace sustainability.



### **MONICA ALCABIN**

Monica Alcabin is a Technical Fellow at The Boeing Company and the ICCAIA Focal to ICAO CAEP Working Group 2 (Airports & Operations). Monica has expertise in the evaluation of operational benefits of avionics, airports and Air Traffic Management procedures and contributed to the development of the Rules of Thumb for the environmental benefits of the ICAO Aviation System Block Upgrades. She is tracking the regulatory landscape for Unmanned Aircraft and was the task lead for the work covered in this article.



### **ROBERTO DE OLIVEIRA LUIZ**

Roberto de Oliveira Luiz is Head of Aviation Business Development at Inframerica, currently manages Brasília and Natal airport and is controlled by Corporación América Airports since 2012. He also has an additional function as Commercial Aviation Advisor at Corporación América Airports, supporting and coordinating the design and execution of the routes development strategies for the all the international airports of the group. Roberto has extended experience in the business aviation. He started at VARIG and held various positions within the company, such as, Manager of Cargo Revenue Accounting, Inspector of Branches and General Manager. In Pluna was responsible for coordinating the business activities of the subsidiaries of the company.



### **FRANCIS MWANGI**

Mr. Francis Mwangi is currently the Senior Planning Officer at Kenya Civil Aviation Authority (KCAA). He is the ICAO CAEP Member for Kenya and Second Focal Point on CORSIA and Climate Change initiatives in Kenya. He is also a Panel Member in ICAO Aviation Data and Analysis Panel (ADAP) since 2014. He has extensive knowledge and experience on economics and environment matters on aviation industry for over 15 years. He holds a B.Sc. in Mathematics (First Class Honours); M.Sc. (Finance) and M.A. Economics all from University of Nairobi; a Certificate in Sustainable Aviation from Manchester Metropolitan University, a Certificate in Airport Green House Gas (GHG) Management from Incheon Airport Aviation Academy, a Certificate in Civil Aviation Management from Singapore Academy.



### **THOMAS CUDDY**

Thomas Cuddy is an expert in aerospace policy, planning, and analysis at the U.S. Federal Aviation Administration, with extensive knowledge of environmental programs, infrastructure financing, and research. He has participated in ICAO's 'Airports and Operations' working group since 2010, and is FAA's representative to the Airport Carbon Accreditation advisory board. He currently manages the Systems and Policy Analysis division at FAA, with the goal to bring enterprise-wide solutions to the most difficult aerospace challenges.

**MARIO SANTI**

Mr Mario Santi has worked for Flughafen Wien AG since 31 years. Responsible for the coordination and communication of the sustainability management system in the company. Collaboration in the practical application of the European Eco Management and Audit Scheme (EMAS). Participation in selected regional working groups and task forces in the context of regional management.

**JOHANNES DEIMEL-ZELENKA**

Mr Johannes Deimel-Zelenka has worked for the Austrian Ministry for Climate Adaptation since 2017. Responsible for environmental issues in aviation and European coordination in aviation for the Ministry. Prior to his current role he worked in the private business sector for one of the largest energy companies in Europe, for the Austrian Ministry for European and Foreign Affairs, and completed a training in the European Commission.

## Chapter 7 - Climate Change Mitigation: Sustainable Aviation Fuels

**MATTEO PRUSSI**

Matteo Prussi is an Industrial engineer, with a scientific background in renewable energy conversion technologies. He is a senior researcher at the Polytechnic University of Turin, and former employed at the Sustainable Transport Unit of the European Commission Joint Research Center. His activity focuses on the assessment of the environmental impacts of the various modes of transport and on the potential for alternative sustainable fuels, in particular for aviation and maritime sectors.

**ROBERT MALINA**

Robert Malina is a professor for environmental economics at Hasselt University in Belgium and Director of the U Hasselt Centre for Environmental Sciences. He is also a Research Affiliate at the Laboratory for Aviation and the Environment of the Massachusetts Institute of Technology. His main area of research is sustainable aviation, in particular the environmental and economic viability of sustainable aviation fuels. For this topic, he also serves as a technical expert to the International Civil Aviation Organization.



### ANDREI MUNGIU<sup>3</sup>

Andrei Mungiu works for the European Commission on EU environmental policies since 2012, and on aviation specific matters since 2017. He works on ICAO affairs, also being involved in work on environment protection, with a focus on Sustainable Aviation Fuels and Market-Based Measures. He serves as expert on ICAO CAEP, in Working Group 4 for CORSIA, Fuels Task Group, Long-Term Aspirational Goal Task Group. He has extensive experience in the private sector in management of software products in Romania, China, US and Belgium. He holds an engineering master degree from the Polytechnics University of Bucharest, Romania.



### NATE BROWN

Nate Brown is SAF Project Manager in the U.S. Federal Aviation Administration (FAA) Office of Environment and Energy responsible for a portfolio of SAF research and development efforts. He manages FAA support for the Commercial Aviation Alternative Fuels Initiative (CAAFI) for which he serves as Head Advisor for Strategy and Implementation. Nate leads FAA coordination with U.S. government agencies on SAF, is co-chair of the SAF Interagency Working Group and responsible for developing and implementing the government-wide SAF Grand Challenge. Nate is also a U.S. expert member of the ICAO Fuels Task Group and co-chairs its Technology Production and Policy (TPP) subgroup.



### MARK RUMIZEN

Mark Rumizen has been the Federal Aviation Administration's (FAA's) regulatory and technical expert for aviation fuels for over two decades. He has been employed by the FAA since 1991 and is currently the Senior Technical Specialist for aviation fuels in the Aircraft Certification Division. He is also a member of the Commercial Aviation Alternative Fuels Initiative (CAAFI) steering committee and is the leader of the CAAFI Certification & Qualification Panel. He is chairman of the ASTM International Aviation Fuels Subcommittee and formerly led that subcommittee's Emerging Fuels section. Mark also helps guide aviation fuel research as the FAA representative on the Coordinating Research Council (CRC) Aviation Fuels Steering Committee. He was employed by aircraft engine manufacturers Pratt & Whitney Aircraft and GE Aviation prior to joining the FAA.



### STEVE CSONKA

Steve Csonka is an aviation professional with 36 years of broad, strategic airline, aviation OEM, and sustainable aviation fuel (SAF) experience. He leverages his expertise in the nexus of advanced technologies, policy, and market forces to advocate for a strong industry, focusing on development of pragmatic solutions to the challenges of aviation growth. From 2012, Steve has served as Executive Director of CAAFI ([www.caafi.org](http://www.caafi.org)), a public-private-partnership fostering the development and commercialization of SAF.

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3 This author also contributed to Chapter 11 – State Action Plan & Capacity Building



#### KRISTIN C. LEWIS<sup>4</sup>

Dr. Kristin Lewis is the principal technical advisor for energy analysis and sustainability at the U.S. DOT Volpe Center with a focus on resilience in transportation, alternative fuels, sustainability, and environmental impact risk assessments. Dr. Lewis supports the Federal Aviation Administration (FAA) as the head research and technical advisor to CAAFI<sup>®</sup>, as co-rapporteur of the ICAO Sustainability Certification Scheme Evaluation Group, and as a member of the ICAO CAEP Fuels Task Group.



#### JOANA PORTUGAL-PEREIRA

Joana Portugal Pereira is an Assistant Professor at Energy Planning Program of the Federal University of Rio de Janeiro (PPE/COPPE/UFRJ). She is a Visiting Fellow at the Centre for Environmental Policy of Imperial College London and a Visiting Assistant Professor at the Mechanical Engineering Department of Instituto Superior Técnico, University of Lisbon. Professor Portugal Pereira is a Lead Author in the IPCC Sixth Assessment Report (AR6) and in the UNEP Emissions Gap Reports. She was a Senior Scientist of the Technical Support Unit of IPCC WG III and coordinated the development of the IPCC Special Reports on 1.5C pathways and Climate Change and Land. She holds a MSc degree in Environmental Engineering (University of Lisbon) (2006), and a PhD in Urban Engineering (The University of Tokyo) (2011), with emphasis on life cycle assessment modelling of alternative fuels. Since 2021, she is an Associate-Editor of the Environmental Science and Policy Elsevier Journal.



#### EDUARDO MULLER-CASSERES

Eduardo is a doctoral candidate at the Energy Planning Program (COPPE/UFRJ) and a guest researcher at PBL (Netherlands Environmental Assessment Agency). He holds a bachelor's degree in Electrical Engineering from UFRJ and a diplôme d'ingénieur from Mines-Télécom Lille Douai, in addition to a master's degree in Energy Planning from COPPE/UFRJ. Eduardo acted as a Chapter Scientist in the IPCC Sixth Assessment Report (WG III, chapter 3). His research focuses on the role of international shipping and aviation in long-term climate mitigation scenarios.



#### DEREK B. WHEELER

Derek Wheeler is a Senior Policy Advisor at ExxonMobil. He has spent over 25 years there in various roles related to equipment design, facilities operation and manufacturing of transportation fuels. Over the past 12 years he has supported advocacy involving the development of carbon reduction policies in the United States and abroad. He is currently focused on aviation policy such as CORSIA and has been a member of the Fuels Task Group in the ICAO Committee on Aviation Environmental Protection since 2019.

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4 This author also contributed to Chapter 8 CORSIA



### JIM HERBERTSON

Jim worked for Ipieca between 2017 and 2022 as Technical Director, Climate and Energy, after nearly 40 years in the oil and gas industry. He graduated in Chemistry from Oxford University and spent the first part of his career in various technology roles. During that time he worked in the UK, France and the USA and led global teams developing new fuels and lubricants and providing support to refining and marketing. More recently, he worked on environmental and safety for the upstream business functions with a focus on policy development.



### FRANCISCO BOSHELL

Mr. Francisco Boshell leads the work on Innovation for Renewable Energy Technologies at the International Renewable Energy Agency (IRENA). He focuses primarily on providing policy advice and guidance to countries regarding technology innovation, quality control and standardisation programmes for a successful deployment of renewables. During his 18 years professional career, Mr. Boshell has also: developed technical standards for quantifying GHG emission reductions from CDM projects and supported the climate change negotiations under UNFCCC; provided consultancy services for the development of renewable energy and energy efficiency projects at DNV GL, formerly KEMA Consulting; and designed and implemented infrastructure and energy related projects in the automotive manufacturing sector at General Motors. His background is in Mechanical Engineering and he holds a MSc. in Sustainable Energy Technology from the Eindhoven University of Technology, in the Netherlands.



### MAISARAH ABDUL KADIR

Maisarah Abdul Kadir is an Associate Programme Officer at International Renewable Energy Agency (IRENA), working for renewable energy roadmaps (REmap) program, focusing on global level and regional analysis including South East Asia. Prior to joining IRENA, she was working in the energy sector in Malaysia and Indonesia.



### RICARDO GORINI

Ricardo Gorini is an economist, holds an MBA in Finance and MSc. and DSc. in Energy. He joined IRENA, in 2018 as Senior Program Officer – REmap, responsible for the Renewable Energy roadmaps program at global, regional and country level. He is co-author of the IRENA global roadmap series including the latest World Energy Transitions Outlook 2050. Previously he has worked in the financial market and mining sector, as well as advisor for energy policies and regulation in Brazil, including as the Director of the Brazilian Energy Office (EPE) in charge of the Brazilian energy planning. He was also involved in the Brazilian NDC formulation and he coordinated the energy group of the Brazilian Climate Change Forum. He was the sherpa for Clean Energy Ministerial (CEM) and Mission Innovation (MI).



### SONIA RUEDA

Sonia Rueda works as advisor at the PtX Hub of the GIZ in Berlin, with focus on solutions for the aviation sector and the chemical industry. She is passionate about sustainable solutions and actions that contribute solving one of the biggest problems facing society today: Climate change. Sonia holds a degree on Chemical engineering from Colombia and a masters in Renewable energy technologies from Germany. Before starting at the PtX Hub, Sonia gained multidisciplinary experience in the private and public sector; on the areas of process engineering and energy efficiency while working for the chemical industry in Colombia and, on capacity building and technical support around renewable energy and energy statistics while working for the International Renewable Energy Agency in the UAE. Sonia is Colombian, has lived in Kenya, Germany and the UAE and has worked with several developed and developing countries



### FRANK MISCHLER

Frank Mischler is with the PtX Hub Brussels, a platform for knowledge exchange, capacity building, policy dialogue and international cooperation on PtX, commissioned by the German government and implemented by GIZ, the German government's agency for development cooperation. Frank leads the policy work of the PtX hub, including regulations on aviation. The Hub supports sustainable aviation fuel production in Brazil and Kenya and are in initial discussions with more countries, and set-up an in-depth training module on PtL/SAF. Before joining the PtX Hub, Frank supported the EU's climate diplomacy efforts with G20 countries.



### RUTH HORSTMANN BARBOSA

Ruth Horstmann Barbosa is specialist on Education and Communications strategies within international cooperation. She holds a master's degree in Educational Leadership and Innovation from Duisburg-Essen University, Germany. Between 2020 and 2022 she worked for the German cooperation office of GIZ in Brazil, supporting project management on Technical and Vocational Education and Training (TVET) and advising the project ProQR - Climate-neutral Alternative Fuels on Human Capacity Development and Communication, focusing the promotion of PtX technologies and SAF production in Brazil.



### JACOB TETER

Jacob Teter leads IEA's team of transport analysts in the Energy Technology and Policy Division. In this role, he aims to further the global dialogue on policies to promote quality transport services while minimising emissions and other environmental impacts. Jacob is a lead author of the IEA's "Future of Trucks" and "Future of Rail" reports, and has contributed to the IEA's "Net Zero by 2050" report, to the annual Global EV Outlook series, and to recent Energy Technology Perspectives and World Energy Outlook reports, among others. He completed his PhD in Transportation Technology and Policy from the University of California, Davis in 2015.



### **PRAVEEN BAINS**

Praveen Bains is currently a Clean Energy Modeller within the Energy Technology and Policy division at the International Energy Agency (IEA). She works within the alternative fuels team, modelling the global alternative fuel production that supplies the energy required by the demand sectors. Her works focuses on bioenergy/biofuels and sustainable aviation fuels, including synthetic kerosene. Ms. Bains has a Master's degree from the Department of Energy Resources Engineering at Stanford University, and a Bachelors of Engineering in Chemical and Biomolecular Engineering from the University of Pennsylvania.



### **PEDRO PIRIS-CABEZAS**

Director, Sustainable International Transport & Lead Senior Economist, Environmental Defense Fund (EDF). Pedro, Ph.D., is an economist and a professional engineer working for EDF since 2007. He directs analysis and policy advocacy to promote the use of high-integrity, sustainable alternative fuels as well as carbon markets and other robust policy frameworks to address emissions from international transportation. In the context of ICAO, Pedro has participated in the design of CORSIA since 2013 and co-led the task group working on sustainability matters related to sustainable aviation fuels within the CAEP, which led to the adoption of ICAO's SAF sustainability framework.



### **XAVIER VIGOR**

Xavier Vigor began his professional career in 1988 within the Air Liquide Group. He has successively held positions in research and development, sales, engineering and management, always in innovative fields. In particular, he has been Managing Director of two of the Group's Research Centers (Chicago, Illinois, and Paris, France), as well as Standard Plants Engineering, and of the Group industrial IT. More recently he was the Managing Director of Air Liquide advanced Technologies in Grenoble. Since 2017, he is Vice-President Technologies (CTO) and Industrial Management of the Air Liquide Hydrogen Energy World Business Line. Xavier Vigor is a graduate of École Centrale des Arts et Manufactures.

## **Chapter 8 – CORSIA**



### **RACHID RAHIM**

Mr. Rachid Rahim is the Head of Aviation Environmental Protection at Qatar Civil Aviation Authority (QCAA), Doha. He is primarily responsible for the drafting and implementation of aviation environmental regulations, Aviation Environmental protection oversight and Aviation Environmental strategy design. He is an expert with a professional experience of more than 20 years at various positions dealing with aviation and environment at the international level. Previously, he worked at the International Air Transport Association (IATA) as leader civil aviation consulting. He holds a Master's in Environmental Engineering from DTU, Denmark and a Master's in Environmental Policy and regulation from Roskilde University, Denmark.



### **JUAN HERMIRA**

Mr Juan Ignacio Hermira holds a BA Honors degree in Environmental Studies from Staffordshire University and also a Masters in Environmental Management. He is senior environmental officer and technical expert for State sponsored group SENASA/Spanish Aviation Authority, AESA. He has been working for aviation industry for 20 years, 15 years' of experience in aviation environmental protection and 10 years' of experience at Aircraft Operator level. He provided assistance and representation on behalf of the Spanish Authorities in a variety of international working groups, including ICAO CAEP WG4 (related CORSIA) and SCSEG (undertaking the evaluation of Sustainability Certification Schemes for SAF). Also qualify expert for ACT-CORSIA programme under ICAO CORSIA Buddy Partnerships.



### **KERRI HENRY**

Kerri Henry has worked with the Government of Canada for 20 years, focused primarily on climate change policy. In her current role she is one of the leads for Transport Canada on the development of climate change measures for international transportation. In this role she has worked on the development and implementation of CORSIA at ICAO since 2014 and was the lead for domestic implementation in Canada. She is currently the co-rapporteur of ICAO's Working Group 4: CORSIA.



### **STEPHEN ARROWSMITH**

Mr. Arrowsmith has worked in the area of aviation and environmental protection for the last 25 years, and in the European Aviation Safety Agency (EASA) since 2005. He has led work in developing global environmental standards on aircraft NO<sub>x</sub> and CO<sub>2</sub> emissions, as well as market-based measures where he is currently co-Rapporteur of the CAEP Working Group 4 on CORSIA. During the past 5 years, he has instigated the EASA European Aviation Environmental Report, which provides an objective overview on the environmental performance of the European aviation sector and how it can be improved. Most recently, he has been supporting the development of SAF initiatives to facilitate their uptake within Europe.



### **DANIEL RIVAS BROUSSE**

Daniel Rivas Brousse is programme officer and representative from Spain, SENASA. SENASA provides specialised technical assistance to public entities in the Spanish aeronautical sector. Daniel is a specialist in sustainable aviation fuel, with several years' experience in the field. He also assists in the organisation of technical discussions at ICAO, and promoting engagement with other international and national organisations. Since 2022, he has been co-rapporteur for the fuel task group that reports to ICAO's aviation environmental protection committee.



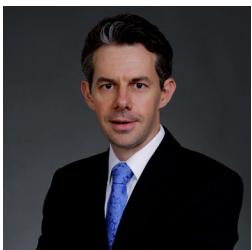
### **JAMES HILEMAN**

Dr. James (Jim) Hileman is the Chief Scientific and Technical Advisor for Environment and Energy for the Federal Aviation Administration. He has responsibility for the Environment and Energy research portfolio of the FAA, which includes the CLEEN Program, the ASCENT Center of Excellence, and the Commercial Aviation Alternative Fuels Initiative (CAAFI), among other efforts. Dr. Hileman is the co-rapporteur of the Fuels Task Group of the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP). Prior to joining the FAA, Dr. Hileman was a Principal Research Engineer within the Department of Aeronautics and Astronautics at MIT. He holds a B.S., M.S., and Ph.D. in Mechanical Engineering from the Ohio State University.



### **STEFANO MANCINI**

Stefano Mancini is working in EUROCONTROL since 1998. In the last 20 years, he has worked primarily on market-based measures addressing aviation sustainability and decarbonisation. Having contributed to the analyses carried out during the design of the inclusion of aviation in the European Union (EU) Emissions Trading System (ETS), he is managing since 2010 the EUROCONTROL Environment Management Information Service (EMIS, formerly ETS Support Facility) supporting States' authorities, aircraft operators, the EU and ECAC in the implementation of the EU, Swiss and UK ETs and ICAO's CORSIA. Expert nominated by the EU in the ICAO-CAEP GMTF, since its inception in 2013, and subsequently in the WG4, he co-led the WG4 CORSIA Tools and Analysis Group (CTAG) till March 2022.



### **PHILIPPE BONNEFOY**

Dr. Philippe Bonnefoy is Founder and Principal at BlueSky. Dr. Bonnefoy leads a team of experts in strategy and analytics focusing on aviation decarbonization through technology, operations, sustainable aviation fuels and market-based measures. Dr. Bonnefoy is an expert nominated by the United States (since 2009) to the ICAO-CAEP where he currently leads the Working Group 4 CORSIA Tools and Analysis Group (CTAG) and the Long-Term Aspirational Goal Task Group (LTAG-TG) Cost and Estimations ad hoc group. He is also contributing to several ICAO CAEP groups; MDG, FESG, WG1, WG3, FTG and ACCS.

## **Chapter 9 - Climate Change Adaptation & Resilience**



### **RACHEL BURBIDGE**

Rachel Burbidge joined EUROCONTROL in 2005. She has been leading EUROCONTROL's work on climate change adaptation and resilience since 2009, authoring the organisation's ground-breaking Challenges of Growth work on Climate Adaptation, and several peer-reviewed journal articles. She leads EUROCONTROL's contribution to the ICAO CAEP Working Group on CORSIA, where she leads tasks on MRV, and is also a member of the ICAO CAEP Working Group on Airport and Operations, where she co-leads the work on climate adaptation. She has degrees in Environmental Studies and Sustainable Development.



### ANDREA SCHWARTZ FREEBURG

Andrea Schwartz Freeburg is a Foreign Affairs Specialist with the U.S. Federal Aviation Administration (FAA) Office of International Affairs. She currently serves as the Southeast Asia desk officer, where she is responsible for coordination with USG and international partners to promote collaboration in civil aviation safety, security, and efficiency in the region. Andrea previously served as the Caribbean desk officer (2017-2021), and in the FAA office of Environment and Energy as an Environmental Protection Specialist and agency lead for climate adaptation (2011-2017). Andrea has a Master of Arts in International Security from George Mason University and a Bachelor of Arts in International Relations from The College of William and Mary.



### JARLATH MOLLOY

Dr Jarlath Molloy is Senior Environmental Affairs Manager at NATS. His professional interests include the environmental performance of the aviation industry, international climate change policy, non-financial reporting, climate change resilience and green finance. He has worked in the public, private and non-profit sectors and is a Chartered Physicist.



### BEATRICE TURRINI

Beatrice is Business Continuity Manager at NATS, responsible for enhancing the wider organisational resilience and preparedness to ensure NATS is able to sustain operations during times of disruption. She has over ten years' experience managing IT operations with a large telecoms company, and is undertaking an MBA in Risk and Resilience.



### TREVOR SMITH

Trevor is a senior engineering manager at NATS. He is responsible for the operation and support of all technical support facilities at ATC centres and remote sites underpinning the NATS ATM technical operation. He has a background in systems engineering applied to aviation related services and is Chartered Engineer.



### NANCO DOLMAN

Nanco Dolman is leading professional at Royal HaskoningDHV, with a MSc in Civil Engineering from Delft University of Technology (1998). For over 20 years Nanco is the Strategic Adviser of Amsterdam Airport Schiphol for coping with climate change, airport planning and water management. Nanco has been also involved in other climate resilient airport studies, which include New Orleans; JFK, New York; Mexico City; Sydney; Kansai, Osaka; Vancouver and Changi, Singapore. Currently he is the team lead for the Global Study on Disaster Resilience for Airports, commissioned by the Coalition for disaster resilient infrastructure (CDRI).



### VIVEKANANDHAN SINDHAMANI

Vivekanandhan Sindhamani is Sustainable Aviation Lead at Netherlands Airport Consultants (NACO, a company of Royal HaskoningDHV), with an MSc in Aerospace Engineering from Delft University of Technology (2012). Vivek has successfully delivered international aviation multi-disciplinary projects around the world in over 20 countries and on 5 continents. Vivek has been involved in the development of a roadmap to make Changi Airport climate resilient and supported the Kansai Airport flood management study. He is core team member in the development of the ICAO Guideline on Airport Climate Change Adaptation. Currently, he is the project coordinator for the Global Study on Disaster Resilience for Airports, commissioned by the Coalition for disaster resilient infrastructure (CDRI).

## Chapter 10 - Biodiversity



### ANASTASIOS ANAGNOSTOPOULOS

Anastasios is Biologist and joined the Environmental Services Department of Athens International Airport S.A. (AIA) in 1997, after employed for a decade as academic researcher in botany, ecosystem management and database engineering in biology. He is currently the leader of the Wildlife and Biodiversity Management Team and AIA's SME Trainer on WHM. He has contributed as Safety Assessor for WHM at the ACI APEX in Safety Review Project. He is founding member of the World Birdstrike Association (WBA) and founding member of WBA regional branch for Europe (WBA-EUR), elected as Regional Vice-President for Europe for 2015-2018.



### WENDY AVIS

Wendy Avis is the Manager, Climate and Environment with the Vancouver Airport Authority where she is responsible for executing YVR's Environmental Management Plan and Roadmap to Net Zero by 2030. She has over 25 years' experience in the environment and sustainability field specializing in environmental management systems and sustainability strategies including carbon, energy, waste and water management. She is the Vice-Chair of the Canadian Airports Council Environment Committee and on the Board of the BC Chapter of Women in Aviation.



### NICK GABRIEL

Nick is a passionate environmental practitioner and chartered environmentalist with the Institute of Environmental Management and Assessment. He has experience in environmental impact assessment, permitting and approvals, and management systems. At Gatwick Nick leads the environment team and oversees environmental matters relating to both operations and development. Prior to joining Gatwick Nick worked on significant infrastructure, transport and energy projects in the UK and Australia.



### ARTUR MIRZOYAN

Graduated from the Moscow Aviation Institute in 1979. Since 1978, he worked at the Central Institute of Aviation Motors (CIAM) in the Propulsion & A/C Matching Department. His main researches are connected with multidisciplinary analysis and optimization of fuel/environmental efficiency of civil aircraft propulsion system. He has more than 100 scientific and technical publications. He supervised the CIAM activities in the several European projects (HISAC, DisPURSAL, AGILE). In 2016, he received the RAeS Gold Award for publication in the Aeronautical Journal. Since 2012, as an expert, he participated in the CAEP, especially in the development of the ICAO CO<sub>2</sub> Standard. Since 2018, he is CAEP Member from Russian Federation.



### KONSTANTIN B. GONGALSKY

Konstantin B. Gongalsky is a specialist in soil macrofauna and terrestrial isopods in particular. Conducting research on soil ecology and forest functioning mainly after disturbances: industrial pollution and forest fires. Applying spatial soil ecology studies and application of geostatistic methods in biodiversity research. Conducting research on soil biogeography and biodiversity. He is Head of both Laboratory of Ecological Soil Functions at A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences and Laboratory for Biogeography of Soils at Moscow State University. He is the author/co-author of more than 70 papers indexed in Web of Science.



### CRAWFORD ALLAN

Crawford leads national and international wildlife conservation programs related to trade, trafficking, and sustainability, with 30 years of experience. Based in Washington DC, Crawford served on the Federal Advisory Council to the U.S. Presidential Task Force on Wildlife Trafficking, 2013-2017. He leads large-scale projects combating nature crimes and building private sector solutions. Including the co-creation/oversight of the USAID ROUTES Partnership and as founder of the Coalition to End Wildlife Trafficking Online, with 47 of the largest tech companies globally.



### CORI MACFARLAND

Working for the world's leading environmental nonprofit, Cori taps into the power of the private sector to address some of the toughest challenges facing our planet. In this role, she collaborates with industry leaders to reduce environmental impacts, raise funds for field programs, and inspire support for WWF's mission. Cori led on building corporate collaboration under the ROUTES Partnership. Cori received her MBA from George Washington University in Washington DC and a BA in Anthropology from UCLA, USA.

## Chapter 11 - State Action Plan & Capacity Building



### OYETOUN ADEGBESAN

Oyetoun is a Deputy General Manager, Economic Regulation, Facilitation & Aviation Environment at NCAA, where she started her career in aviation in 1994. She is the Focal Point and coordinator for the Nigerian State Action Plan on reduction of CO<sub>2</sub> emissions and CORSIA. Oyetoun is a member of ICAO Technical Advisory Body (TAB) and serves as a Trainer for ICAO ACT-CORSIA. She holds a BSc in Microbiology and an MBA.

## Chapter 12 - Multistakeholder Cooperation



### PATRICIA ESPINOSA

Patricia Espinosa is the Executive Secretary of UN Climate Change since 2016. Ambassador of Mexico to Germany since 2012 and from 2001 to 2002, Ms. Espinosa was Minister of Foreign Affairs of Mexico from 2006 to 2012, bringing more than 30 years of experience at highest levels in international relations, specialized in climate change, global governance, sustainable development, gender equality and protection of human rights.



### INGER ANDERSEN

Inger Andersen is Under-Secretary-General of the United Nations and Executive Director of the United Nations Environment Programme, headquartered in Nairobi, Kenya. Between 2015 and 2019, she was the Director-General of the International Union for Conservation of Nature (IUCN). Between 1999 and 2014, she held several leadership positions at the World Bank including Vice President of the Middle East and North Africa; Vice President for Sustainable Development and Head of the CGIAR Fund Council. Ms. Andersen has more than 30 years of experience in international development economics, environmental sustainability, strategy and operations.



### PETTERI TAALAS

Prof. Petteri Taalas is the Secretary-General of the World Meteorological Organization, with its headquarters in Geneva, Switzerland. Having been elected by the World Meteorological Congress, he took up his position in January 2016. Previously, Prof. Taalas was Director General of the Finnish Meteorological Institute. He has a PhD in Meteorology from the Department of Physics at the University of Helsinki and is the author of around 50 peer-reviewed papers on satellite technology, global change, climate and atmospheric chemistry.



### ZURAB POLOLIKASHVILI

Zurab Pololikashvili has been Secretary-General of the World Tourism Organization (UNWTO) since January 2018. Under his leadership, UNWTO gained unprecedented visibility and prominence within the United Nations system, strengthening bonds with other key agencies and placing tourism at the heart of the wider agenda for recovery and sustainable development. After graduating with a degree in Banking, the Georgian national worked in a number of high-level roles in both the private and public sectors. His experience in the public sector includes posts like Deputy Minister of Foreign Affairs of Georgia, Minister of Economic Development of Georgia, Ambassador Extraordinary and Plenipotentiary of Georgia to Spain, Andorra, Algeria, and Morocco. He has also had prominent roles in one of Georgia's biggest banks and as CEO of the country's leading football team, FC Dinamo Tbilisi.



### SEBASTIAN MIKOSZ

Sebastian is the Senior Vice President for Environment and Sustainability at the International Air Transport Association (IATA). Representing 190 airlines, IATA's mission is to represent, lead and serve the airline industry. Sebastian is responsible for guiding and implementing IATA's strategic work on sustainability including the work towards the industry's net zero CO<sub>2</sub> target. He is the former Group Managing Director and CEO of Kenya Airways. Prior to that, he was the CEO of eSKY Group - the largest Polish Online Travel Agent. He is a graduate of the Institute of Political Studies (IEP Paris) in France with a master's degree in Economics and Finance.



### TIM JOHNSON

Tim is the Director of the UK-based Aviation Environment Federation (AEF), an NGO campaigning on aviation's impacts for people and the environment. He is a lead representative for the International Coalition for Sustainable Aviation (ICSA) at the UN's International Civil Aviation Organisation (ICAO), where he has co-led CAEP's expert group responsible for developing the emission unit eligibility criteria for CORSIA, and continues to lead the support group for ICAO's carbon emissions calculator. In the UK, he is a member of the Department for Transport's newly created Jet Zero Council.



### CAPTAIN JACK NETSKAR

Jack has a military background and is based in Oslo, Norway. Captain Netskar flies Boeing 737NGs for SAS, his employer for the past two decades. Soon after starting at SAS, he got involved in union work and has been elected to a variety of positions in national, regional, and global organizations. He has served the SAS Pilot Union as Board member, Deputy Chairman, and Chairman, as well as International Director of the Norwegian Airline Pilots Association and as Executive Vice-President, Professional & Government Affairs at the International Federation of Air Line Pilots' Associations (IFALPA). As IFALPA President, Captain Netskar is responsible for all aspects of IFALPA's activities and guides the Federation's participation in the International Civil Aviation Organization. His academic background includes the Air Force Academy, a bachelor's degree in organizational psychology, and a master's degree in Aviation Leadership.



### **JAN PIE**

Jan Pie has been Secretary General of the AeroSpace and Defence Industries Association of Europe (ASD) since 2013. During 2021 and 2022, he is also Chairman of the Board of the International Coordinating Council of Aerospace Industries Associations (ICCAIA). Jan served as the Chairman of the Board during 2013-2014 and 2017-2019. Jan is a delegate in the Consultative Commission on Industrial Change (CCMI) as part of the European Economic and Social Committee (EESC). Since 2021 he serves as an expert in the European Commission Industrial Forum. He holds an IFL Executive Management degree from the Stockholm School of Economics and an IHM Masters from the IHM Business School in Gothenburg.



### **LUIS FELIPE DE OLIVEIRA**

Luis Felipe de Oliveira has led Airports Council International (ACI) World as Director General since June 2020, applying his vast experience in commercial and technical aviation. He believes that aviation has a crucial role to play in fostering social and economic growth worldwide and is committed to helping ACI members and business partners sustainably recover from the impact of the pandemic.