

ICAO JOURNAL

NEWS AND DEVELOPMENTS FROM THE INTERNATIONAL CIVIL AVIATION ORGANIZATION - VOL.70 - NO.4

ACTION ON THE ENVIRONMENT

STATES' ACTION PLANS DRIVE PARTNERSHIPS AND PROGRESS
EMISSIONS/NOISE STANDARDS MOVE AHEAD UNDER ICAO CAEP
E-GAP SEMINAR SHOWCASES EMISSIONS REDUCTION
AIRCRAFT END-OF-LIFE BEST PRACTICES

STATE PROFILE SPECIAL FEATURES:
UNITED ARAB EMIRATES
RUSSIAN FEDERATION

ALSO IN THIS ISSUE:

ICAO AIR NAVIGATION COMMISSION 200TH SESSION
PUBLIC PRIVATE PARTNERSHIPS
ADS-B TO ENHANCE BRAZIL'S AVIATION SAFETY, CAPACITY
ICAO MUSEUM OPENS TO PUBLIC



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Dr. Fang Liu

THE POWER OF PARTNERSHIPS

 With the inaugural ICAO World Aviation Forum (IWAF) having concluded just a few weeks ago, and on such a positive note, it gives me great pleasure to be able to once again highlight the power and effectiveness of partnerships in this latest issue of the *ICAO Journal*.

Gathering at our Montréal Headquarters around the theme of *Aviation Partnerships for Sustainable Development*, over 800 IWAF participants, representing ICAO Member States, international organizations, financial institutions and the air transport industry, explored a variety of topics.

In the first place these Ministers and senior officials resoundingly supported ICAO's *No Country Left Behind* initiative, its goal that all States should achieve effective implementation of ICAO global Standards and Recommended Practices and policies, and that this compliance forms the critical foundation upon which future and sustainable aviation development can be achieved.

Strong evidence was also provided that with effective implementation of ICAO SARPs comes the critical regulatory framework that builds trust between States and assures global connectivity, through which there can be growth in traffic, trade and tourism, resulting in economic benefits for a State. This in turn lifts populations out of poverty and allows States to invest in further aviation development, commitments which then reinvigorate the cycle of increased air transport connectivity and mutually inclusive growth.

I was very encouraged that ICAO was able to bring together so many decision makers at the IWAF who can make a difference in this regard, and that the event was able to jump start the discussions and partnerships which will be of great assistance to the global aviation sector as we seek to secure a larger portion of annual transportation-related development investments going forward.

This support will be essential to the ability of States and Regions to manage coming aviation growth, safely and efficiently. It will also be key to how fully they can realize the significant and sustainable socio-economic prosperity benefits of safe and reliable air transport services. But before this dynamic can begin to be placed at the service of these societies, we will need to see the discussions and ambitions voiced at the World Aviation Forum translated into solid and long-term commitments.

2015 was also a very successful year for ICAO with respect to raising awareness on the value of partnerships for aviation environmental performance. Our Organization's State Action Plan initiative continued to extend its global reach and assist more and more States in developing local strategies specific to aviation emissions mitigation, and as readers will note on pages 8 and 10, partnerships in these efforts with the European Union (EU) and the United Nations Development Programme/Global Environment Fund (UNDP/GEF) have helped drive tremendous State Action Plan progress.

The ICAO-EU Assistance Project in particular is a joint assistance project on capacity building for CO₂ mitigation from international aviation in 14 States, 12 of them from Africa and two from the Caribbean region, and I was very heartened to read the positive testimonials on page 10 covering results to-date from Cameroon, Burkina Faso, Kenya and the Dominican Republic.

Similarly I was very pleased to learn more in this issue regarding commonalities in ICAO's work and the objectives of the United Nations Framework Convention on Climate Change (UNFCCC) Nationally Appropriate Mitigation Actions (NAMAs). These parallel and harmonized reporting regimes significantly contribute to capacity building by multiplying the effects of emissions reductions and environmental benefits of these initiatives in aviation and create synergies with other sectors

“With effective implementation of ICAO SARPs comes the critical regulatory framework that builds trust between States and assures global connectivity, through which there can be growth in traffic, trade and tourism, resulting in economic benefits for a State.”

of the economy, while respecting both organizations' mandates and regulatory frameworks.

Lastly on the subject of partnerships, readers will find a very informative summary of the special event we held in September – the ICAO 'EGAP' Seminar, which addressed current and foreseen initiatives to reduce the environmental footprint of aviation in various areas while showcasing how our Organization has been able to serve as a catalyst for increased and more effective partnerships toward this end.

Besides this there are many other very informative articles to be found in this issue, covering additional environmental priorities and developments such as the promise of ADS-B in driving greater operational efficiency and reduced fuel burn, or the new CO₂ Standard for aircraft now being finalized for 2016 under ICAO's Committee on Aviation Environmental Protection (CAEP).

Readers can also learn about the value of Public Private Partnerships (PPPs) in aviation development projects, the 200th anniversary of the ICAO Air Navigation Commission, and learn more about what the United Arab Emirates and Russian Federation are presently achieving in civil aviation in their special State Profiles.

At the time of this writing, ICAO had not learned of the outcomes of the COP/21 in Paris, but we will certainly be informing *Journal* readers in our Spring 2016 issue on all outcomes from that event which may impact our current and related efforts, being undertaken through ICAO, on civil aviation environmental governance.

Until then we will continue to work towards fostering further partnership and action on all of ICAO's Strategic Objectives, consistent with our mission and leadership role in civil aviation, and leading up to what I am certain will be one of our most successful Assemblies next September 27 to October 7 here in Montréal. ■

An aerial night photograph of Buenos Aires, Argentina, featuring light trails from traffic and the prominent Obelisco de Buenos Aires. The scene is framed by two large, overlapping, semi-transparent arches that create a tunnel-like effect. The text 'FROM BUENOS AIRES TO THE' is in white, and 'A BETTER WAY TO FLY.' is in yellow.

FROM BUENOS AIRES TO THE A BETTER WAY TO FLY.

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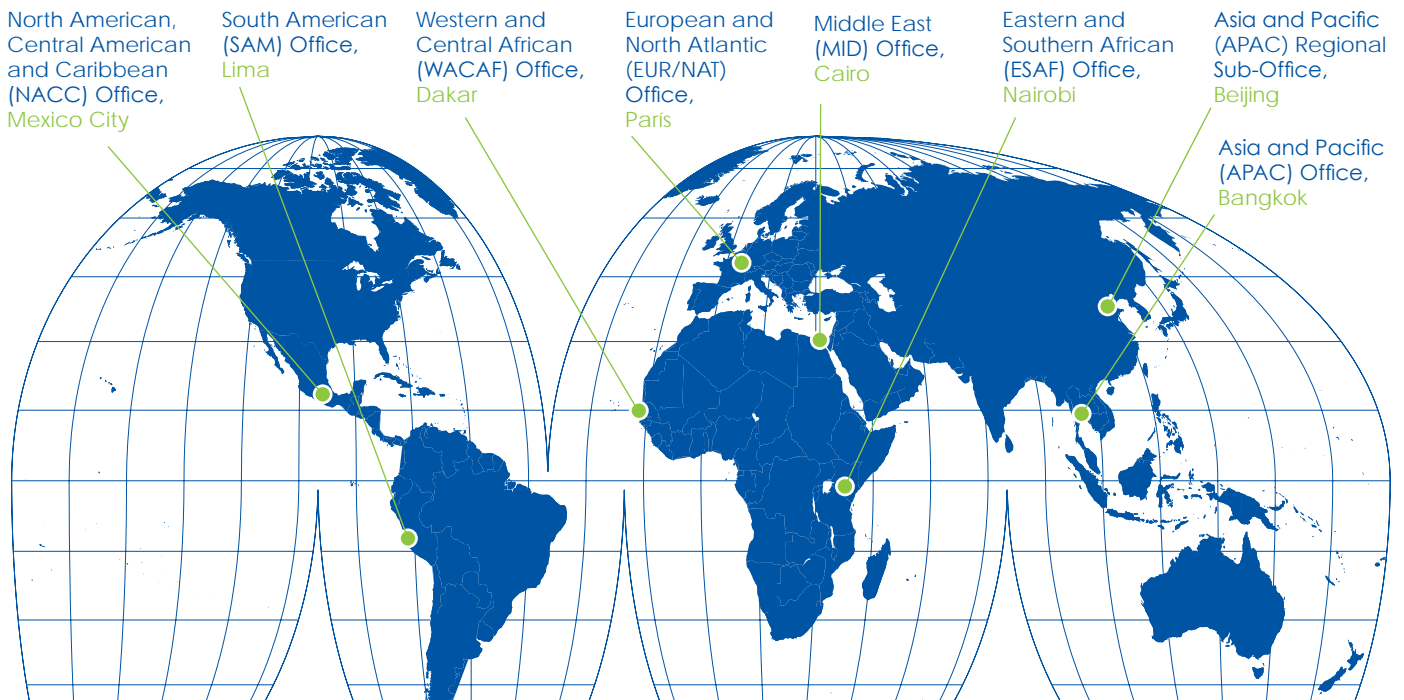
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ICAO's Global Presence



ICAO Member States and Environmental Action



STATE ACTION PLANS DRIVING ENVIRONMENTAL PARTNERSHIPS



JANE HUPE
Deputy Director, Environment,
Air Transport Bureau, ICAO, and
Secretary of the Committee
on Aviation Environmental
Protection (CAEP). She has
been at the forefront of ICAO's
efforts to define and promote
Policies and Standards for
environmentally sustainable
international aviation.

✈ State Action Plans on CO₂ emission reduction from international aviation have become one of the key elements of ICAO's environmental strategy. They are a tool for States to communicate to ICAO and the international community on progress toward the environmental goals set by the Assembly. To date, ICAO has received 83 State Action Plans, representing more than 80 percent of international air traffic. These Action Plans and related assistance projects represent examples of how the ICAO *No Country Left Behind* initiative is demonstrating to the world how international aviation intends to achieve the ultimate objective of environmental sustainability.

For the past five years, ICAO has been working on a comprehensive strategy to strengthen national capacities on environment and, specifically, to reduce the impact of international aviation on climate change.

Many Member States wanted to take action, but were not sure how. To be successful, ICAO needed an integrated plan to best support the States. This included developing and promoting guidance, technical material, and offering capacity building to facilitate the development of State Action Plans.¹

At the 38th Session of the ICAO Assembly in 2013, Member States praised the positive outcome of the initiatives undertaken by the Organization and tasked ICAO and its Member States to build on these successful results and lessons learned: to do more

¹ http://www.icao.int/environmental-protection/Pages/ClimateChange_ActionPlan.aspx

and to do better. Assembly Resolution A38-18 invited States to update their Action Plans every three years. Of the 83 State Action Plans submitted, 23 have already been updated, and ICAO is working with States to continue receiving new submissions before the next session of the ICAO Assembly in 2016.

One of the key elements of the ICAO strategy is forming joint partnerships to facilitate access to financial resources for Member States' actions to reduce aviation emissions. It also encourages States that submitted their Action Plans to build partnerships with other Member States that did not. This Action Plan "Buddy Programme" is an instrumental step to enhancing the submission of State Action Plans and to make sure that all avenues are explored to multiply their effects.

ICAO-EU JOINT ASSISTANCE PROJECT

In 2013, ICAO established the first such partnership with the European Union: a joint assistance project on capacity building for CO₂ mitigation from international aviation in 14 selected States, 12 of them from the African region and two from the Caribbean region (see list on page 10).

The main objective of the ICAO-EU project is to contribute to implementing capacity building activities that will support the development of low-carbon air transport and environmental sustainability in the selected States.

The results achieved thus far are a testimony that the project is heading in the right direction. In my experience working on environment and policy development, I have never before seen

an initiative with such a multiplier effect. From the success stories, we know this project has enabled a shift in institutional culture regarding the environment in the selected States. An issue that was not seen as a priority in the past has now become increasingly relevant for States, which have taken ownership, greatly increased awareness of environmental issues, and are enthusiastic to undertake concrete action. This is what capacity building is all about.

Member States had the willingness to address their environmental issues; they just required assistance to mobilize their national stakeholders and take action. This assistance project has provided exactly the support they needed. Many other Member States are now interested in this initiative; they see it as a successful example on how to tackle the impacts of aviation on the environment.

The project activities initiated with kick-off seminars in Santo Domingo, Dominican Republic in December 2014 and Yaoundé, Cameroon in February 2015. More than 30 national 'focal points,' designated by the selected States, participated in these Seminars, which aimed to strengthen the national capacities of the beneficiary States for the preparation of State Action Plans in accordance with ICAO Doc 9988, *Guidance Document for the Development of States' Action Plans*.

The establishment of National Action Plan Teams has changed the way the States work toward environmental objectives. Action Plans are the result of an inclusive process that involves all the national stakeholders: civil aviation authorities, ministry of environment, ministry of transport, airports, airlines, air navigation service providers, and fuel suppliers, amongst others.



Participants in the Caribbean regional kick-off seminar held at the Academia Superior de Ciencias Aeronáuticas (ASCA) in Santo Domingo, Dominican Republic. The aim of the seminar was to strengthen the national capacities of the beneficiary States for the preparation of States' Action Plans.



The establishment of National Action Plan Teams has enabled the civil aviation authorities to bring together all the stakeholders involved in international aviation activity. *Photo left:* a working group in Santo Domingo, Dominican Republic. *Photo right:* seminar collaboration in Yaoundé, Cameroon.

The consultation process has allowed the inclusion of creative and innovative ideas to reduce fuel consumption and emissions. Indeed, it has sped up the approval process – lead governmental entities are involved early in the process, and it has created the necessary synergies to ensure financial funding and political buy-in for the implementation phase of the mitigation measures.

The presence of ICAO through the local project offices and on-site missions has been essential for the civil aviation authorities of the selected States to ensure the engagement and commitment of all the relevant actors toward the common goal of environmental protection. In less than a year, the ICAO Secretariat project team visited each of the 14 selected States, encouraging them to work with the members of the National Action Plan Teams to complete the collection of historical data, prepare the baseline scenarios, and facilitate discussions on the potential mitigation measures available for the States to reduce fuel consumption and emissions from international aviation.

AUTOMATIC EMISSIONS MONITORING

One resource developed under the ICAO-EU Assistance Project is the Aviation Environmental System (AES), which will facilitate the establishment and monitoring of CO₂ emissions inventories. The AES has been installed in 12 selected States on specialized computer equipment that has been purchased with the project funds. To facilitate integration of the AES with existing local reporting systems and processes, country-specific interfaces have been developed and relevant stakeholders trained through on-site missions. The AES will be implemented in all the selected States by the end of 2015; from early 2016, the States will be encouraged to use it for the automatic reporting of their emissions inventories to ICAO.

ICAO organized two hands-on seminars focused on the AES: in Trinidad and Tobago for the Caribbean States in October and in Kenya for the African States in November.

In 2016, ICAO will continue to support the selected States in the implementation of the mitigation measures included in the Action Plans: providing guidance, preparing feasibility studies, and

facilitating access to financial resources through partnerships with international financial organizations that are interested in supporting this type of sustainable development initiative.

ICAO STATE ACTION PLANS AND UNFCCC: THE SYNERGIES OF TWO COMPLEMENTARY PROCESSES

In 2010, ICAO adopted global aspirational goals for international aviation and launched a comprehensive capacity building programme to support States and industry in taking action to address CO₂ emissions from international aviation. ICAO Member States' Action Plans have provided the means to better quantify the volume of CO₂ aviation emissions and understand the possible measures available to reduce these emissions and showcase their needs for assistance to take action. Three years later in a similar approach, all Parties of the UNFCCC² agreed to prepare their Intended Nationally Determined Contributions (INDCs), showcasing their objectives and actions to reduce their domestic emissions.

ICAO States' Action Plans foster the establishment of national stakeholder groups made of representatives from the government, public agencies, private companies, etc. across various disciplines. The national stakeholders group facilitates the flow of information amongst all parties, improves understanding, and identifies emission reduction measures. While carrying out this work, States realized that the robust data collection processes that were implemented in the context of the States' Action Plans also enabled them to collect data related to domestic aviation and thus see synergies and opportunity to prepare the information to feed into the UNFCCC reporting mechanism as the ICAO States' Action Plan structure already reflects the actions to reduce domestic emissions as co-benefits. ICAO States' Action Plans also provide an important vehicle to identify assistance needs. Similarly, the UNFCCC's Nationally Appropriate Mitigation Actions (NAMAs) are envisaged to facilitate assistance for capacity building, technology transfer, and financing.

It is fascinating to see these parallel, harmonized and complementary reporting systems at play. This dual-reporting mechanism

² Decision 1/CP.19 of November 2013 during COP19 in Warsaw



FEEDBACK FROM STATES ON THE ICAO-EU ASSISTANCE PROJECT

Cameroon

Cameroon, on behalf of the 10 Member States of the Economic Community of Central African States, is grateful to ICAO and the European Union for this initiative as it supports the exchange of information, experiences, and best practices amongst the participating States. As the project provides structured guidance and close support in every step, it is allowing those countries with less expertise to keep on track and learn from others' experiences. This is a great example of the ICAO No Country Left Behind initiative; such assistance projects should be definitely replicated in other groups of countries."

Burkina Faso

"The project is a great way for us to raise awareness in the region on environment-related issues in aviation since our State is the only beneficiary in West Africa of the ICAO-EU project. This project gives us the opportunity to pave the way in this area, to strengthen the regional cooperation on it, and to trigger interest in neighbouring national civil aviation authorities to get more involved on CO₂ emissions reduction at their national level."

Kenya

"Whilst our national airline and some of our carriers have been implementing measures to improve fuel efficiency and reduce CO₂ emissions for some time, we (like many States) have been experiencing challenges in data collection, in particular a robust data collection system to monitor effective progress. This gap will be filled by the activities planned in the ICAO-EU project, which has also given the CAA the opportunity to engage with local stakeholders through the National Action Plan Team and to come up with a more robust and common strategy in CO₂ emissions reduction in the sector."

Dominican Republic

"The ICAO-EU assistance project has been a key element for the process of development and updating the Dominican Republic Action Plan on Emissions Reduction (DRAPER), an important step to promote a comprehensive strategy to address climate change in the country within the aviation sector. The project allows the Instituto Dominicano de Aviación Civil (IDAC) to involve the key stakeholders, strengthen cooperation, and improve processes and systems for data collection for aviation statistics and monitoring of CO₂ emissions. ■

ICAO-EU cooperative assistance to States project: Capacity building for CO₂ mitigation from international aviation

Objective: To assist States in addressing aviation emissions by implementing capacity building activities that will support the development of low-carbon air transport – including the ability to track, manage, and reduce their aviation emissions

14 beneficiary countries from the African and Caribbean ICAO regions:

- Angola
- Central African Republic
- DR Congo
- Kenya
- Burkina Faso
- Equatorial Guinea
- Republic of the Congo
- Burundi
- Chad
- São Tomé and Príncipe
- Cameroon
- Dominican Republic
- Gabon
- Trinidad and Tobago

significantly contributes to capacity building, as it multiplies the effects of emissions reductions and environmental benefits of these initiatives in aviation and creates synergies with other sectors of the economy, while respecting both organizations' mandates and regulatory frameworks. A clear win-win-win situation.

ICAO-UNDP-GEF GLOBAL CAPACITY BUILDING PROJECT

More recently, a second partnership was signed with the United Nations Development Programme (UNDP) with financing from the Global Environment Facility (GEF) to undertake a Global Capacity Building project – including the implementation of a pilot project on renewable energy in Small Island Developing States (SIDs).

The ICAO-UNDP-GEF project is expected to catalyze the incremental reduction of greenhouse gas emissions arising from the implementation of additional mitigation measures to reduce CO₂ emissions from international aviation in developing countries and SIDs.

This assistance project will focus on:

- Identification of low-emission measures in developing countries and SIDs with the development of guidance on the costs and environmental benefits of the basket of measures
- Support to developing countries and SIDs to strengthen their national capacities and to improve their national process and mechanisms for the reduction of aviation emissions through (1) provision of guidelines to facilitate access to other sources of financing for the implementation of the mitigation measures, and (2) development of guidance documents on the use of drop-in fuel for international aviation and renewable energy for airport ground operations
- Establishment of technical platforms to disseminate information, guidance, and best practices on the implementation of the low-emission measures.

CAEP PROGRESSES ON NOISE AND EMISSIONS STANDARDS

 The ICAO Committee on Aviation and Environmental Protection (CAEP) made significant progress on several key topics at its annual Steering Group meeting in Montréal, Canada in July. Attended by about 150 participants from States and stakeholder organizations around the world, the meeting served as the final review of the work of over 600 international experts before inputs are formally submitted for the approval of the 10th meeting of CAEP (CAEP/10) in February 2016. Topics covered included global climate, local air quality, aircraft noise, and the assessment of present and future trends across these areas. For the first time two new standards will be considered at a single meeting by CAEP.

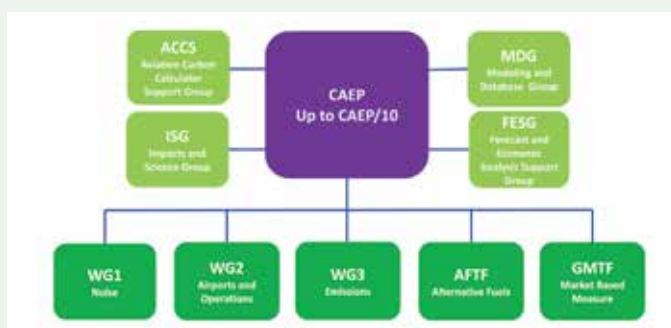
Protecting the environment by ensuring the sustainable development of civil aviation is one of the strategic objectives of ICAO. In this respect, the Committee on Aviation Environmental Protection (CAEP) is playing a major role in providing technical solutions to address effects of aviation on the environment.

The current CAEP cycle is undertaking specific work on noise, local air quality, and the 'basket of measures' today considered for reducing international aviation CO₂ emissions, which include aircraft technology, operations improvement, market-based measures, and alternative fuels.

The aim of the next CAEP meeting in February 2016 is to recommend new Standards and Recommended Practices (SARPs) for Annex 16, as well as guidance and reports to allow the aviation community to continue to progress toward the achievement of ICAO environmental goals.

The ICAO Council will review and consider the CAEP recommendations and in turn report to the 39th session of the ICAO Assembly, where global policies on environmental protection will be reviewed and adopted.

CAEP STRUCTURE



In addition, CAEP will support the Council's and Assembly's decision making by providing aviation environmental trend projections for noise, emissions that affect local air quality, fuel consumption, and CO₂ emissions.

The CAEP Steering Group meets annually to review and provide guidance on the progress of the activities of CAEP. Here are highlights and some deliverables from the recent CAEP Steering Group meeting discussions:

ENVIRONMENTAL ANALYSIS AND TRENDS

As requested by the 38th Session of the Assembly, the Council is tasked to report on the environmental trends assessment undertaken by CAEP for the present and future impact of aircraft noise and aircraft engine emissions.

An updated set of noise, local air quality, and global climate trends will be delivered to the CAEP/10 meeting in February 2016 for adoption. Significant effort has been placed in developing projections and a suitable lifecycle assessment methodology to estimate the potential future contributions of alternative fuels to net CO₂ emissions from international aviation on the global climate trends, in addition to the estimate of the contribution of technological and operational measures for CO₂ emissions reductions.

These trends will be recommended as the basis for decision making during the 39th Session of the ICAO Assembly.

1st ICAO AIRCRAFT CO₂ EMISSIONS CERTIFICATION STANDARD

A major area of activity in the field of aviation and climate change is the development of a CO₂ emissions certification Standard for aircraft, which aims to ensure that the best available technology is on board future aircraft.

Development of this Standard has been one of the most challenging tasks undertaken by CAEP; nonetheless, the Committee is on track to deliver the new ICAO Aircraft CO₂ emissions certification Standard in 2016.

The final decision on the CO₂ Standard will be underpinned by a significant exercise within CAEP to ensure that the new Standard is environmentally effective and economically reasonable. Once the CO₂ Standard has been finalized, it will be included in a completely new Volume of Annex 16 (Volume III).

LOCAL AIR QUALITY – A NEW PM STANDARD

Aircraft engines burning hydrocarbon-based fuels emit gaseous and Particulate Matter (PM) emissions as by-products of combustion.



CAEP Steering Committee meeting: in centre front (in dark grey suit) is Alexandre Filizola CAEP Steering Group Chairperson, flanked by Vice-Chairperson Frauke Pleines-Schmidt (to his left) and CAEP Secretary Jane Hupe (to his right).

At the engine exhaust, PM emissions mainly consist of ultrafine soot or black carbon emissions. Such particles are called “non-volatile” PM (nvPM), and can have impacts on local air quality and human health, as well as climate impacts.

CAEP regularly reviews the ICAO SARPs in all environmental areas to ensure that they remain current, reflecting advances in new technologies. This work has included the development of a new nvPM Standard.

The initial nvPM Standard, which is on schedule for agreement at CAEP/10, will utilize the current ICAO Standard for smoke, and will include an nvPM certification requirement that will set the stage for a more stringent nvPM Standard to be recommended as early as 2019.

HELICOPTER, SUPERSONIC AIRCRAFT, AND RPAS NOISE IMPACTS

CAEP recently reviewed the status of helicopter noise technology and will now evaluate current helicopter noise certification schemes to ensure that they are up to date.

Since the introduction of supersonic aircraft in commercial service, action has been taken by CAEP to avoid creating unacceptable situations for the public due to sonic boom. CAEP is now progressing toward a supersonic aircraft Standard, which is crucial to future supersonic operations. The environmental acceptability of the impacts of supersonic operations constitutes the main challenge.

CAEP also continues to investigate the current state of noise certification for remotely piloted aircraft systems (RPAS) and is monitoring certification issues in this fast-growing sector.

1st GLOBAL MARKET-BASED MEASURE (MBM) SCHEME FOR INTERNATIONAL AVIATION

At the 38th Session of the ICAO Assembly, Member States agreed to develop a proposal for a global MBM scheme for decision in 2016, with implementation from 2020. It is one of the most challenging technical tasks within the scope of CAEP’s work.

CAEP continues to develop technical design elements of a global MBM, including a set of recommendations on the means to assess the eligibility of emission units (carbon credits) to be used in a global MBM scheme for international aviation. In addition, recommendations have been made on how emissions from international aviation would be monitored, reported, and verified (MRV). Options for developing international and national registries for the scheme have also been discussed to make specific recommendations.

In addition, CAEP was asked to respond to requests from the Council’s Environment Advisory Group (EAG), which oversees all the work related to a global MBM and makes recommendations to the Council. As per the requests from the Council and EAG, CAEP has been undertaking technical analyses on the assessment of costs and environmental impacts of different approaches for a global MBM scheme being considered by the EAG. The CAEP’s work on future emissions trends and alternative fuels also supports the development of design elements for a global MBM scheme.

CAEP work on a global MBM scheme will continue on the outstanding technical design elements, necessary analyses, and the finalization of recommendations leading up to the CAEP/10 meeting.

POTENTIAL OF SUSTAINABLE ALTERNATIVE FUELS

The use of sustainable alternative fuels is a key part of ICAO’s efforts in limiting and reducing the impact of aviation greenhouse gas emissions on the global climate. It is clear that further policy actions will be needed to accelerate the appropriate development, deployment, and use of sustainable alternative fuels for aviation. This will require the introduction of appropriate measures to create a long-term market perspective.

In addition to the work on quantifying the potential contribution of sustainable alternative fuels to reducing the lifecycle emissions from international aviation, the CAEP/10 meeting will also consider a Life Cycle Assessment (LCA) methodology for use in the monitoring, reporting, and verification system (MRV) of a global MBM scheme. ■

CAEP'S MANDATE, MEMBERS, AND OBSERVERS

ICAO has been at the forefront of aviation environmental issues since the 1960s. The Organization's work on the environment focuses primarily on issues that benefit most from a common and coordinated approach on a worldwide basis, namely aircraft noise and engine emissions. ICAO develops Standards and Recommended Practices (SARPs) in order to address its goals to limit or reduce the:

- Number of people affected by significant aircraft noise,
- Adverse impact of aviation emissions on local air quality,
- Impact of aviation greenhouse gas emissions on the global climate.

ICAO's Committee on Aviation Environmental Protection (CAEP) is a technical committee of the ICAO Council with the mandate to study and develop proposals to minimize aviation's effects on the environment.

The CAEP was established in 1983, superseding the Committee on Aircraft Noise and the Committee on Aircraft Engine Emissions.

The CAEP members and observers meet annually as a Steering Group to review and provide guidance on the progress of the activities of CAEP. Triennial meetings of CAEP produce a report with recommendations for the consideration of the ICAO Council. The Council reviews and adopts the CAEP recommendations and reports to the ICAO Assembly where ICAO policies on environmental protection are defined and issued.

All of CAEP's proposals are assessed on the basis of four criteria:

1. Technical Feasibility
2. Environmental Effectiveness
3. Economic Reasonableness
4. Interdependencies


CAEP's WORKING GROUPS AND DELIVERABLES	
<ul style="list-style-type: none"> ■ SARPs in Annex 16, Volume I (Noise) ■ Helicopter, RPAS, and supersonic aircraft noise research 	WG1 Noise Working Group
<ul style="list-style-type: none"> ■ Airport Planning Manual (Doc 9184) update to include green airport infrastructures and best practices in land-use planning and management ■ Airport Air Quality Manual (Doc 9889) update to emission factors ■ Aviation System Block Upgrade (ASBU) environmental benefits analysis ■ Circular on Community Engagement for Aviation Environmental Management ■ Report on Environmental Assessment of proposed Air Traffic Management Operational Changes Best Practices 	WG2 Airports and Operations Working Group
<ul style="list-style-type: none"> ■ New Standard on aircraft CO₂ emissions (creating a completely new Annex 16, Volume III) ■ New Standard on non-volatile particulate matter (nvPM) ■ SARPs in Annex 16, Volume II (Emissions) up-to-date 	WG3 Emissions Working Group
<ul style="list-style-type: none"> ■ ICAO Environmental future trends projections (basis for decision making on the environment since the 37th Session of the ICAO Assembly) ■ Review of environmental models ■ Environmental effectiveness analysis of the proposed aircraft CO₂ Standard 	MDG Modelling and Database Group
<ul style="list-style-type: none"> ■ Review of forecasts and economic analysis models ■ Assessment of economic reasonableness of proposed aircraft CO₂ Standard 	FESG The Forecasting and Economic Analysis Support Group
<ul style="list-style-type: none"> ■ Update to the methodology for computing the CO₂ emissions from passenger air travel ■ New methodology to calculate CO₂ emissions generated by air cargo 	ACCS Aviation Carbon Calculator Support Group
<ul style="list-style-type: none"> ■ White papers on: <ul style="list-style-type: none"> ■ Aviation and Climate ■ Aviation Impacts on Air Quality ■ Climate Impacts on Aviation ■ Aviation Noise Impacts 	ISG The Impacts and Science Group
<ul style="list-style-type: none"> ■ Recommendations for the monitoring, reporting, and verification (MRV) system of international aviation emissions and registries ■ Recommendations for the quality of carbon credits for use in a global market-based measure (MBM) scheme for international aviation ■ Analytical work on impacts of various approaches for a global MBM scheme 	GMTF Global Market Based Measure Technical Task Force
<ul style="list-style-type: none"> ■ Methodologies to account for the lifecycle emissions from alternative fuels ■ Assessment of the potential range of emission reductions from the use of alternative fuels in aviation up to 2050. 	AFTF The Alternative Fuels Task Force

ICAO through CAEP develops Policies and Guidance for aviation environmental protection and Standards and Recommended Practices (SARPs) for the certification of aircraft noise and aircraft engine emissions, which are covered by Annex 16 of the Convention on International Civil Aviation (Chicago Convention).

MEMBERS (22 States)				OBSERVERS (6 States and 10 Organizations)			
Argentina	Australia	Brazil	Canada	Greece	Indonesia	Norway	Saudi Arabia
China	Egypt	France	Germany	Turkey	United Arab Emirates	ACAC	ACI
India	Italy	Japan	Netherlands	CANSO	EU	IATA	IBAC
Poland	Russian Federation	Singapore	South Africa	ICCAIA	ICSA	IFALPA	UNFCCC
Spain	Sweden	Switzerland	United Kingdom				
Ukraine	United States						

CAEP conducts its activities through working groups, each of which researches and develops proposals in different fields of civil aviation and environmental protection. Each working group is divided into task groups (TGs) that examine specific issues in their area of study. The Committee also has support groups to assist the working groups.

E-GAP SEMINAR SHOWCASES POWER OF PARTNERSHIPS

 The spirit of partnerships for action on aviation emissions reductions has at no time been more acute and their multiplier effects more tangible than now, as showcased at the Global Aviation Partnerships on Emissions Reduction (E-GAP) Seminar, hosted at ICAO Headquarters in Montréal, Canada in mid-September. It was clear that only through resolve and strong partnerships among States, industry, non-governmental organizations, experts on the carbon markets, and other stakeholders, will ICAO be able to achieve its environmental objectives. Throughout the two-day Seminar, 1,000 partners were presented which enable support to ICAO's emissions reductions initiatives and to multiply their effects. They are part of our "constellation of partnerships for sustainable skies."

The Seminar showcased – to more than 250 participants from around the world – ICAO's ability to act as an engine for partnerships, multiplying the effects of emissions reduction initiatives beyond ICAO's direct reach and to the entire aviation sector.

The E-GAP Seminar addressed current and foreseen initiatives to reduce the environmental footprint of aviation in various areas:

- Aircraft technology and research programmes
- Recycling of aircraft
- Next-generation air navigation and green operations
- Sustainable alternative fuels and renewable energy
- Financing for aviation environmental activities
- Carbon markets

A few days later, at the Plenary Session of the United Nations Sustainable Development Summit at UN Headquarters in New York City, ICAO Secretary General Dr. Fang Liu committed the Organization to realizing the UN Sustainable Development Goals (SDGs). ICAO's environment work contributes to 10 out of the 17 SDGs, shaping a more sustainable future through partnerships.

During the presentations and discussions, there was no doubt among the panellists and audience at the E-GAP Seminar that action is needed *now*. Action should focus on attaining ICAO's aspirational goals of 2 percent annual fuel efficiency improvements and carbon neutral growth from 2020. A number of concrete emissions reduction initiatives can also be replicated and scaled up.

SUSTAINABLE BIOFUELS

With more than 2,000 commercial flights operated on alternative fuels since 2011, the aviation sector has demonstrated it firmly believes in sustainable biofuels for aviation. Among the important initiatives showcased at the Seminar, Angela Foster-Rice, Managing Director, Environmental Strategy & Sustainability, presented United Airlines' biofuel scale-up programme, leading to the delivery of 90 million gallons of biofuels annually as of 2018-2021. Brazilian airline GOL Renewable Fuels Program Head, Pedro Scorza, shared their plan to reach carbon neutral growth in 2022-2025 through the use of sustainable alternative fuels.

States as well are developing a strong biofuel agenda and momentum is being achieved throughout the sector. For its part, ICAO committed to help stakeholders



“ICAO has more than a thousand partners acting with the same objective – sustainable skies.”

unlock the biofuel potential. It stressed the importance of the work of the Committee on Aviation Environmental Protection (CAEP), which is developing methodologies to account for the CO₂ emissions benefits of biofuels over their life-cycle and to project the future use of alternative fuels. (See “CAEP Progresses on Noise and Emission Standards,” page 11.) ICAO will also continue to facilitate information and action in this area through the Global Framework for Aviation Alternative Fuels (GFAAF), a web-based platform for the dissemination of data related to the use of sustainable fuel in aviation. Speakers indicated that the carbon footprint of sustainable biofuels could be up to 80 percent smaller than that of standard fuels, without compromising food security.

GLOBAL MARKET-BASED MEASURE

The Montreal Seminar also focused on another element of the ‘basket of measures’ – a global market-based measure (GMBM) for international aviation, which the 2013 ICAO Assembly agreed would be developed for presentation to next year’s Assembly for implementation beginning by 2020. For the first time, the focus

was on the status and functioning of carbon markets, responding to a request by States for more concrete information in this area.

One of the highlights of the event was the preview of the UNFCCC carbon offsetting platform¹, facilitating access to carbon offsetting at individual and corporate levels. It was officially launched the following week at the UN Summit in New York. As international aviation seeks to reduce emissions, offsetting has become an important tool. Offsetting programmes have already been adopted by airlines; for example, Delta attained carbon-neutral growth through the purchase of 1.7 million offsets in 2013-14 and Portugal-based TAP has linked its booking system with voluntary carbon settings by passengers. Andreia Afonso, Environment Engineer, said TAP passengers have offset a total of 51,993 tonnes of CO₂ since 2009. Also, Amadeus uses voluntary carbon markets to allow passengers to offset the emissions related to their flights. To do so, partnerships are essential, as demonstrated by their project with My Climate Japan. Travel agencies working with Amadeus have access to robust carbon

¹<https://offset.climateutralnow.org/>

reduction projects and, through the use of ICAO's carbon calculator, a high-quality offsetting programme can be delivered.

ICAO's carbon calculator² was recognized as a robust tool to estimate the CO₂ emissions from international flights. It is recognized worldwide and is one of the most consulted tools on the ICAO website with an average of 13,000 hits per month.

It was also emphasized that the social and economic effects of offsetting programmes go beyond environmental benefits. Such programmes also support local livelihoods, agriculture, education, improved access to health services, and gender equality.

STATE ACTION PLANS

State Action Plan is a robust capacity building programme launched in 2010 and an essential vehicle to disseminate climate

change mitigation know-how. It fosters the development and voluntary submission of Action Plans to reduce aviation emissions by ICAO Member States. As important as the content of the States' Action Plans – i.e. the quantification of international aviation emissions and emissions reductions measures – is the process leading to their completion. Indeed, States establish stakeholder groups in order to facilitate the flow of information among all parties, improve understanding, and identify emissions reductions measures and their co-benefits on domestic aviation emissions. This is a significant contribution to capacity building, as it multiplies the effects of emissions reductions initiatives in our sector and creates synergies with other sectors of the economy. To date, 83 Action Plans have been submitted.

State Action Plans provide a strong incentive to build partnerships at the national level – beyond aviation. Two major initiatives are a

² <http://www.icao.int/environmental-protection/CarbonOffset/Pages/default.aspx>

Aircraft Re-Use & Recycling

Q&A: SAFE AND ENVIRONMENTALLY SOUND AIRCRAFT END-OF-LIFE BEST PRACTICES

An interview with Derk-Jan van Heerden,
President of the Aircraft Fleet Recycling Association (AFRA)



Old, unwanted aircraft represent an environmental hazard, in terms of some of their materials, but also an opportunity in re-usable replacement parts – provided the task is well managed. At the Global Aviation Partnerships on Emissions Reduction (E-GAP) Seminar, ICAO and the Aircraft Fleet Recycling Association (AFRA) announced they are exploring cooperation on aircraft “end-of-life” best practices.

ICAO Journal spoke with Derk-Jan van Heerden, President of AFRA. He is the general manager of Aircraft End-of-Life Services (AELS) in the Netherlands, a company he founded in 2006 after a degree in aeronautical engineering from Delft University.

That same year, AFRA was founded for the purpose of promoting sound practices for aviation disassembly and recycling. The organization now has about 70 members in 18 countries.

In addition to the core dismantling companies, members include aircraft manufacturers such as Bell Helicopter, Boeing, Bombardier, and Embraer; engine and avionics Original Equipment Manufacturers (OEMs) such as Honeywell, Pratt & Whitney, and Rolls-Royce; airlines, aircraft lessors, airports, metals specialists, and even a couple of university research institutes.

WHAT IS THE CURRENT SCOPE OF THE AIRCRAFT RECYCLING BUSINESS WORLDWIDE?

The aviation sector as a whole is very successful in re-using parts and components on airplanes that reach end-of-life. The supply chain that is in place for parts that are repaired, re-certified, then put back in stock is very well developed. Disassembling airplanes and feeding those 'rotatable' components back into the global pool of spare parts guarantees availability and reliability for airlines all over the world. An estimated 40-50 percent of the weight of all dismantled aircraft is returned to the parts distribution pipeline; engines are a very big chunk of that weight.

What is left – basically the hull – is crushed and goes through a shredder process and techniques to separate different types of metals: aluminum, stainless steel, titanium.

partnership with the Global Environmental Facility (GEF) and the United Nations Development Programme (UNDP) to develop a pilot project on renewable energy at airports in Jamaica, and – jointly with the European Union – capacity building activities in 14 African and Caribbean States. (For more on these initiatives, see “State Action Plans Driving Environmental Partnerships” on page 7.)

NEW SECTOR CHALLENGES

The E-GAP Seminar highlighted new challenges for the sector. For example, speakers warned that operational efficiency gains resulting from partnerships between airlines, airports, air navigation service providers, and ground service providers are at risk of being compromised by the sector’s lack of preparedness to *adapt* to climate change. Rachel Burbidge, Environment Officer, EUROCONTROL, said, “We must integrate resilience to climate change as a routine part of business and operational planning.”

Based on ICAO’s trends, at least 3 percent efficiency gains could be realized through the implementation of Aviation System Block Upgrade (ASBU) Block 0 by all ICAO States. “Perfect flights” can reduce the carbon footprint of a flight by up to 50 percent; the challenge is to make these “perfect flights” business as usual. Implementing the relevant operational changes requires strong partnerships, and preserving the corresponding efficiency gains requires a comprehensive strategy, including climate change resilience measures.

The Seminar also explored the essential aspect of the full aircraft life-cycle. While ICAO’s environmental work has focused on developing standards for new aircraft, and the CAEP work on Standards aims to ensure that no technological backslide is allowed, a new challenge is emerging with the retirement of more than 10,000 aircraft in the next two decades. We have to better under-



About 400 to 600 aircraft are disassembled each year; the value of their reusable spare parts is several billions of dollars.

Certain parts of the airplane, of course (such as the landing gear) are ‘life-limited’; they can only be used for so many cycles, so many flight hours, or so many calendar months. The only solution you have for those is to recycle them for the metals and other valuable materials if there is no useful life left.

WHAT ARE KEY CHALLENGES FACING THE AIRCRAFT RECYCLING INDUSTRY?

Not all end-of-service aircraft owners consider environmental performance when looking for a provider. The industry focus is very much on cost. A lot of people in the industry are not aware of the risks – both to aviation safety and the environment – of poor end-of-life management.

We know of a project where inexperienced people started using a circle saw on an airplane in which the fuel was not yet drained; that resulted in an explosion and the death of a person.

In Europe, the radioactive depleted uranium counterweights from a Boeing 747 got mixed in with the recycled aluminum.

We also know of an airport which auctioned a stranded airplane, but they had limited records. So the airplane buyer is now on a list of bogus part providers.

Within AFRA, we strongly believe that the industry has demand for a sustainable and safe solution. It’s not only about the environment; it’s also about removal of parts in a safe way and done correctly so no damage occurs to the parts.

WHAT ACTIONS IS AFRA TAKING TO MITIGATE RISK IN THE END-OF-LIFE PROCESS?

AFRA has developed two Best Management Practices (BMP) accreditation programmes for improving industry safety, environmental responsibility, and sustainability. The first programme addresses the aircraft disassembly process – how to remove and tag parts, how to protect the soil, how to train your people, and so forth. The second BMP programme is for the recycling process. Each of the accreditation processes involves a rigorous evaluation by an independent auditor.

Currently there are 17 AFRA members who have been accredited for disassembly, five for recycling, and five others for both disassembly and recycling.

We think the AFRA accreditation programme that’s in place will be recognized as the standard, and we hope the industry is going in a direction that demands quality.



stand the environmental impact of aircraft dismantling activities and to make sure that States have the adequate guidance to meet this challenge. Boeing Director of Environment Strategy, Sean Newsum, noted that environmental considerations do not start when the aircraft operates and that the aircraft life-cycle needs to be considered in the design and manufacturing phases. Kahina Oudjehani, Eco-Design Lead, Product Development Engineering for Bombardier Aerospace, said advanced composites can reduce the weight of a single aircraft by 2,000 pounds. Airbus Environment Policy Director, Olivier Husse, shared that the savings linked to the use of 3-D printing can mean as much as 95 percent less metal waste!

Much also needs to be done on aircraft dismantling and recycling, as thousands of aircraft will be retired in the next decade. There are a number of associated legal, environmental, safety, and financial challenges. ICAO and the Aircraft Fleet Recycling Association (AFRA) announced that they are moving toward a close cooperation on progressing end-of-life best practices under the work of CAEP. (See an interview with AFRA President Derk-Jan van Heerden on page 16.)

Maryam Al Balooshi, Environment Manager, General Civil Aviation Authority (GCAA) of the United Arab Emirates, added that the number of abandoned aircraft is increasing, and it is a challenge to locate the owner to de-register the aircraft before dismantling.

POWER OF PARTNERSHIPS

The E-GAP Seminar power of partnerships showcase was perfectly illustrated by ICAO's assistance projects to States that wish to elaborate their Action Plans. These assistance projects

are an integral part of ICAO's *No Country Left Behind* campaign. One of the examples was an initiative in Trinidad & Tobago; by putting together their State Action Plan they were able to trigger a broad range of synergies with public and private sectors, bringing all parties closer together to implement emissions reductions initiatives. Partnerships are flourishing. Aviation has become an integral part of national environmental programmes. Different ministries explore cooperation opportunities to establish synergies between their carbon management policies. According to Ricardo Henry, Manager, Economic Regulations, Civil Aviation Authority, Trinidad & Tobago, a new carbon low-emissions programme identified 27 measures to remove 22,800 tonnes of CO₂ from 2018. On the energy front, a paradigm shift is being created, putting in motion new partnerships to supply solar energy at airport gates and sustainable biofuels to aircraft. Farmers, oil companies, and fuel suppliers, as well as experts from the agricultural, energy, and biodiversity sectors are getting together to create sustainable supply chains for aviation biofuels.

Jane Hupe, ICAO's Deputy Director for Environment, said, "Partnerships lead us to set common goals. Partnerships lead us to break the silos. Partnerships not only multiply environmental actions, they also multiply their effects."

ICAO has more than a thousand partners acting with the same objective – sustainable skies. Through the multiplier effects of partnerships, there is no limit to what can be achieved. Grass-root initiatives stretch the limits of our imagination and our ambition. New ICAO partners are welcomed to achieve environmentally sustainable aviation. ■

“A RESPECTED, INDEPENDENT AUTHORITY”

AN INTERVIEW WITH MARTIN BROADHURST,
PRESIDENT, ROYAL AERONAUTICAL SOCIETY (RAES)



Fourth in a series of interviews with world aviation leaders

Established in 1866, the Royal Aeronautical Society (RAeS) has been at the forefront of developments in aviation and aerospace for 150 years.

Based in the UK, the RAeS (also often referred to as ‘the Society’) is more than a British organization. With pilots and engineers as its heart and soul, it aspires to be more broadly representative. “We’re the only learned society dedicated to the entire aerospace community. There are a lot of people involved in our industry who are not engineers or flyers but who are major contributors to the industry – contracts managers, project managers, buyers – we want them to get involved so they can share in the same peer recognition and the professionalism the Society promotes,” said Martin Broadhurst, current RAeS President.

An Officer of the Most Excellent Order of the British Empire (OBE), Broadhurst has spent his entire professional career in the aerospace industry. Thirty-five years of that was with Marshall Aerospace, a design and manufacturing organization which has been involved with wide-ranging projects from A400M aircraft trials to supporting low-earth-orbit satellite launches to installing Boeing 747-400 cabin interiors to managing the Cambridge airport, adjacent to its headquarters location. Broadhurst was Marshall’s chief executive from 1995 until his retirement in 2010.

The following year he became more active in the Society, of which he had been a member for more than two decades. Broadhurst was elected to the governing Council in 2011, became chairman of the member services board, then was voted President-elect in 2014. He moved into a one-year term as President in May 2015.

ICAO *Journal* editor Rick Adams spoke with Broadhurst at the Society’s London, UK headquarters.

How would you characterize the Society’s role within the global aviation community?

I think what makes us unique and how we continue to play an important part in the aviation industry is the fact we don’t represent any specific view of the world; we represent the professionals. Our whole *raison d’être* is to support professionalism in the industry and bring the knowledge and experience of those professionals to bear on subjects that are directly influencing our interests and those of society generally.

At ICAO, we’ve been afforded official observer status. What it shows, I think, is a level of recognition for the Society and the quality of the work it does. We can bring together within our specialist groups the top professionals in each sector to think about the subjects that are exercising our industry and put forward positions to ICAO as debates develop.



Martin Broadhurst, OBE MA CDir FIOD FRAeS, President of the Royal Aeronautical Society.

As a professional body, how does the Society seek to impact the evolution of aviation?

The vision for the Society is to be recognized as a respected, independent authority on aerospace and aviation. We seek to influence opinion by offering impartial and authoritative evidence to decision and policy makers at both a national and international level. And we seek to initiate debate through the dissemination of discussion papers, specialist papers, world-leading conferences, lectures, and other events.

It's been part of our strategy to up our game in terms of harnessing the breadth of knowledge and experience of the nearly 20,000 professionals involved with the Society. That's not always easy; you take that number of people, there will be a huge range of views of issues. But by organizing the Society through specialist groups, where we concentrate their interest, we can distill the views of the membership and be able to put forward a cogent view. It's respected, I believe, because we're not representing any vested interest. We're not an industry group; we're not a trade body; we represent professionals in the industry.

The Society is in very good heart. And it's clear from the numbers of senior people who are looking to join the Society and become involved with its events, we continue to enjoy support at the highest levels of government, industry, and academia.

Many people are familiar with the events at the RAeS headquarters at No. 4 Hamilton Place in London's Mayfair district. They're perhaps less familiar with the Society's branch system or your expanding online resources.

Last year we ran nearly 100 events at our headquarters – lectures, conferences, seminars, briefings – with an estimated footfall of some 6,000 people. But the Society is fairly unique in the strength of its branches. During the course of the past year, our approximately 70 regional and international branches have organized more than 400 events attracting an audience of more than 20,000 people.

That's great stuff getting people coming to lectures and events. But one of the challenges is to significantly improve the Society's use of digital media so we can ensure that the vast range of Society content is made available more widely. A lot of our content is available through our podcast (www.aerosociety.com/podcast), and we have started to live stream some of our larger events on YouTube. It's not quite the same experience but it's not far off. There's still a lot to do. Resources are always an issue.

You also have several outreach programmes to attract young people into aviation fields.

One of the major remits we have in the Society is to inspire future generations of professionals, and we take that very seriously. For example, we run one-day events called Cool Aeronautics for primary school groups; these include talks on aerospace and interactive workshops. It's a fantastic opportunity for 8- to 12-year-olds to understand a little more about aviation and inspire them about the exciting possibilities ahead. We also created Amy's Aviation, a radio and animated series. Amy will talk through how to make a paper airplane or how a jet engine works and so on.

Our biggest programme for secondary students (ages 12-18) is the School Build-A-Plane challenge, supported by Boeing. Students gain experience in project management, understanding design processes, and get hands-on access to tools and equipment. Last year, the first plane built by a school (a RANS SE6 Coyote II light aircraft) flew at the Farnborough Airshow, performing an aerial display. All the schools that have been involved in it so far are saying what a fantastic inspiration to young people.

“One of the major remits ... is to inspire future generations of professionals.”



RAeS President Martin Broadhurst with Lowri Nicholls, awarded a bursary to study a Masters in aerospace engineering. The AeroMSc bursary scheme is targeting talented graduates from engineering, science and math.

We buy the kits for the schools and through the Society provide supervision to help them put the kit together. Through the Light Aircraft Association we ensure quality processes are followed and certified so the aircraft are capable of flight. The aim is to purchase a number of kits, build the aircraft, sell those on to light aircraft enthusiasts, and then reinvest the money in future projects.

Another programme, the Falcon Initiative, provides funding to selected schools to enable them to build a fully functional flight simulator.

I think we're starting, just starting, to turn perceptions around about the value of careers in technical subjects. We will be facing some quite severe structural shortages in the 2020s. That's just not aerospace, but aerospace will suffer equally if we're not generating the skills that we need.

One of your major interests is integrating remotely piloted aircraft systems (RPAS) into the airspace.

We want to engage with partners from the tech sector so we're developing a much deeper understanding of the applications of unmanned systems. Young people are far more interested in what it will do than what it is. We need to really focus on the applications rather than the kit itself. The aim of the year will be to encourage debate and hopefully greater understanding of some of the ethical and societal challenges surrounding remotely piloted systems.

First, regulatory challenges have to be understood and we are moving forward on that. Understanding the possibilities and technology, of course. But I think there's also a huge societal concern about remotely piloted systems or UAVs. The word drone is something people misunderstand; it sounds sinister. I think

there are also fears about being spied on with remotely piloted systems watching everything we do. We need to educate the public, help them understand the benefits and the opportunities that come through the deployment of beneficial applications.

And of course there are also implications for traditional professions and skills, not least the pilot community.

The Society will kick off its year of sesquicentennial celebrations on January 12, 2016 with something you're calling a 'black-tie debate.'

The debate that evening aims to attract a focus from senior professionals in all our communities. Our motion will be: "This house believes there will be no pilots 40 years from now." That's not to say for a minute that that's what the Society believes – but when you say something like that, immediately people start to get into a debate. That's exactly what we want – to stimulate that debate and get people thinking. We want people to be thinking 50 years into the future and what the world's going to be like and some of the exciting possibilities during that period. ■

RAES CELEBRATES 150 YEARS IN 2016



**ROYAL
AERONAUTICAL
SOCIETY**

- Founded 1866 as Aeronautical Society of Great Britain
- Royal title granted by King George V in 1918
- Notable members have included Winston Churchill, Frederick Handley Page, Thomas Sopwith, Kelly Johnson
- HQ London; branches in major centres of aerospace activity including Dubai, Hamburg, Montréal, Munich, Paris, Seattle, Toulouse, Washington DC
- RAeS National Aerospace Library, Farnborough, one of the world's most extensive collections devoted to the development of aeronautics, aviation, and aerospace technology – over 100,000 books, articles, reports and images. www.aerosociety.com/NAL
- **Website:** aerosociety.com
- **Facebook:** <http://www.facebook.com/RoyalAeronauticalSociety>
- **Twitter:** www.twitter.com/AeroSociety

Building the Future of Civil Aviation Together

The United Arab Emirates believes in synchronizing international cooperation and is continuously seeking opportunities for extending bridges within the aviation community. Working hand-in-hand under the scope of ICAO, the UAE is committed to helping resolve today's industry challenges to bring prosperity to global aviation.





Bin Saeed Al Mansouri

A MESSAGE FROM THE UNITED ARAB EMIRATES MINISTER OF ECONOMY, HIS EXCELLENCY ENG. SULTAN BIN SAEED AL MANSOURI

Since its beginnings in the world of civil aviation, the United Arab Emirates has committed to developing the aviation industry by extending bridges of cooperation with countries around the world. The exchanges are meant to benefit all sides and allow us to accommodate the active and fast growth of the sector.

The UAE's seat on the ICAO Council provides an unprecedented opportunity for fostering regional and international partnerships. The development of the aviation industry is driven by mutual cooperation and exchanges of dynamic experiences – the UAE is continuously looking at ways to build regional and international cooperation within the civil aviation community. We will continue our strive to be at the forefront of global cooperation through training, project execution, joint programmes, specialized conferences and by sharing experiences.

Simply integrating and engaging with the international aviation community generates significant benefits in terms of aviation growth, because a truly sustainable civil aviation system cannot be based on unilateral approaches alone. Challenges facing the industry today cannot be addressed solely within national boundaries; there has to be cooperation in nations and regions throughout the world.

The past, present and future of civil aviation is built through mutual partnerships.

“The international aviation industry is flourishing and growing at unprecedented rates. This global acceleration is our driving force to innovate and propose new ideas to our local and international stakeholders.”



Saif Mohammed Al Suwaidi

A WORD FROM THE DIRECTOR GENERAL OF UAE CIVIL AVIATION AUTHORITY, HIS EXCELLENCY SAIF MOHAMMED AL SUWAIDI

For many years, the United Arab Emirates has been focused on developing regional and international cooperation with countries in all fields related to the civil aviation sector. Allowing for the global nature of the aviation industry, we support international cooperation in all its forms: through shared experiences, training, project execution, joint programmes, specialized conferences and more.

Since its establishment in 1996, the General Civil Aviation Authority has taken major steps to enhance international cooperation in civil aviation. The UAE has been a Member of the ICAO Council since 2007, success-

fully earning its status through its participation in the international civil aviation community. We will continue to support ICAO's initiatives in the Middle East region and other regions as well.

For many years, we have provided the technical support required for ICAO's project for developing search and rescue in 14 Latin American States. We also conducted specialized training courses for the Latin American Civil Aviation (LACAC), the African Civil Aviation Commission (AFCAC) and the Arab Civil Aviation Commission (ACAC), and we continuously coordinate and consult with ICAO on all matters with the potential to enhance the international civil aviation sector.

I would like to reaffirm the UAE's permanent commitment in supporting the international and regional civil

aviation sector, because we believe in the importance of mutual effort, partnerships and cooperation in civil aviation.

First & Foremost: Safe Skies

Aviation safety is among the top priorities for the UAE's General Civil Aviation Authority (GCAA). Our vision of establishing a safe and secure civil aviation system can only be achieved with dedicated and competent human resources, the latest tools, regulations that are in par with the best international standards, and with robust processes and cooperation between various entities and stakeholders.

These efforts have culminated in the UAE being ranked as a top ICAO Member State in terms of compliance with ICAO requirements under the USOAP Programme.

Mindful of the international nature of civil aviation and aviation safety, the UAE has been at the forefront of international safety cooperation by actively participating in ICAO Committees and Panels to advance the global efforts on aviation safety. ICAO's Airworthiness Panel, the ICAO Wake Turbulence Study Group, 83 bis Group, Air Traffic Management/Operations (ATM/OPS), and Flight Operations and Aerodromes Panels are just a few examples of the groups the UAE participates in at ICAO.

Our aviation safety experts teamed up with experts from ICAO Member States to draft and approve the newest addition to the Chicago Convention, *Annex 19*, which revolves around Safety Management. Annex 19 is the outcome of international deliberations during the

ICAO High Level Safety Conference in 2010 which recommended the development of an Annex dedicated to safety management. Eng. Ismaeil Al Blooshi, Assistant Director General, Aviation Safety Affairs Sector, represented the UAE as the Vice Chair of the ICAO Safety Management Panel, which was responsible for drafting and approving Annex 19. The new Annex allows the global aviation industry to benefit from a wide range of carefully tailored standards and recommendations on safety management that address safety risks proactively; manage and support strategic regulatory and infrastructure developments and reinforce the roles played by the States in managing safety at State level, in coordination with service providers.

To ensure an optimal understanding and implementation of the new Annex, the

UAE is supporting ICAO Global Aviation Training in designing and implementing training courses and exercises based on Annex 19 and the new SM Manual, notably for the Safety Management System (SMS) training course.

Recognizing mutual interests in enhancing aviation safety, regulations, oversight and technical cooperation, the United Arab Emirates signed an agreement with the European Aviation Safety Agency (EASA). The agreement is an extension of the existing Cooperation Arrangement on Aviation Safety with EASA.

Driven by our commitment to establish the beneficial exchange of aviation safety knowledge with the aviation community, the UAE became the first State in the region and the second State outside the EU to be granted



full membership in the European Union's Safety Assessment of Foreign Aircraft (SAFA) in 2014. The UAE has compiled and shared the GCAA SAFA Ramp Inspection Guidance Material and continues to mentor other States in an effort to develop a regional centralized database for SAFA.

Regionally, the UAE provides assistance to ACAC Member States and chairs the Middle East Regional Aviation Safety Group (RASG-MID) Committee which implements the *Global Aviation Safety Plan (GASP)*, and the associated *Global Aviation Safety Roadmap (GASR)* in the Middle East Region. Ensuring effective coordination and cooperation between all stakeholders is key to achieving our common aviation safety objectives. We work closely with ICAO Member States to monitor progress in the implementation of the GASP and GASR and establish a performance-based safety system for the region.

Runway safety is another arena where the UAE has demonstrated its commitment to extend bridges of cooperation with other States in the region. Our consolidated efforts granted UAE the Chair position of the MID-Region Runway and Ground Safety Working Group. We have been actively collaborating with a number of States in the area of aerodrome certification and have introduced a number of Tool Kits to assist Middle East States (like the MID-Region Model/Tool Kit for State Aerodrome Certification Processes, the MID-Region Model/Tool Kit for State Aerodrome Certification Regulatory framework and the MID-Region Model/Tool Kit for Bird and Wildlife Hazard Management, which is a tool kit for the establishment of local runway safety teams.

**AVIATION SECURITY:
A GLOBAL MATTER**

The global industry is witnessing exponential growth with increasing numbers of air traffic movements.

Existing airports are making every possible effort to increase passenger and cargo handling capacities which also necessitates the renovation and expansion of airport facilities, and in some cases, warrants construction of new airports.

The UAE is aware of this phenomena and is taking extra steps to manage the dynamic and fast changing environment. To keep pace with such extreme development there is a constant need to work with the international civil aviation community to develop suitable and internationally acceptable security processes, procedures, and other measures aimed to safeguard civil aviation against acts of unlawful interference.

During these testing and challenging times issues relating to civil aviation security calls for special attention to ensure the security of the travelling public. The UAE attaches immense importance to civil aviation security and leaves no stone unturned when ensuring the safety and security of civil aviation operations within the country.

The UAE firmly believes and stands for a harmonized global security approach under the aegis and able leadership of the ICAO. The UAE, as a Contracting State of ICAO, has played a vital role in the development of civil aviation security at both regional and international levels. Aviation security experts from the UAE have actively participated in various ICAO aviation security forums such as ICAO AVSEC Panel meetings, ICAO AVSEC Working Groups, Seminars and Conferences, etc.

The UAE is also a member of the following ICAO Panels and Working Groups:

- ICAO Aviation Security Panel;
- ICAO Dangerous Goods Panel;
- ICAO Facilitation Panel;
- ICAO Dangerous Goods Working Group on Lithium Batteries;
- ICAO Dangerous Goods Working Group on Reporting and Investigation;



- ICAO Dangerous Goods Working Group on Training;
- ICAO AVSEC Panel and Dangerous Goods Panel Joint Task Force; and
- ICAO AVSEC Panel Working Group on Threat and Risk.

The UAE has assisted ICAO by providing experts to carry out Aviation Security audits of Member States under its Universal Security Audit Programme (USAP) and also provides aviation security experts to ICAO's Implementation & Support Division to conduct ICAO aviation security courses and workshops at various ICAO Training Centres from time to time.

The UAE took the initiative to sign Memorandums of Understanding (MoU) with a number of States (such as the United States, United Kingdom, and Australia) to facilitate the sharing of information and



expertise in the field of civil aviation. The sole purpose of these agreements is to collaborate and assist each other in safeguarding and protecting civil aviation from new and emerging threats.

On a regional level, the UAE has been actively involved in the development of civil aviation security. The UAE is a member of the AVSEC Panel within the Arab Civil Aviation Commission (ACAC) and is also a member of the Aviation Security Committee within the Gulf Cooperation Council (GCC).

Today, the international aviation security community can benefit from advancement in technologies and the UAE is fully aware of the fact that technological advances will be a key driver in the future success of civil aviation security initiatives. The GCAA, which is also the 'Appropriate Authority'



for Aviation Security within the UAE, has launched a number of on-line initiatives in the field of civil aviation security such as the online Reporting of Dangerous Goods Occurrences (RODGO) and the online Reporting of Security Breaches (ROSB). These initiatives support ICAO and other civil aviation security stakeholders in protecting civil aviation, as well as developing databases to determine trends and have in place measures to mitigate threat to civil aviation.

As a Contracting State of ICAO, the UAE has implemented the Standards and Recommended Practices of Annex 18 and in full compliance with ICAO Technical Instructions (TIs). The means of achieving this compliance has been to create the United Arab Emirates Civil Aviation Regulations (CAR Part VI, Chapter 2. Transport of Dangerous Goods by Air). These are very comprehensive regulations and among other things, they require UAE operators to have approval to carry dangerous goods, which is not a requirement of the Annex, but is seen as an aid to enforcement.

STATE-OF-ART AIR NAVIGATION FACILITY AND SERVICES

The United Arab Emirates drives many ICAO Air Navigation initiatives across the Middle East Region. The State is strategically located in one of the world's fastest-growing aviation regions and plays a vital role in terms of improving the connectivity between the Asia Pacific, Africa and European regions.

The Sheikh Zayed Air Navigation Center (SZC), which was inaugurated in 2009, put the UAE on the world map of ANS services as the most advanced state-of-art air navigation service provider in the region. The SZC, led by the Assistant Director General, Air Navigation Services Mr Ahmed Al Jallaf, has strived for continuous safety improvement and air navigation service modernization. Today the SZC handles more than 2,400 flights per day, servicing multiple airports in the UAE, including the world's busiest airport for international passenger traffic - Dubai (DXB).

The UAE recognizes that continuous improvement in aviation safety, efficiency and economy will be achieved through partnerships with industry leaders and collaboration with stakeholders. Accordingly the UAE has been the driving

force behind many local, regional and international ICAO initiatives.

Locally, in collaboration with industry stakeholders and neighbors, the UAE is conducting an Airspace Optimization



Project in preparation for the forecast increases in traffic demands which is currently growing at over 7 percent per annum. Upon completion, the UAE's airspace will be able to safely and efficiently handle over 5,000 movements per day (by 2030).

Regionally, the UAE is chair of the ICAO Middle East ATM Enhancement Programme (MAEP). MAEP is a regional platform that provides the basis for a collaboration approach towards planning and implementation of air navigation

projects in support of the MID air navigation strategy within the time frame 2014-2028. Through its Chairmanship, the UAE is very keen to implement timely and harmonized projects to improve air traffic safety and efficiency. This holistic



approach is focusing on the "No Country Left Behind" strategy.

The UAE is also chairing the ambitious Middle East AIS Database (MIDAD) project and other important sub-groups and task forces. The UAE also plays a key role in advancing the ICAO Information Management Panel (IMP) and had the honor of being among 13 ICAO Member States that were invited to participate. The Information Management Panel (IMP) investigates and develops solutions supporting the planning framework on information management contained in the *Global Air Navigation Plan (GANP)*, including further development of system-wide information management (SWIM) concept as elaborated by the Air Traffic Management Requirements and Performance Panel (ATMRPP). The UAE is also a very active member in the ICAO Instrument Flight Procedures Panel (IFPP).

The confidence entrusted by ICAO in the UAE to drive many Air Navigation initiatives affirms the UAE's role in the

regional and global growth in aviation. It also recognizes the contribution the UAE made in implementation of the *Global Air Navigation Plan 2013-2028* and the strategic direction for future plans.

**AIR ACCIDENT INVESTIGATION:
A COLLABORATIVE EFFORT**

In line with ICAO Annex 13, the Air Accident Investigation Sector (AAIS) of the UAE GCAA is responsible for accident investigation and incidents involving civil aviation that occur in the territory of the UAE, and safety events involving UAE-registered civil aircraft that occur anywhere in the world.

Air accident investigation has, by its nature, a very significant international component. Every accident or incident investigation carried out by the UAE potentially involves a foreign operator, manufacturer, ATC service provider, airport and MRO and requires interaction with several foreign entities. In addition to the investigations, the international activity of the UAE Air Accident

Investigation Sector contributes to various committees, organizations, associations, and groups. We benefit from these activities through the air safety knowledge and information that is gained by the UAE.

To assist in maintaining professional standards, the AAIS Air Accident Investigators are full members of the International Society of Air Safety Investigators (ISASI). This is the premier association for investigators in the world. The annual seminars of ISASI are attended by at least one AAIS investigator who can gain knowledge of new investigatory issues, technologies, methodologies, etc. This knowledge is then made available to the other AAIS investigators. A regional branch of ISASI, the Middle East and North Africa Society of Air Safety Investigators (MENASASI) has been formed under the leadership of the GCAA. The inaugural meeting took place at GCAA Headquarters in 2012. Annual Air Safety Investigation Seminars are held, with the 2015 Seminar taking place in Dubai in November. Further



Seminars will be held in Morocco in 2016 and in Saudi Arabia in 2017.

AAIS plays an active part in the ICAO/RASG-MID Steering Committee and the Assistant Director General - AAIS chairs the SST Safety Group.

AAIS holds an annual Accident Simulation Exercise. The exercise is a full scale two-day event and is designed within the ICAO international framework governing air accident investigation processes. Participants include operators, aircraft manufacturers, airports, and other State investigation agencies. All the national and international partners work closely with the GCAA to ensure the highest standards of safety and security are practiced during the exercise. The air accident exercise allows all partners involved to refine the accident process and practice the necessary procedures.

The GCAA operates a state of the art DFDR and CVR laboratory at its Abu Dhabi headquarters. The facilities of the lab are capable of downloading greater than 95 percent of DFDRs and CVRs in service today. Assistance in downloading data is provided to other States in the MENA region.

A bi-annual aircraft accident investigation magazine called "The Investigator" is published in both hard and soft copy by AAIS. The publication has a worldwide readership among State investigators, operators, airports, universities, and general aviation.

ENVIRONMENTAL PROTECTION UNDER THE LEADERSHIP OF ICAO

Environmental protection and sustainable development are core elements of the UAE's policy agenda. The UAE is actively committed to supporting the stabilization of the global climate system while minimizing the economic impact and assuring environmental integrity, as evidenced by numerous initiatives and substantial investments in improved technology and infrastructure.

The UAE launched its Environmental Policy for the civil aviation sector in 2012.

The Policy is the first State-level environmental policy and it affirms the directive of ICAO to reduce the impact of emissions of civil aviation and climate change. It calls for the UAP to apply environmental laws and regulations, and puts the emphasis on encouraging strategic partners to provide reports on the environmental performance on a regular basis. It also aims to encourage the formulation and adoption of environmental policies and plans by all strategic partners in the domestic aviation sector, as well as the application of best practices based on cost-effective and positive economic impact.

Following in this vein, the UAE is also hosting the headquarters of the International Renewable Energy Agency (IRENA) in Abu Dhabi. IRENA's mandate is to promote sustainable use of renewable energy sources globally.

Operating efficient, commercially driven airlines and airports is a key dimension of 'sustainability.' The UAE's airlines have consequently invested heavily in the most modern aircraft in order to leverage their vastly superior performance in terms of fuel consumed and environmental impact and the UAE aviation sector in general has been aggressive in its pursuit of reductions in fuel usage and emissions.

Attention is also being paid to ground handling operations and catering to reduce environmental impacts through recycling, waste management and community partnerships. Energy saving and waste reduction measures have been introduced by airport operators across the State.

The UAE played a vital role in supporting the region in establishing environmental awareness and to supporting their presence in various meetings, such as representing the Arab Civil Aviation Authority in the steering group of the Committee on Aviation Environment Protections (CAEP) from 2010-2012. Also, UAE were the chairperson of the regional environment committee for four years.

The UAE hosted the following ICAO Environment meetings:


- State Action Plan Seminar for the Middle East Region in 2011 and 2015;
- Environment Committee of ACAC in 2010, 2011, 2013;
- The first Steering Group Meeting of ICAO's Committee on Aviation Environmental Protection (CAEP/10 was held in 2013 in Dubai) had representatives from over 46 states and organizations. It was the first time in CAEP's 30-year history that a meeting was held in the MENA region. UAE's collaborative efforts on environmental issues allowed it a seat as an observer member on the committee.
- The task force of Global Market Based Measures (GMBM) with 80+ representatives from different States and organizations, government and non-government, was held in November 2013.

Today, the UAE is a key player and has been invited to speak and attended a number of high-level meetings with ICAO and has also been facilitating and supporting the UAE's Federal governments on the following meetings and projects:

- United Nations Framework work on Climate Change Convention (UNFCCC) meetings with Ministry of Foreign Affairs, precisely in the Sectorial approach file;
- The preparation of UAE green strategy along with all aviation stakeholders and the Ministry of Environment and Water. Engaged in all stakeholders workshops and meetings and assured the right representation of the sector expertise.

The UAE has been a Member State of ICAO since 1972 – a year after the federation of seven emirates was founded. Since then, the UAE has unhesitatingly taken recourse of ICAO as the global aviation standard-setting authority. Without ICAO's invaluable assistance, the rapid development of the UAE aviation sector could have never taken place. ■

ICAO AIR NAVIGATION COMMISSION MARKS 200th SESSION

 The Air Navigation Commission (ANC) of the International Civil Aviation Organization (ICAO) celebrated its landmark 200th session with a special ceremony on 5 November 2015. The ANC considers and recommends – for approval by the ICAO Council – Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS) for the safety and efficiency of international civil aviation.

“The ICAO Air Navigation Commission has been an integral component of how States and industry find common ground, through ICAO, on their most pressing technical challenges,” remarked ICAO Council President Dr. Olumuyiwa Benard Aliu. Since the ANC first began its work, over 12,000 SARPs have been developed. These are contained in 16 Annexes to the Chicago Convention, five PANS publications, and numerous ICAO manuals.

The Commission is comprised of 19 persons who, as outlined in the Convention on International Civil Aviation (Chicago Convention), have “suitable qualifications and experience in the science and practice of aeronautics.” Commission Members, who act in their personal expert capacity, are nominated by Contracting States and are appointed by the Council of ICAO.

Originally the Committee on Air Navigation, as established by the Provisional International Civil Aviation Organization (PICA0) on 28 August 1945, directed and coordinated a number of technical sub-committees composed of civil aviation specialists from Member States and observers from relevant international organizations. PICA0 was formalized as ICAO on 4 April 1947, and two years later on 1 February 1949 the ICAO Council adopted several resolutions on the establishment of what

would henceforth be recognized as the ICAO Air Navigation Commission. The ANC held its first meeting a week later.

The development of SARPs and PANS follows a structured, transparent, and multi-staged process – often known as the ICAO “amendment process” or “standards-making process” – involving a number of technical and non-technical bodies which are either within the Organization or closely associated with ICAO. Typically, it takes about two years for an initial proposal for a new or improved SARP or procedure to be formally adopted or approved for inclusion in an Annex or a PANS. Occasionally, this timescale can be expanded or compressed depending on the nature and priority of the proposal under consideration.

To ensure all new or improved SARPs and PANS will be effective and practical for end-users, the



Members of the ICAO Air Navigation Commission (ANC), 2015. ANC experts are nominated and selected for their technical knowledge, and are not considered to be representing their home States when serving as Commissioners. **Top row, left to right:** Einar HEDINSSON, Jameel METWALLI, Jeffrey BOLLARD, Declan FITZPATRICK, Rolf MONNING, Kyung-soo YU. **Middle row, left to right:** Antonio CRESPO, Ismael PACHECO, Alexander KORSAKOV, Moussa HALIDOU, Simon ALLOTEY, Hajime YOSHIMURA. **Bottom row, left to right:** Mervyn FERNANDO, William VOSS, Claude HURLEY, Kirsten RIENSEMA, Farid ZIZI (President, ANC), Steve CREAMER (Director, ICAO Air Navigation Bureau - ANB), TAI Feng, Raul CARBONI

ANC works through established panels of experts in various disciplines who are assigned specific tasks from the overall work programme. It also takes advantage of the expertise within States and international organizations to develop its technical proposals.

Each ANC Panel is supported by the ICAO Secretariat with the appointment of a Secretary, while their respective Chairpersons are elected from amongst the Panel membership.

The primary purpose of these Panels is to advance, within specified timeframes, solutions for specialized problems, and to develop ICAO Standards for the evolution of air navigation which cannot be done within the ANC or the ICAO Secretariat. The ANC establishes the Panel's Terms of Reference and its Work Programme, and determines Panel membership by putting emphasis on expertise and well-balanced geographical representation, taking care to include International Organizations as well as States. ICAO relies on States and industry to provide highly qualified experts to develop the required provisions using the most current knowledge of the field.

Current ANC Panels include:

- Accident Investigation
- Aerodrome Design and Operations
- Airworthiness

- Air Traffic Management Operations
- ATM Requirements and Performance
- Communications
- Dangerous Goods
- Flight Operations
- Frequency Spectrum Management
- Information Management
- Instrument Flight Procedures
- Meteorology
- Navigation Systems
- Remotely Piloted Aircraft Systems
- Safety Management
- Separation and Airspace Safety
- Surveillance

"All of these contributions of this dedicated and talented technical group ultimately serve to ensure the safety of passengers and goods and the overall efficiency of the global air transport system," noted Dr. Aliu. "And for that every man, woman, and child who has ever flown owes some degree of gratitude to the men and women who have committed themselves to the ANC's important mission."

For further detail on the ANC and its panels, visit the Air Navigation Section on the ICAO website: www.icao.int/about-icao/AirNavigationCommission/Pages/default.aspx.

AUSTRALIA'S ROBERT BUTCHER RECEIVES BINAGHI AWARD



At the ICAO Air Navigation Commission's 200th session, ANC President Farid Zizi presented the Walter Binaghi Air Navigation Commission Laurel Award to Robert Butcher of Airservices Australia: "In recognition of his outstanding contribution to the work of the Air Navigation Commission through his leadership of and continued participation in the Separation and Airspace Safety Panel (SASP) ... as well as his work on automatic dependent surveillance – broadcast (ADS-B) separation and ADS-B height-keeping monitoring." In addition, he has contributed significantly to the work of the ASIA/PACIFIC Air Navigation Planning and Implementation Regional Group (APANPIRG).

Butcher is the seventh Laurel Award recipient and the first from the ASIA/PACIFIC region. Zizi said, "It is our great pleasure therefore to recognize Rob Butcher for this prestigious award, but I would also wish to extend my personal gratitude to every technical expert who has served the ANC over the last 70 years, without whose dedication its work would not have been possible."

Butcher called the award "very humbling." Of his work as chairman of the SASP since its inception in 2001, he said, "After you've been working on something for quite a number of years and then you eventually see it published into the PANS-ATM and people actually using it, that's pretty rewarding. The safety aspect is what's always in our mind. Everybody is always working to a common goal and that's to do the right thing, to make sure we can assist the aviation industry in a safe and expeditious way."

An air traffic controller in the Royal Australian Air Force for two decades before joining Airservices Australia in 1996, Butcher currently heads the operational analysis unit in their safety group.

“EXPERTS ARE SCARCE RESOURCES”

AN INTERVIEW WITH FARID ZIZI, PRESIDENT, ICAO AIR NAVIGATION COMMISSION (ANC)



Fourth in a series of interviews with ICAO leaders

Farid Zizi jokes that he arrived at ICAO with ‘the volcano.’ In April 2010, he became an Air Navigation Commissioner, nominated by his native France, and he caught what may have been the last possible flight from Paris to Montréal before the ash cloud from the eruption of the Eyjafjallajökull volcano in Iceland swept past Brest and disrupted air traffic across the European continent.

In the five years Zizi has been on the ANC, the past two years as President, the Commission has provided technical support to the ICAO Council in dealing with not only volcanos but also aircraft tracking, conflict zones, remotely piloted aircraft systems, and a myriad of emerging aviation technologies in an era of unprecedented air traffic growth.

The Air Navigation Commission consists of 19 members, each chosen for their expertise (Zizi was Director for Education and Research at l’École Nationale de l’Aviation Civile, ENAC, France’s aviation university), as well as observers from industry organizations such as Airports Council International (ACI), Civil Air Navigation Services Organisation (CANSO), International Air Transport Association (IATA), International Business Aviation Council (IBAC), International Coordinating Council of Aerospace Industries Associations (ICCAIA), International Council of Aircraft Owner and Pilot Associations (IAOPA), International Federation of Air Line Pilots’ Associations (IFALPA), and International Federation of Air Traffic Controllers’ Associations (IFATCA).

ICAO Journal editor Rick Adams spoke with Zizi near his home in southwest France.

The Air Navigation Commission is not well known outside of ICAO circles. How would you characterize the ANC’s role?

Our scope is what the ICAO Council gives to us. Basically we review every Standard and Recommended Practice (SARP); this is the biggest part of ICAO business. We work on the air navigation scope of ICAO, which is embracing everything about safety and efficiency of flight and directly involves all but three of the ICAO Annexes.

The 19 commissioners on the ANC are nominated by their States and are elected on the basis of their expertise, but we act independently. In the chamber we are not authorized to express national positions; it’s agreed that you carry on your back your network and your national expertise but you are not working for them. In a consensus-driven organization like ICAO, you do not build consensus on a ‘power game.’ You bring your practical and operational expertise but it’s to illustrate the point of view that can contribute to the consensus-building.



The Commission is supported by a number of specialist panels, which you refer to as the ‘ANC Community.’ How do you develop the panels?

For each domain to be investigated, we identify a number of States and International organizations that have the required expertise and we send a first invitation. This secures a hard core of expertise whom we can trust will do the work properly. But you are never sure that you know the world properly, so we send a second letter of invitation, open to every State. Experts are vetted on the basis of their CV, like the Air Navigation Commissioners. A nomination can be accepted or not; it’s always difficult to refuse, but it’s possible. One reason is that we want to keep the panels to a manageable size so they are not discussing things forever but are really producing work together.

Every panel is around 20 experts, who can be accompanied by advisers. On some subjects, there are between 50 and 100 people in the room. The average is about 60 panel experts and observers across 15-17 panels, which is a lot of people to support the ANC.

You could consider Air Navigation Commission as a ‘super panel.’ The ANC is usually not developing the Standards; we are reviewing. The ones who are developing the Standards really are the panel experts. They are the ones that really prepare the work – the ANC community.

Those experts are scarce resources. It’s a big expense for States to contribute to those panels, and some States hesitate to invest that resource in the system. But ICAO is not more than an organization of States, and ICAO cannot be more than what the States put in it.

How does the Air Navigation Commission relate to ICAO’s Air Navigation Bureau?

The ANB is a bureau of the Secretariat of ICAO working in the same domains as we are. They are our main interlocutor every day. ANB is the partner of the ANC – everything we want to do goes through them in some way or another. At the same time, the ANC is supervising the Bureau.

The director of the ANB, Steve Creamer, is secretary of the Air Navigation Commission, Technical officers of the ANB serve as secretary on the panel of experts in their domain.

We are supposed to cooperate, but we are not the same, which means that sometimes we contradict, what I would call ‘productive tension’ between the two bodies. It’s a good construct because otherwise it’s a one-minded organization.

One of the criticisms of ICAO is that it seems to take a long time to develop and adopt new SARPs and guidance. How do you deal with that perception?

Let’s start with the final stage of the approval of a Standard. Imagine that the States do their work properly, that they coordinate inside the States with the operators, etc, and then give you an educated, mature answer on what you’ve proposed. That’s at least three months to consult with States worldwide – and three months is short. The time to prepare the State Letter is at least one month (also very short); it has to be in six languages. Before that the ANC reviews the Standard; let’s say we are very efficient and do it in two weeks. At the end, reviewing responses to the State Letter with no challenging questions, two weeks. You are already at five-months just for the purpose of consultation. Then you go to the Council – their next Session could be three months out.

When you adopt a Standard, the States need to prepare themselves to implement it. The shortest possible time is six months. A State has to transform its regulations, etc.

Upstream, let’s assume that our panels are very effective – they have only taken six months to develop the problem and proposed Standard. You have there almost two years as a cycle.

“Cybersecurity ... can create a major impediment to communication.”

What is time-consuming is consensus-building. You cannot accept that nothing is consulted, and what you want at the end is that the States implement it. It's not enough to have a plan, even if it's a nice plan. If it doesn't go to implementation, it doesn't produce any result. We have developed a strategy within ANC to look on the implementation challenges and ask the experts in panels to evaluate the impact of what is proposed and the implementation challenges for the States. If only one State is implementing a Standard, we don't realize anything in terms of global harmonization.

What are some of the ANC's specific challenges in the next few years?

Certainly one challenge for the whole aviation system is remotely piloted aircraft systems (RPAS). These aircraft fly differently from other aircraft, different processes, different trajectories. Most of the civilian applications are surveillance, which means they don't fly from Point A to Point B; they survey a zone. In terms of occupancy of the airspace it will be totally different.

ICAO is mainly focused on international aviation but the challenge with RPAS is domestic first, not international. There's a lot of pressure on various States to develop their own regulations. We have to find a way to learn from each other, best practices, and to harmonize sufficiently so when we come with international regulation we don't find sort of a battlefield where everybody is in totally disharmony.

We have created an RPAS panel, but it will not solve everything by itself. They will set the scene for integration of RPAS in the non-segregated airspace.

You also have some significant data and information issues on your agenda.

One challenge for implementing the *Global Air Navigation Plan* in the future is information management system-wide, worldwide. We will need to mature a lot in some regions of the world; we are far from having real-time information management of aircraft in the present system. The expertise in aviation is not so well spread in terms of scientific knowledge on the discipline of information management. We are users of information management, but only a few States have the required expertise. We will have to create a game-changing competency over the next few years on that subject.

This is combined with a challenge that is beginning to appear difficult to manage: cybersecurity. If everything is exchange of information and if you have to manage cybersecurity in the middle, obviously we will have to invent processes which may create a major

impediment to communication. In using some of the operational bandwidth we have for air-to-ground communication for cybersecurity processes, we may lose capacity for real-time information actions that are needed for operations.

Since 9-11, ICAO has worked on terrorist threats to aviation. But another important element of security is other threats – laser for example – unlawful acts but not necessarily terrorism. Stupid acts, vandalism. This will come with cyber as well – spam, viruses, and just hacking the system. We have identified the problem and the questions. Now we have to find a way in a very international forum to work on it, knowing that on security not so many people open the books. So that's part of our difficulty.

In this context I would also mention datalink. Everybody agrees that the future of the ATM system will be datalink based and of course you need datalink to do the information management. The problem is that for more than a decade we cannot manage to agree between Europe and the US on simultaneous steps to the common goal. If we want aircraft not to have multiple boxes, we have to define today in a relatively certain way what they will have to carry in 10-15 years.

All of these, of course, require significant commitment and resources.

Capacity building is about making States mature, mature, mature. And mature in a non-artificial way. Not a ticking of the boxes exercise that they comply with ICAO requirements; I would prefer they comply more on the fundamentals of safety management. This is the purpose of the *No Country Left Behind* campaign. We will reach the result the day the concerned States have taken their future in their own hands.

You can't drive all the changes from Montréal. The ICAO Regional Offices will have a very important part. At ANC we also review every report from the various regional groups in order to have a sense of what's going on and try to work with them on the regional adaptation of the global strategy.

What strikes you as unique to your ICAO experience?

Before ICAO, I had good international experience but I had never worked before in a multicultural environment. It's far richer. It looks from the outside less efficient. Perhaps it takes more time to make things understandable, exchanging vocabulary, and to absorb many different ways of looking at things. One of the things ICAO has managed is to create common language that everyone can understand and adhere. That's a really important step before you can discuss common solutions. ■



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JÉRÔME SIMON

As ICAO Air Transport Bureau Infrastructure Manager, Secretary of the Airport Economics Panel (AEP) and the Air Navigation Services Economics Panel (ANSEP), he focuses on economic development of air transport.

✈ Airports and air navigation service providers in Brazil, China, Congo, Egypt, France, Ghana, India, Jamaica, Jordan, Saudi Arabia, South Africa, the United States, and elsewhere around the world are building the capacity of air transport infrastructure through government partnering with private enterprises.

In September, the African Development Bank (AfDB) approved their first private-sector investment in Ghana's transport sector – a US\$120 million corporate loan to support construction of a new terminal at Kotoka International Airport (DGAA) in Accra and rehabilitation of other airports including Kumasi, Tamale, Ho, and Wa.

The bank stated: "The programme will support the country's ambitions of modernizing vital infrastructure in Ghana through upgrading the airport to a gateway for West Africa and a regional aviation hub. The programme will also increase air passenger handling capacity and improving airport safety standards and efficiency at KIA and the regional airports. Through strengthening the country's airport infrastructure, the programme is expected to boost the country's economy, in particular the growing tourism and oil and gas sectors, through facilitating connectivity to markets and reducing the cost of doing business. Developing national airport infrastructure will be critical building blocks for regional integration as Ghana has been serving as a platform in connecting regional landlocked countries to international markets and support inter-African trade."

This is just the latest of a growing number of Public-Private Partnerships (PPP). In the spirit of ICAO's *No Country Left Behind* capacity building initiative, PPPs can supplement limited public sector capacities and raise additional finance in an environment of budgetary restrictions.

Taking into account both fully privatized airports and those operated under PPPs, one-third of global airport traffic is now managed and/or financed by private stakeholders. A new section on the ICAO website highlights case studies of dozens of such projects (www.icao.int/sustainability/Pages/im-ppp.aspx).

ALTERNATIVE TO TIGHT CREDIT

Why are PPPs gaining in popularity? One reason is the tightening of government budgets, the difficulty developing States have borrowing funds in the current economic climate, and the spectre of future interest rate hikes. The *2014 ACI Airport Economics Report*, published by the Airports Council International, noted: "In an economic climate where States are increasingly cutting government expenditures to reduce growing debts hanging over their economies, government financing and ownership of airports is not always a viable and sustainable option. However, incentives for private-sector participation help capital flow to the airport industry."

ACI stated, "There is no denying that private investment and entrepreneurship go hand in hand. Entrepreneurs generate innovations and value for customers, but they also expect a return for the risk that investors must bear in so doing. From a financial

LESSONS FROM THE JAMAICA PPP SUCCESS STORY

From a case study funded by the Caribbean Development Bank

- The regulatory framework needs to be established prior to the transaction.
- Roles and responsibilities of government agencies must be clear and reliable.
- Tight agency coordination is critical, driven by strong political will.
- Competitive bids are better than sole-source negotiations.
- Hiring qualified experts helps to ensure a strong business plan.
- Specialized PPP staff members are critical to a successful transaction process.

perspective, airport operators perform better when they are free to grow and build both the aeronautical and non-aeronautical sides of their businesses independently. Based on the available evidence, private airports also tend to use resources more efficiently and create greater value for investors compared to airports with other ownership models.”

One example of a highly successful PPP is Sangster International Airport (MKJS), Jamaica’s largest airport and gateway to the island’s vital tourist industry. Sangster is operated by MBJ Airports Limited, which has invested nearly US\$200 million into the expansion of the facility and improvements, and won the Caribbean Leading Airport by the World Travel Awards five years running. MBJ Airports Limited is now comprised of Abertis Infraestructuras SA (formerly Dragados), a European leader in infrastructure management and one of the world’s major benchmark companies in the field, together with Vantage Airport Group, among the world’s premier airport operators.

Elizabeth Brown Scotton, Chief Commercial Officer for MBJ Airports Limited, said, “The beauty of the privatization is that the airport operator can be proactive rather than reactive in terms of decision making, service levels, and the management of partnerships that make up the entire team at Sangster International Airport. Operating as an entrepreneur, focused on business decisions, allows for the flow of new ideas and quick implementation.”

DIMENSIONS OF PPP

Just as each airport has a different set of challenges, opportunities, and circumstances, there is no “one size fits all” model for PPPs. Within the ICAO case studies, you will find projects which are majority-owned by governments, projects in which private consortiums own more than 50 percent, and even some with 100 percent private equity. The tasking might involve build-

operate-transfer, design-finance-operate, or any of a number of other agreements. Some deals encompass 20 or 30 years, a few as long as half a century.

ICAO has been working with subject experts in airport and ANSP operations, PPP investors such as the World Bank, legal, regulatory, and other specialists to develop a framework and guidance for States interested in public-private partnerships. The intent is not to promote one business model over another but rather to enable the Member State to address its unique situation.

When planning a PPP, States should thoroughly consider these main dimensions:

1. *Effects* – for example, will the private operator build a ‘greenfield’ development or take over existing infrastructure?
2. *Functions and activities* – such as infrastructure design, financing, build, operate, maintain, own.
3. *Payment mechanisms* – user fees? Performance-based fees? Or both?

To attract private sector funding requires a solid business plan based on market realities. This may involve bringing in some experts from outside the State – such as members of ICAO’s technical team – who have a regional or global perspective. The ACI report noted, “Private investment typically flows to airports with a sufficient critical mass of traffic.” If it cannot be demonstrated that an airport will attract sustained traffic over years and decades, and thus generate a solid return on investment, the investors will not fund the project.

PPP projects should also have demonstrable social and economic benefits and a favorable policy environment. A strong political will is critical, and an appropriate regulatory environment – including an effective legislative, legal, and controls framework – will greatly facilitate privatization and should be put in place prior to the transaction.

The best use of private sector operational efficiencies can increase the quality, efficiency, and competitiveness of public services, as well as speed up infrastructure development.

When considering the commercialization or privatization of airports and ANSPs, States should also bear in mind that they are ultimately responsible for safety, security, and economic oversight of these entities. Privatization should not in any way diminish the State’s requirement to fulfil its international obligations, notably those contained in the Chicago Convention, its Annexes, and in air services agreements.

For further details, consult these ICAO documents:

Doc 9082 – *ICAO’s Policies on Charges for Airports and Air Navigation Services*

Doc 9562 – *Airport Economics Manual*


Doc 9980 – *Manual on Privatization in the Provision of Airports and Air Navigation Services* ■

1944-1970



Walk through civil aviation history. Visitors to the ICAO Museum in Montréal, Canada can view highlights from the past century: including milestones of ICAO's work, the most significant documents, and the public figures who led the achievements of the Organization.

ICAO MUSEUM OPENS TO THE PUBLIC

 ICAO has officially opened its international civil aviation museum to the public. The new facility is located in the main lobby of ICAO Headquarters, 999 Boulevard Robert Bourassa, Montréal, Canada. The public may access the Museum Tuesdays through Fridays between 12:30 and 16:30.

The ICAO Museum celebrates the history of air transport and other developments relating to the Organization's past, present, and future priorities. Member States' donations have been selected and arranged to create an exhibition dedicated to the civil aviation community.

Walking through different time periods related to milestones of ICAO's work, visitors can discover the most significant legal documents, public figures, and achievements of the UN specialized agency for aviation during its first 70 years in existence.

The retrospective includes a brief overview of aviation before ICAO was formally established under the Chicago Convention in 1944.

The ICAO Museum was established through an initiative by ICAO Council President Dr. Olumuyiwa Benard Aliu, and officially inaugurated last December as part of ICAO's 70th anniversary celebrations. At that time, visiting international dignitaries joined President Aliu, then-ICAO Secretary General Raymond

Benjamin, and senior officials representing the governments of Canada, Québec, and the City of Montréal in welcoming its achievement and celebrating its objective to generate public interest in all areas of civil aviation.

It is ICAO's intention that the new Museum will be of interest and inspiration to local and visiting pre-university and university level students who have an interest in civil aviation, international law, and United Nations governance, as well as to civil aviation enthusiasts from around the world. ■

ICAO MUSEUM – PUBLIC ACCESS HOURS

ICAO Headquarters,
999 Boulevard Robert Bourassa, Montréal, Canada

Tuesday-Friday: 12:30-16:30

Closed Mondays, Weekends, and Statutory Canadian Holidays.

All visitors will be required to be processed through building security prior to gaining admittance.





Sustainable development of civil aviation - one of the key drivers of economic growth in the Russian Federation

The factor of the vast territory of Russia is an important incentive for the sustainable development of civil aviation, which, in turn, is one of the key drivers for the national economic growth.

SUSTAINABLE DEVELOPMENT OF CIVIL AVIATION – ONE OF THE KEY DRIVERS OF ECONOMIC GROWTH IN THE RUSSIAN FEDERATION



On 9 February 2013, Russian civil aviation celebrated a significant date – the 90th anniversary of the founding of the Council for Civil Aviation Head Department of Air Fleet. In July of that same year (1923), the first Russian regular airline started to operate its flights from Moscow to Nizhny Novgorod.

In the Russian Federation, with the world's largest dimension of its territory and with the greatest distances between regional business and cultural centers, civil aviation plays a strategic role in economic development and in consolidation of social and economic links between regions in the country.

Russia's territory covers about one-eighth of the world's land surface. This distance is an important incentive for the sustainable development of civil aviation, and is an integral key element in terms of providing national economic growth. In many regions of Russia, such as in the Far North and Siberia and a considerable part of the

Far East territory, actually there is no alternative to air transport.

With financial support from the Russian Federation Government, the development of regional air transport and air transport infrastructure became a decisive factor for increasing population mobility with aviation, and for expanding economic

relations and aligning the geographical imbalance in the labour market. In order to support the development of the civil aviation sector, regional transportation and local airlines are subsidized from Federal and Regional budgets. Airlines are also granted loans for accelerated fleet renewals.

Modernization of the air transport complex in Russia is carried out on the basis of strategic industry plans that define mechanisms for developing and financing civil aviation in the long term such as: *State Policy of the Russian Federation Framework in the Field of Aviation Activity for the Period up to 2020*; *Transport Strategy of the Russian Federation up to 2030*; *The Federal Target Programme for Development of Transport System of Russia for 2010-2015*; *The Concept of Development of Airport (Aerodrome) Network of the Russian Federation for the Period up to 2020*; and also the *Concept of Development and Implementation of Air Navigation System of Russia*, expected to be completed in 2025.





Despite the global economic crisis, Russia's air transport industry continues to show main indicator growth. In 2014, 93.2 million passengers were transported by Russian airlines, which is 10.2 percent higher than in 2013. In general, passenger traffic increased by 7.2 percent. Domestic traffic increased by 22 percent in comparison with 2013, and amounted to more than 10 million passengers.

Based on preliminary estimates and contrary to the prediction that Russia would experience an air transport recession in 2015, passenger traffic growth on domestic air routes is holding steady. According to IATA statistics, in 2014, Russia demonstrated the biggest traffic growth rate in the world – 18 percent, with China second with 11.2 percent. It is expected that by the end of 2015 more than 50 million passengers will be transported by domestic airlines alone and the passenger traffic of Russian civil aviation will grow by 5.5 percent.

In 2014 and 2015, Russian airlines provided a significant contribution to the enormous work involved in preparing and concluding world events like the XXII Olympic Winter Games and the XI Paralympic Winter Games of 2014 in Sochi, University Games in Kazan; the St. Petersburg International Economic Forum; the

Summits of BRICS and SCO in Ufa; and the XVI World Cup in Water Sports in Kazan. More than 6.2 thousand flights carried more than 390 thousand passengers for the XXII Olympic and XI Paralympic Winter Games alone.

Within the preparations for the XX World Ice Hockey Cup in 2016 and the XXI FIFA World Cup of 2018, detailed assessments of aerodrome infrastructures have been carried out, and the necessary modernizations have been determined.

AIRPORTS OF RUSSIA

Today the airport network of the Russian Federation includes 282 aerodromes for both international and regional flights. In 2014 more than 157.7 million passengers were served at Russian airports. The volume of passenger traffic through the Russian airports increased by 10.8 percent in comparison with the previous year.

Within the Russian Federation programme targets for aerodrome network development, the Federal budget allocates significant funds for maintenance, construction of land infrastructure and the renewal of aerodrome equipment. In particular, considerable modernization work was carried out in Federal Air Enterprises: *Airports of the North*; *Airports of Kamchatka*; *Airports of Priamurye*;

and *Airports of Sakhalin*; among others. There were 61 aerodrome infrastructural facilities in the Far East and the Baikal and Sakhalin regions that were financed under the Federal target investment programme for 2014. For 2015, funds for modernizing 147 land infrastructural airport facilities were earmarked.

Also in 2015, significant modernization of the airport in the capital of Bashkiria, Ufa was carried out within the framework of the preparation phase for holding a meeting of the Council of Heads of the Member States of the Shanghai Organization of Cooperation (SOC) and Heads of States and Governments of BRICS.

Prior to the FIFA World Cup of 2018, project development for the new airport, Youzhny in Rostov-on-Don, has been completed. Modernization of aerodromes at the Volgograd, Hrabrovo (Kaliningrad), Samara, Saransk airports is being carried out. Modernization of aerodromes at Nizhny Novgorod, Sheremetyevo, and Domodedovo is expecting to start in the near future.

Construction and commission of a new airport on Iturup island in the Far East was completed. In addition, five runways at the regional airports: Lipetsk, Vladikavkaz, Makhachkala, Nikolayevsk-na-Amure, Palana have been modernized and commissioned.

Land infrastructure extension projects at the Abakan, Voronezh, Petropavlovsk-Kamchatsky, Samara airports have also been completed. Modernization of the airports in Arkhangelsk (Talagi), Sheremetyevo (construction of the third runway), Domodedovo, Krasnodar, Yakutsk, Voronezh, Murmansk, Magadan are being continued.

Also commissioned and expected to be finished in 2015: modernization of aerodrome complexes at the Petropavlovsk-Kamchatsky and Krasnodar airports, as well as the runways at the airports Volgograd, Samara, Krasnodar, Petropavlovsk-Kamchatsky.



Along with the implementation of programmes that will increase capacities at the Moscow aviation hub, work on establishing new air-transport hubs in several other cities, such as St. Petersburg, Yekaterinburg and Rostov, are continuing to ensure transit flows are maintained.

Completing federal development plans for the aerodrome network in the Russian Federation will allow for implementing optimum transit potential and ensure safe, effective flight operations in civil aviation.

AIR CARRIERS OF RUSSIA

Leading Russian airlines, which have been demonstrating stable indicators for many years, continue to increase traffic volume: AirBridgeCargo Airlines (+18 percent tonnage); Aeroflot (+9.8 percent); the S7 group of companies (+0.5 percent); Ural Airlines (+4 percent); Russia (+2.5 percent); Globus (+18.6 percent); VIMAvia (+14.3 percent); Aurora (+9.9 percent); Utair, etc. Besides that, the AirBridgeCargo Airlines' (ABC) has earned the prestigious 'All-Cargo Airline of the Year Award' at the 32nd annual Cargo Airline of the Year ceremony, voted for by air cargo customers around the world.

In September 2014 the new airline *Pobeda* was created as a part of the Aeroflot group airlines and at the same time, as a classical low-cost carrier. The airline's fleet is the youngest in Russia and the airline is actively extending its route network. It is expected that by 2018 it will include 45 domestic and international flight routes, the fleet of aircraft will reach 40, and traffic volume will reach 10 million passengers a year.



AIR NAVIGATION SYSTEM OF RUSSIA

It's remarkable, that the national air space within the Russian Federation is the most demilitarized in the world, that creates unique opportunities for optimizing its civil aircraft utilization. Roll-out projects assume a stage-by-stage modernization of the Russian Federation's Integrated Air-Traffic Management Systems, sectoral aeronautical information services, and meteorological services. It also measures implementation for managing Unified Aerospace Search and Rescue System, the establishment and development of a domestic air navigation complex based on the Global Operational Air Traffic Management Concept, which was adopted by ICAO for the period up to 2020 and based on use of digital communication and satellite navigation.

The total area of air space served by the Russian Federation's 61 centers of Integrated Air-Traffic Management System, exceeds 25 million km². The total length of the airways is 532 thousand kilometres, of which more than 150 thousand kilometres are for international routes. The national air navigation service provider services more than one million commercial aircraft annually.

The high rate of air traffic flow growth in the national air space predetermines the necessity of for accelerated implementation of new approaches and technologies for air traffic management, communications and surveillance aids, as well as airborne, ground and satellite air navigation aids and systems.

In the course of this work the Russian Federation undertakes a wide range of actions, such as the enlargement of ATM centres of the Integrated Air Traffic Management System, modernization of the Moscow Center of Automated Air Traffic Control, deployment of ground infrastructure for automatic dependent surveillance (ADS-B) on air routes and the modernization of aeronautical telecommunication and data network.

The research programme for implementing technology for continuous surveillance for aircraft of general aviation at low altitudes and remotely piloted aircraft systems has been successfully realized.



AVIATION INDUSTRY

For the last several years, Russia focused substantial efforts towards increasing production of nationally manufactured aircraft. In the previous year a number of abovementioned aircraft (such as: SSJ100/95B, Il-96-300, Tu-214, Il-76TD-90SW, An-148 and others) were delivered by aircraft manufacturers to national operators.



Along with the steady growth of sales of military aircraft, the world aviation markets are observing an increase in demand for civil aircraft produced in Russia. It is expected that the first test flight of the short- and medium-range passenger aircraft MS-21 will fly in April 2016 and that the Russian-Chinese intergovernmental agreement on the joint design of the wide-body aircraft will be signed by the end of this year. In building this type of aircraft, collaborations are planned to increase the capabilities of Russian and Chinese manufacturers.



Also during this time, the Russian aviation industry continues to increase production of helicopters, which are actively used in various sectors of economy.



TRAINING CIVIL AVIATION SPECIALISTS

For several decades, youth interest in flight and the various technical disciplines of civil aviation has increased significantly. The extensive training system consists of numerous civil aviation institutions throughout Russia that are offering training in the field of air transport. Today's foundation for industry-specific education is provided by the Moscow State Technical University of Civil Aviation, with branches in Irkutsk and Rostov, as well as by aviation technical colleges (Egoryevsky, Kirsanovsky, Rylsky, Irkutsk and Troitsk).

Civil aviation pilot and engineer training is also provided at St. Petersburg State University of Civil Aviation and in its branches – Buguruslansky Flight School, Vyborg, Krasnoyarsk, Khabarovsk, and Yakutsk Air-Technical School, along with the Ulyanovsk Highest Aviation School of Civil Aviation and its branches – Omsk Flight-Technical College, Sasovsky, and Krasnokutsky Flight Schools.

Recently 53 training aircraft and 14 flight simulators, which fully imitate flight in real time, were delivered to flight schools to better train pilots. This equipment allows future pilots to master, with practice, all subtle details of controlling various aircraft types, from take-off to landing, in strict accordance with modern national and international rules and regulations.



FURTHER PROSPECTS FOR CIVIL AVIATION DEVELOPMENT IN THE RUSSIAN FEDERATION

Further development and modernization of civil aviation infrastructure, as well as the implementation of projects that involve domestic transportation development, are the priorities of Russian aviation industry in medium-term prospects.

The most important task of the Russian aviation industry is to provide aviation security and safety for passenger and cargo transportation by air while maintaining flight regularity and high standards of passenger service. ■





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VOLGA-DNEPR: THE BRIDGE IN THE AIR

This year, Volga-Dnepr Group celebrates its 25th anniversary in the cargo sector of the air transport industry. Volga-Dnepr, after initially creating the market niche, became a global leader in the heavy and outsize air cargo segment. The charter airline transports heavy and outsize cargo using a fleet of AN-124-100 Ruslan and IL 76TD-90VD freighter airplanes, as well as AirBridge Cargo Airlines, which operates a scheduled airline fleet of Boeing 747s and 737s. With its modern aircraft and the latest advances in carrying freight, Volga-Dnepr is able to transport complex air cargo deliveries worldwide.

The Group possesses wide-ranging experience in the oil and gas, aviation, aerospace, energy and motor car industries. In the last quarter century, the company has become a global expertise leader in international logistics and transports telecommunication satellites, helicopters, airplane wings and fuselage sections, industrial equipment, humanitarian aid freight, and even world heritage pieces of art.

Company specialists develop optimum logistic models that meet individual customer needs while ensuring high-quality, time-sensitive and cost-effective transportations.



When developing solutions for unique cargo transportations, Volga-Dnepr not only changes the established air logistics concepts, but also significantly influences various State industries. One of the most complex engineering and logistics tasks accomplished by Volga-Dnepr involved the movements of gas industry equipment to

Papua New Guinea. The Group was engaged in the construction project of a new airport (Komo-Manda) capable of accommodating airplanes like AN-124-100, and needed deliveries of gas processing equipment. The equipment that was delivered allowed them to build a liquefied natural gas processing plant, and played an important role in developing the economy of Papua New Guinea, which also had a positive effect on the country's economy.



Among the most outstanding projects of Volga-Dnepr was the delivery in 2013, on board an AN-124-100, of two B787 Dreamliner's half-wing panels from the manufacturer's site, at Mitsubishi Heavy Industries in Japan, to Boeing's factory in the United States in 2013 for final assembly.



Delivery of freight, which requires special storage and transportation conditions, is one of the Group's greatest strengths. In 2008, Volga-Dnepr Airlines performed a delivery of a hydro turbine wheel for a Kambarata-2 Hydro Power Plant that was under construction. The turbine wheel was delivered from St. Petersburg to Bishkek, Kyrgyzstan on board an AN-124-100 freighter. Volga-Dnepr began 2015, its

jubilee year, with the delivery of a 70-ton electrodynamic vibration stand to perform testing, facility strength checks and tool calibration. Transport from Shanghai to Chelyabinsk was on an AN-124-100 Ruslan.



One of the flagship activities of Volga-Dnepr from its establishment in 1990, has been transporting aerospace equipment. To date, Volga-Dnepr delivers every third satellite to its launch site and in its 25-year history, the Company has performed more than 4,500 flights for the aerospace industry.

With the assistance of Volga-Dnepr aerospace logistics planning, the People's Republic of China replaced railway transport with airlifts, which allowed for transporting satellites almost fully assembled, which significantly improved the efficiency and reliability of PRC's aerospace programmes. Since 2006, Volga-Dnepr AN-124-100s have delivered 36 aerospace shipments to the Xichang Satellite Launch Center.



Volga-Dnepr has assisted various States with developing aerospace programmes and last year delivered the first Argentina satellite ARSAT-1 to its launch site in French Guiana. The event became a milestone, enabling Argentina to enter a path of new achievements.



In 2014, Volga-Dnepr delivered a six-ton Airbus Defence and Space Astra-2G telecommunications spacecraft from Toulouse, France to Baikonur Cosmodrome, Kazakhstan. The company makes it possible to complete the most complex logistics operations, with satellite delivery as one example. Satellites require special transportation containers equipped with the temperature monitoring system. To date, there is no operational cosmodrome worldwide that has not been visited by Volga-Dnepr.



Besides industry interests, Volga-Dnepr has carried out other projects. The Company's airplanes delivered the exposition of the State Tretyakov Gallery in Beijing, which included painting works by famous Russian artists like Surikov, Levitan, Repin and a total of over one hundred of XVIII to XX century paintings. Volga-Dnepr has had a broad experience in shipping cultural valuables for both state-owned museums worldwide and private galleries.



Volga-Dnepr Airplanes delivered from Shanghai to Guam, famous Chinese terracotta warriors, the Terracotta Army, a collection of full size terracotta sculptures of warriors and horses to a UNESCO World Heritage Site. With the exception of transporting objects of art, which are subject to customer inquiries, the airline provides additional logistics services that include arrangements for terminal handling of cargo on a tight schedule.



For many years, Volga-Dnepr Group has participated in major national projects. In 2013-2014, the Group provided cargo logistics for the 2014 Olympics in Sochi. The amount of cargo transported totaled more than 1,800 tonnes. The Company also took part in the Olympic Flame Relay project: in December 2013, the Olympic Flame took to the skies over Ulyanovsk on board a well-known Ruslan freighter airplane.



Among the most important activities of Volga-Dnepr are humanitarian aid deliveries for various international organizations, including the United Nations and the Red Cross. The Company's fleet, particularly the AN-124-100s, are in special demand during humanitarian catastrophe response activities. For State-run programmes, like that of the People Republic of China which supported West African countries in 2014, Volga-Dnepr delivered special epidemio-

logical protection aids to the regions struck by the Ebola virus. It is worth noting that the Company developed and implemented a standard for performing flight operations in the virus-spread area which fully excluded the risk of infection for the crew.



For the UN Ebola Emergency Response Mission, a Volga-Dnepr An-124-100 freighter delivered Mi-8 helicopters from Moscow to Freetown in Sierra Leone. To load three 25-meter Mi-8s on board An-124-100, Volga-Dnepr used a proprietary loading pattern that was developed for helicopters.



For the last quarter century, Volga-Dnepr has performed deliveries of humanitarian aid and special equipment for response missions to disasters and catastrophes worldwide. In 2015, Volga-Dnepr accomplished flights in response to devastating Cyclone Pan in Vanuatu Islands and the earthquake in Nepal.

During this time, Volga-Dnepr has developed unique expertise in air cargo transport worldwide and has accumulated interactive experience with local authorities in various States. It has a reputation for being a leading technology partner and a reliable provider of comprehensive solutions in the domain of air cargo deliveries, which makes Volga-Dnepr, a most important link in the global economy. ■

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ADS-B TO ENHANCE BRAZIL AVIATION SAFETY, EFFICIENCY, CAPACITY



SAULO JOSÉ DA SILVA
Chief, Air Navigation Implementation Planning and Support Section, ICAO. Previously he was an air traffic controller and engineer for 23 years with the Brazilian Air Navigation Service Provider, DECEA.



DANIEL MARINHO
A Brazilian journalist specialized in air traffic management, aviation and tourism affairs.

✈ Last year, more than 3.2 billion passenger flight tickets were sold worldwide, an increase of about five percent over 2013. According to the *ICAO Air Navigation Report* for 2015, this number is expected to reach over 6.4 billion by 2030, based on current projections.

Brazil, which currently handles about 100 million passengers a year, is expected to grow over the next 15 years to handle 270 million passengers annually, becoming the fifth biggest aviation market in the world.

To meet the growing demands, the Brazilian air navigation service provider Departamento de Controle do Espaço Aéreo (DECEA) has been investing in new assets to increase the performance of the air navigation system. One new technology which is ready to take off, a breakthrough for the Brazilian air surveillance system, is the Automatic Dependent Surveillance - Broadcast (ADS-B) implementation.

With appropriate ground and airborne equipage updates and operational procedure readiness, ADS-B provides several key benefits, including the ability to improve existing safety standards while increasing system efficiency and capacity.

ADS-B is rapidly becoming an aviation industry standard for surveillance. Different from radar, which works by bouncing radio waves from fixed terrestrial antennas to airborne targets and then interpreting the reflected signals, an ADS-B Out-capable aircraft derives its precise position from the Global Navigation Satellite System (GNSS), combining with other flight data (speed, heading, altitude, flight number, etc.) linked to a ground receiver and air traffic control centres. ADS-B accuracy does not seriously degrade with range, atmospheric conditions, or target altitudes. Moreover, its systems and machinery are simpler, lower cost, and easier to maintain when compared with secondary radars.

In Brazil, ADS-B's debut will take place over an oceanic region with a huge helicopter traffic flow to and from Brazilian oil and gas platform areas. Adjacent to the state of Rio de Janeiro, the Campos Basin encompasses the Brazilian Pre-salt Layer, a massive oil reserve area.

As helicopters that support oil exploration fly at low altitude, shuttling cargo and personnel between land and sea, the conventional radar range does not detect them. Therefore, the service currently provided to these aircraft over the sea is based on non-radar procedures, which significantly reduces the air traffic control capacity – especially for Instrument Flight Rules (IFR).

The use of ADS-B in the Campos Basin will enable the surveillance of aircraft flying at low altitudes and will allow the provision of optimum trajectories and flight profiles, hence improved air traffic management service with consequent enhanced system performance as a whole.

HOW DOES ADS-B WORK OVER OIL PLATFORM AREAS OFFSHORE IN BRAZIL?



The ADS-B terrestrial infrastructure is comprised of six stations (four on sea platforms, two on the mainland), integrated with the ATM System (SAGITARIO) at Macaé Approach Control (APP-ME). The equipment was delivered in August 2015. After operating procedures confirmation, the service will be activated for suitable aircraft. By 2017, all helicopters should be properly equipped with ADS-B (1090ES) to fly in the region.

Philip Heringer, Aviation and Safety Manager of Petrobras, the largest oil company in Brazil, says ADS-B will allow an increased capacity in the Campos Basin area and significantly contribute to the logistical efficiency of air transport service. "In the case of air operations inactivity by adverse weather or other issues, ADS-B will allow greater resilience of flight schedules to handle contingencies, providing an increase in capacity to face extra demands. The operational safety is the greatest benefit, considering that the airspace control is crucial to handle a large number of aircraft in the Campos Basin, especially at peak times."

The offshore initiative is the prelude to an even larger project: ADS-B over the entire Brazilian continental area – a huge endeavour considering Brazil's 8.5 million square kilometres. ADS-B stations will leverage the established infrastructure of radar and VHF sites.

The objective is to implement the land system over the next five years in order to provide ADS-B air traffic surveillance throughout the national airspace above 31.000 feet (FL 310).

Airlines already have a considerable number of equipped aircraft (about 70 percent) in compliance with current requirements of Mode S Transponders established by the Brazilian civil aviation authority – Agência Nacional de Aviação Civil (ANAC), as well as the integration of these transponders to GNSS. For general aviation, however, largely because of the cost of the avionics and retrofit labour, mandatory use of ADS-B in continental Brazilian airspace is only predicted to take place from 2022.

Even with the introduction of ADS-B, DECEA will maintain its non-dependent surveillance layer since these radars are not susceptible to the types of failures or abnormalities that may occur in satellite-based positioning systems.

Nevertheless, the new ADS-B system will increase safety, capacity, and efficiency while reducing the impact of aviation on climate change. ADS-B system implementation is one of the most important projects to the Brazilian airspace control in the coming years. ■

NEWS IN BRIEF



ICAO COUNCIL PRESIDENT ALIU DISCUSSES CAPACITY BUILDING IN AZERBAIJAN

ICAO Council President, Dr. Olumuyiwa Benard Aliu, met in October with the President of the Republic of Azerbaijan, H. E. Ilham Aliyev, and commended the country's leadership on its substantial investments on infrastructure, the modernization of airport and air navigation systems, and aviation training facilities, all of which support the socio-economic development of the country.

Dr. Aliu requested that these efforts be sustained through continuous capacity building and effective aviation safety and security oversight, consistent with ICAO's *No Country Left Behind* initiative, urging Azerbaijan to collaborate with other States, including on the training of aviation personnel. He pledged ICAO's continued close cooperation with Azerbaijan on projects to address areas of civil aviation challenge.

President Ilham Aliyev said Azerbaijan's favourable geographical location created good opportunities in terms of the establishment of the regional transport infrastructure and logistics, noting that further development of civil aviation is an important part of the country's economic strategy. The head of state emphasized that huge investment is being made in infrastructure projects, adding that several airports have been built, the Heydar Aliyev International

Airport has been completely reconstructed (among the world's 10 four-star airports), and a number of new planes have been purchased by Azerbaijan recently.

President Aliyev also praised Dr. Tatiana Anodina's contribution to cooperation with the civil aviation of Azerbaijan. She is chairperson of the Interstate Aviation Committee.

The ICAO President was visiting Azerbaijan to attend the 35th Session of the Interstate Council on Aviation and Airspace Use in Baku. Dr. Aliu told delegates: "A safe, efficient and reliable civil aviation sector is a fundamental requirement for any State wishing to participate in the modern, global economy, and for it to reap the sustainable benefits air transport growth delivers through enhanced tourism, access to foreign supplies, services and markets, and many other positive impacts on local and regional prosperity."

He added, "With our sector set to double in flight and passenger volumes over the next decade and a half, it is essential that States begin to recognize, as soon as possible and at the highest levels, how important air transport development investments today will be to the future prosperity of their citizens and businesses."



The President of the Republic of Azerbaijan, H. E. Ilham Aliyev (centre) with ICAO Council President, Dr. Olumuyiwa Benard Aliu (second from left), and IAC Chairperson Dr. Tatiana Anodina (second from right). They're joined by the President of Azerbaijan Airlines, Jahangir Askerov (far left) and ICAO European/North Atlantic Regional Office Regional Director, Luis Fonseca de Almeida (far right).

SG VISITS CHINA



During a visit to China in September, ICAO Secretary General, Dr. Fang Liu (left), met with Ma Kai, Vice Premier of China. The Vice Premier expressed China's full support as Dr. Liu seeks to lead ICAO towards fostering a safe, secure, efficient and sustainable aviation system worldwide. Dr. Liu expressed ICAO's gratitude for China's support to ICAO's programmes and its outstanding assistance with the ICAO Regional Sub-Office in Beijing. Dr. Liu was accompanied by ICAO's Technical Cooperation Bureau Director, Ivan Galan, and Regional Director for the Asia and Pacific Region, Arun Mishra. Ma Kai was accompanied by Li Jiexiang, Administrator, Civil Aviation Authority of China; Wang Zhiqing, Deputy Administrator; Ma Tao, China's ICAO Council Representative, and other senior officials.

RECORD PARTICIPATION IN ICAN2015

More than 800 participants representing 95 States and territories and seven international organizations gathered in Antalya, Turkey for the eighth ICAO Air Services Negotiation Event (ICAN2015), seeking to expand air transport liberalization and market access. During the five-day event, 588 negotiation sessions were conducted, leading to the signing and initialling of more than 450 air service agreements and other related arrangements.

ICAO Council President, Dr. Olumuyiwa Benard Aliu, noted that "the significant level of participation at this year's ICAN ... confirms the collective and ongoing resolve of governments and industry to continue to work together towards the sustainable economic development of air transport."

President Aliu opened ICAN2015 together with senior Turkish government officials, including Deputy Minister of Culture and Tourism, Yildirim Ak; Deputy Undersecretary of the Ministry of

Transport, Maritime, Affairs and Communications, Dr. Ozkan Poyraz; and Turkey's Director General of Civil Aviation, Bilal Eksi. Other dignitaries included representatives of States to ICAO and its Council, senior executives from international organizations, such as the World Tourism Organization (UNWTO), the International Air Transport Association (IATA), Airports Council International (ACI), and several CEOs of airlines and airport operators.

Since its inception in 2008, seven successive ICANs have been held in different regions of the world, contributing to liberalization of international air transport and enhancing air connectivity for the benefit of the industry and travelling public. It has also become an important interactive platform for promoting understanding and cooperation among government policy makers and regulators, as well as industry players and other aviation stakeholders.

THE 29th ICAO AVIATION SECURITY TRAINING CENTRE (ASTC)

was officially inaugurated in October at the Minsk National Airport (UMMS) in Minsk, Belarus. The Regional Director of the ICAO European and North Atlantic Office, Luis Fonseca de Almeida, presided at the event. The training centre at Minsk was established in 2009 and developed quickly to become the most important Aviation Security (AVSEC) training entity in Belarus. In 2014 the centre applied for endorsement by ICAO and the evaluation for compliance with ICAO's Terms of Reference

revealed excellent results. The ASTC Minsk subsequently hosted in October the ICAO Regional Aviation Security and Facilitation seminar with participants coming from a wide range of Russian-speaking States. Belarus First Deputy Minister of Transport and Communications Yevgeny Rogachev said the training centre "is an important step in improving the effectiveness of the measures for the protection of civil aviation against acts of unlawful interference and will enhance the image of Belarus in the international aviation community."





Addressing Competition: Towards a better operating environment

The third ICAO Air Transport Symposium will explore a wide range of pressing competition issues for policy makers, air transport regulators, industry representatives, aviation professionals, competition law experts, and other stakeholders. It will provide participants with a unique opportunity to examine practical solutions to issues such as the role of governments, connectivity and competitiveness in liberalized markets, applying competition rules to international air transport, and aviation-specific safeguards.

High-level presenters from civil aviation and competition authorities, airlines, airports, academia and international organizations will guide a series of discussions, providing invaluable insights into the development of multilateral arrangements encouraging liberalization of market access, and air carrier ownership and control. And companies will have the opportunity to showcase new technologies, research, and products and services. For more information please visit: www.icao.int/events



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