

ICAO JOURNAL

NEWS AND DEVELOPMENTS FROM THE INTERNATIONAL CIVIL AVIATION ORGANIZATION – VOL.72 – NO.4

AVIATION FOR A BETTER FUTURE

GLOBAL CONNECTIVITY AND ECONOMIC GROWTH

ALSO IN THIS ISSUE

REPORTS ON
SPACE 2017, GACS 2,
DRONE ENABLE /
RPAS 2017, DGCA54

DREAMS SOAR
– SHAESTA'S
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Dr. Fang Liu

GENERATING LOCAL ECONOMIC GROWTH THROUGH GLOBAL AVIATION CONNECTIVITY

✈ With the importance of aviation connectivity to local economic vitality and prosperity becoming much better appreciated, most especially in the context of the 17 UN Sustainable Development Goals (SDGs) adopted under Agenda 2030, it's critical that governments be committed to fully ICAO-compliant air transport operations and that they continue to work through ICAO to ensure that future air transport growth is effectively managed, and that air services expand sustainably and equitably.

To help assure this, ICAO has been continuing to help States cooperate together on the basis of the more than 12,000 Standards and Recommended Practices (SARPs) for global air transport adopted under the Convention on International Civil Aviation (Chicago Convention).

These ICAO provisions serve as an important foundation upon which governments can develop their local aviation infrastructure, operations and other capacities, consistent with other States' expectations and the exemplary global alignment of our network.

This greatly aids governments' related ambitions to leverage, on behalf of their local citizens and businesses and the sustainable future of their civil societies, the distinct socio-economic benefits which derive from global aviation connectivity.

Today those benefits generate many positive impacts for the global economy, with our sector directly and indirectly employing some 63.5 million people, contributing over 2.7 trillion dollars annually to global GDP, and moving over 3.8 billion passengers and one third of world freight by value each year.

Air transport also moves over half of the world's 1.4 billion annual international tourists, establishing commercial air services as a veritable economic lifeline for many landlocked developing countries (LLDCs) and small island-developing States (SIDs).

When we talk about effectively managing the forecast growth in air transport, our sector is focused most intently on improving upon our current metrics for ICAO Strategic Objectives such as aviation safety, security and capacity/efficiency.

“ICAO is expanding global awareness at the highest levels on aviation's unique ability to connect cities and countries to the world.”

ICAO, States, and industry groups focus on capacity and efficiency in aviation because the speed by which modern commercial aircraft can move passengers and freight globally is the core value offering of international air transport.

Safety and security provisions complement this essential rapid transit attribute, establishing an overall foundation of speed, breadth, confidence, and dependability which no other form of transport can equal.

ICAO also places a determined focus on the sustainability of our sector, as represented by our additional Strategic Objectives for the economic development and environmental performance of civil aviation.

Environmental goals and challenges are especially urgent today given the current global context, and we have been grateful for our States' leadership in helping our sector to achieve some key world firsts – whether in terms of a new aircraft CO₂ emissions standard or the landmark international emissions offsetting solution

represented by our recent Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) agreement.

One thing we know for certain is that our network needs both new and modernized infrastructure established, especially if we're to manage future growth while still improving upon our sector's admirable safety and security results.

To help address these issues, whether through our ICAO World Aviation Forums or other events and missions we undertake, ICAO is expanding global awareness at the highest levels on aviation's unique ability to connect cities and countries to the world.

We are stressing to ministers and State planners everywhere that, to optimize aviation's significant socio-economic benefits, their aviation infrastructure and related development needs should be incorporated into their national development plan and strategies.

We also, of course, wish to engender higher levels of investment for the large-scale air transport infrastructure modernization now needed, whether in developed or developing States. To that end our World Aviation Forums are specifically designed to forge new partnerships among the aviation, finance, donor, and development communities, and also to help our Member States realize business plans consistent with investor expectations for increased transparency and accountability.

Our objective through all of these efforts is to foster sustainable economic growth for those governments which make the necessary commitments, and which also follow through successfully on their projects and investments.

This in turn will greatly expand local access to foreign markets and producers, amplifying business opportunities and engendering more dependable and positive employment and tax base impacts, permitting further staged growth.

Another important element of this planning is the numbers of skilled young men and women available to operate our technologically, logistically, and politically complex global network.

Just this year we hosted our first Global Summit for Next Generation Aviation Professionals, and initiated an ICAO Gender Equality Programme. Both of which are now helping to address our future aviation workforce and human development challenges in league with ICAO's Global Aviation Training office.

Aviation is now poised to usher in a 21st Century air transport network which will serve as a key enabler of local economic vitality and sustainable development by optimizing global connectivity.

This role and responsibility are directly consistent with the Chicago Convention which established ICAO, and a great testament to the vision of its drafters. ■

Dr. Fang Liu
Secretary General of ICAO

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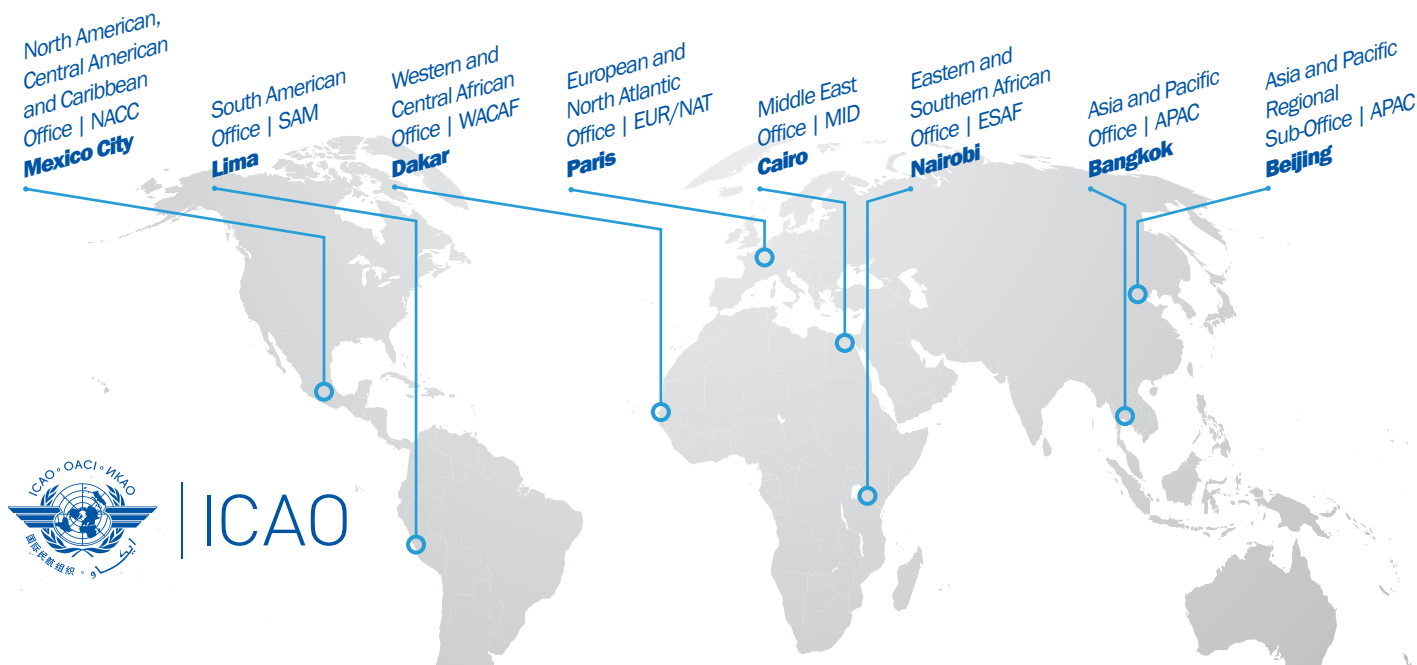
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ICAO'S GLOBAL PRESENCE



AVIATION FOR A BETTER FUTURE

Excerpts from the Industry High-Level Group (IHLG) report, *Aviation Benefits 2017*

The Industry High-Level Group (IHLG), established in 2013, is an initiative of the International Civil Aviation Organization (ICAO) Secretary General, bringing together the heads of four industry organizations: the Airports Council International (ACI), the Civil Air Navigation Services Organisation (CANSO), the International Air Transport Association (IATA) and the International Coordinating Council of Aerospace Industries Associations (ICCAIA). The IHLG is an informal group which considers matters of global significance to international civil aviation that can be better addressed in a collaborative

arrangement between States and the industry rather than working individually on such matters.

The IHLG organizations have collaborated to provide a comprehensive view of the importance of aviation on supporting the global economy and generating social benefits through the prism of sustainable air transport solutions.

The complete 68-page document, *Aviation Benefits 2017*, is available on the internet:

<https://www.icao.int/sustainability/Documents/AVIATION-BENEFITS-2017-web.pdf>



✈️ Aviation is one of the most “global” industries: connecting people, cultures and businesses across continents. Colleagues throughout the sector are committed to raising awareness of the benefits and the role of aviation. It is necessary for all stakeholders and partners to work together to maximize the benefits of air transport, and to support the sustainable growth of aviation by connecting more people and more places, more often.

Aviation has continued to expand. It has weathered crises and demonstrated long-term resilience, becoming an indispensable means of transport. Historically, air transport has doubled in size every 15 years and has grown faster than most other industries. In 2016, airlines worldwide carried around 3.8 billion passengers annually with 7.1 trillion revenue passenger kilometres (RPKs). Fifty-three million tonnes of freight were transported by air, reaching 205 billion freight tonne kilometres (FTKs). Every day, around 100,000 flights transport over 10 million passengers and around US\$18 billion worth of goods.

AVIATION: MAJOR CONTRIBUTOR TO GLOBAL ECONOMIC PROSPERITY

Aviation provides the only rapid worldwide transportation network, which makes it essential for global business. It generates economic growth, creates jobs, and facilitates international trade and tourism.

According to recent estimates by the cross-industry Air Transport Action Group (ATAG), the total economic impact (direct, indirect,

..... SHARED VALUE: NUESTRA HUERTA

“Nuestra Huerta” (Our Garden) is a programme initiated by Mariscal Sucre International Airport, Quito, Ecuador, which aims to integrate the area’s small agricultural producers in a chain of virtual community commercialization. Currently, 16 producers and their families, residing in parishes around the airport, are participating in Our Garden. Airport employees consume local products of Our Garden: fruits, dairy products, vegetables, bread, desserts, cooked grains, and prepared food.

The programme involves training for producers in areas such as sound agricultural and manufacturing practices, industrial safety, social responsibility, entrepreneurship and innovation, accounting management, and customer service. With the technical and financial advice of the Inter-American Development Bank, the airport has started to turn Our Garden into a shared value programme.

Source: Quiport

“It is necessary for all stakeholders and partners to work together to maximize the benefits of air transport.”



induced and tourism-connected) of the global aviation industry reached US\$2.7 trillion, some 3.5 percent of world's gross domestic product (GDP) in 2014.

The air transport industry also supported a total of 62.7 million jobs globally. It provided 9.9 million direct jobs. Airlines, air navigation service providers and airports directly employed over three million people. The civil aerospace sector (the manufacture of aircraft, systems and engines) employed 1.1 million people. A further 5.5 million worked in other on-airport positions. 52.8 million indirect, induced and tourism-related jobs were supported by aviation.

These estimates do not include other economic benefits of aviation, such as the jobs or economic activity that occur when companies or industries exist because air travel makes them possible, the intrinsic value that the speed and connectivity of air travel provides, or domestic tourism and trade. Including these would increase the employment and global economic impact numbers several-fold.

One of the industries that relies most heavily on aviation is tourism. By facilitating tourism, air transport helps generate economic growth and alleviate poverty. Currently, approximately 1.2 billion tourists are crossing borders every year, over half of whom travelled to their destinations by air. In 2014, aviation supported over 36

million jobs within the tourism sector, contributing roughly US\$892 billion a year to global GDP.

Air transport is a driver of global trade and e-commerce, allowing globalization of production. The small volumes of air cargo amount to big values in world trade. In 2014, US\$6.4 trillion worth of goods were transported internationally by air, representing 35 percent of world trade by value, despite representing only 0.5 percent by volume. Aviation's advantage over other modes of transport in terms of speed and reliability has contributed to the market for "same-day" and "next-day" delivery services and transportation of urgent or time-sensitive goods.

Some 87 percent of business-to-consumer (B2C) e-commerce parcels are currently carried by air. The e-commerce share of scheduled international mail tonne kilometres (MTKs) grew from 16 percent to 83 percent between 2010 and 2016 and is estimated to grow to 91 percent by 2025.

AVIATION PROVIDES SIGNIFICANT SOCIAL BENEFITS

The availability of reliable air transport services provides people with access to what they need: decent livelihoods, food, healthcare, education, safe communities and spaces, etc. Aviation is by far the world's safest and most efficient mode of long-range mass



..... AIR CONNECTIVITY SUPPORTS CARIBBEAN TOURISM

The Caribbean region is heavily reliant on tourism for its economic health. In many markets such as Cuba, Guyana, Martinique, Saint Lucia, Trinidad and Tobago, and Dominican Republic, more than 90 percent of tourists arrive by air. In 2014, aviation supported US\$27 billion in tourist spending across the region, of which US\$24.3 billion was leisure tourism and US\$2.7 billion was business tourism. This amount would be sufficient to cover public spending on healthcare and education in the region combined.

Source: IATA

.....

CHINA'S BELT AND ROAD INITIATIVE

The Belt and Road initiative is a development strategy proposed by China that aims to promote the connectivity of Asian, European and African continents and their adjacent seas, plus establish and strengthen partnerships among over 65 countries. The identified countries jointly account for 62 percent and 30 percent of the world's population and gross domestic product (GDP), respectively. In the next five years, China is estimated to invest up to US\$150 billion in Belt and Road countries.

The initiative calls for the integration of the region into a cohesive economic area through building infrastructure, increasing culture exchanges, and broadening trade. On the basis of respecting each other's sovereignty and security concerns, countries along the Belt and Road should improve the connectivity of their infrastructure construction plans and technical standard systems, jointly push forward the construction of international trunk passageways, and form an infrastructure network connecting all sub-regions in Asia, and between Asia, Europe and Africa, step by step.

Countries need to improve the region's infrastructure, putting in place a secure and efficient network of land, sea and air passages, lifting their connectivity to a higher level and further enhancing trade and investment facilitation. For air transport, the initiative calls to expand and build platforms and mechanisms for comprehensive civil aviation cooperation, and quicken the pace in improving aviation infrastructure.

.....

AIR AMBULANCES FOR REMOTE NORWAY

People living in rural and remote areas may face particular challenges. One of the biggest is healthcare. In Norway, where residents of rural towns benefit from Air Ambulance Services, a programme was put in place nearly 30 years ago to provide prompt and easy access to healthcare. With a budget of around 800 million Norwegian kroner (US\$91 million) and 20,000 patients helped annually, this service allows remote areas in Norway to maintain their population and assure the urgent care of their medical needs

Source: *luftambulansetjenesten*

transportation. It provides the only possible means of transportation to provide health care to many remote communities, and it is a fast and reliable way to deliver urgent humanitarian aid during emergencies caused by natural disasters, famine and war.

Furthermore, educational opportunities are made available to students around the world, especially for those students from developing countries who must travel abroad for higher quality education. Aviation also contributes to improving quality of life by broadening travellers' leisure and cultural experiences. It provides an affordable means to visit distant friends and relatives, and fosters awareness of other cultures.

SUPPORTING UN SUSTAINABLE DEVELOPMENT GOALS

The United Nations (UN) adopted the Transforming Our World: 2030 Agenda for Sustainable Development in 2015. This agenda is a plan of action for people, planet and prosperity, and seeks to strengthen universal peace in larger freedom. The world should aim to achieve the 17 Sustainable Development Goals (SDGs) and 169 targets by 2030. Aviation contributes to achieving many of the SDGs directly and indirectly.

Attainment of the SDGs relies on advances in sustainable air transport, which is a driver of sustainable development. In accordance with the recommendation made by the UN Secretary General's





High-Level Advisory Group on Sustainable Transport, all stakeholders must make a genuine commitment to transforming the transport system in terms of individual travel and freight into one that is “safe, affordable, accessible, efficient, and resilient while minimizing carbon and other emissions and environmental impacts.”

“Aviation provides the only rapid worldwide transportation network.”

SUSTAINING THE FUTURE OF AVIATION

By 2034, both air passenger traffic and air freight traffic are expected to more than double, compared to 2016. Passenger traffic is expected to reach over 14 trillion RPKs with a growth of 4.6 percent per annum, and freight will expand by 4.4 percent annually over the same time period, to 466 billion FTKs.

This growth holds tremendous economic potential which will support all States in achieving the UN’s 2030 Agenda for Sustainable Development. In 2034, aviation will provide 99 million jobs and generate US\$5.9 trillion in GDP, a 122 percent increase from 2014.

.....

FLOWERS FOR THE WORLD FROM SMALL GROWERS IN KENYA

In Kenya, over 100,000 jobs (and 500,000 livelihoods) depend on the cut flower industry, which supports 1.6 percent of the national economy, generating around US\$1 billion in foreign exchange each year. Horticulture is Kenya’s fastest growing sector and is ranked third after tourism and tea as a foreign exchange earner.

Over 90 percent of fresh horticultural products are transported by air freight. An estimated 70 percent of the flowers are grown at the rim of Lake Naivasha, northwest of Nairobi. There are good road network connections between the Lake Naivasha growing area and Nairobi’s Jomo Kenyatta International Airport, a distance of about 80-100 kilometres. Flowers picked in the morning reach markets in Amsterdam, The Netherlands, by evening.

Source: World Bank

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AIR SAFETY = ECONOMIC BENEFITS

The growth of air traffic depends on factors such as airfares, relative prices, real income, level of output, etc. Although there is not a clear understanding of how safety performance affects traffic demand, public safety reputation might affect travellers’ choice of destinations and airlines.

A potential impact of safety on traffic demand can be estimated using the econometric model, which uses an effective Implementation (EI) score measured by the ICAO Universal Safety Oversight Audit Programme Continuous Monitoring Approach (USOAP-CMA) as a proxy to each State’s safety performance. With all other factors affecting traffic being constant, this hypothetical analysis suggests that 10 percent improvement of the EI of a State’s safety oversight system might generate on average an additional 1.8 percent of aircraft departures from the State concerned.

Source: ICAO

The future growth of air transport will likely depend on sustainable world economic and trade growth, as well as declining airline costs and ticket prices. Other factors, including regulatory regimes (such as liberalization of air transport), technological improvements and fuel costs will also impact future growth.

If traffic growth were to slow by just one percent annually, the total number of jobs supported by the air transport sector would diminish by over 10 percent (more than 10 million jobs) and the contribution of the air transport sector to world GDP would drop by some 12 percent (US\$690 billion).

To encourage this projected growth in a sustainable manner and produce inclusive and productive development and employment, aviation must continue to develop coherent policies with tourism, trade and other transport sectors. A national or regional policy framework consistent with ICAO's standards and policies, and with globally accepted good regulatory practices, can unlock the full value of aviation. New technologies and procedures should also be adopted to further improve connectivity and modernize infrastructure while minimizing any possible adverse impacts of this growth on the environment. ■

“It provides the only possible means of transportation ... to deliver urgent humanitarian aid during emergencies.”

MAXIMIZING THE BENEFITS OF AVIATION

This checklist provides a guide for maximizing aviation benefits in a sustainable manner. Implementation will require leadership and concerted, coordinated actions from public authorities at all levels, together with aviation stakeholders, financial sectors, and international and regional organizations.

01

ECONOMIC DEVELOPMENT PLANNING

Mainstream the priorities of the aviation sector in States' economic development planning so that aviation can be used as an economic development driver.

02

AIR TRANSPORT REGULATORY FRAMEWORK

Establish and apply good governance for air transport, i.e. the institutional, regulatory, and policy frameworks, in which air transport is designed, implemented and managed.

03

AVIATION INFRASTRUCTURE

Develop quality aviation infrastructure (including air navigation systems and airports) commensurate with the level of predicted traffic growth and based on ICAO's global plans.

04

RESOURCE MOBILIZATION

Promote diversified funding and financing sources in partnership with States, international and regional organizations, and industry, as well as multi-lateral development banks and other financial institutions.

05

SAFETY AND SECURITY

Comply with ICAO's global standards and policies, as well as industry standards to continue enhancing civil aviation safety and security.

06

ENVIRONMENTAL PROTECTION

Reinforce efforts toward minimizing the environmental effects from civil aviation activities, especially the achievement of the aspirational goals of carbon neutral growth from 2020.

07

PUBLIC ENGAGEMENT

Foster an informed and engaged public as a crucial partner to advance sustainable air transport solutions.



We're going further than ever before to raise aviation standards worldwide.



As part of the newly formed International Group of the UK Civil Aviation Authority, CAA International is now extending the impact of the CAA's expertise across the globe. We have become a social enterprise, reinvesting a sustainable part of any profits we make into the global aviation community. This allows us to deploy the UK CAA's skills and experience where they are most needed throughout the world.

By bringing together experience, technology and resources in an actionable and long-lasting way, we hope to maintain our focus on raising aviation standards worldwide, and help create better aviation for everyone.

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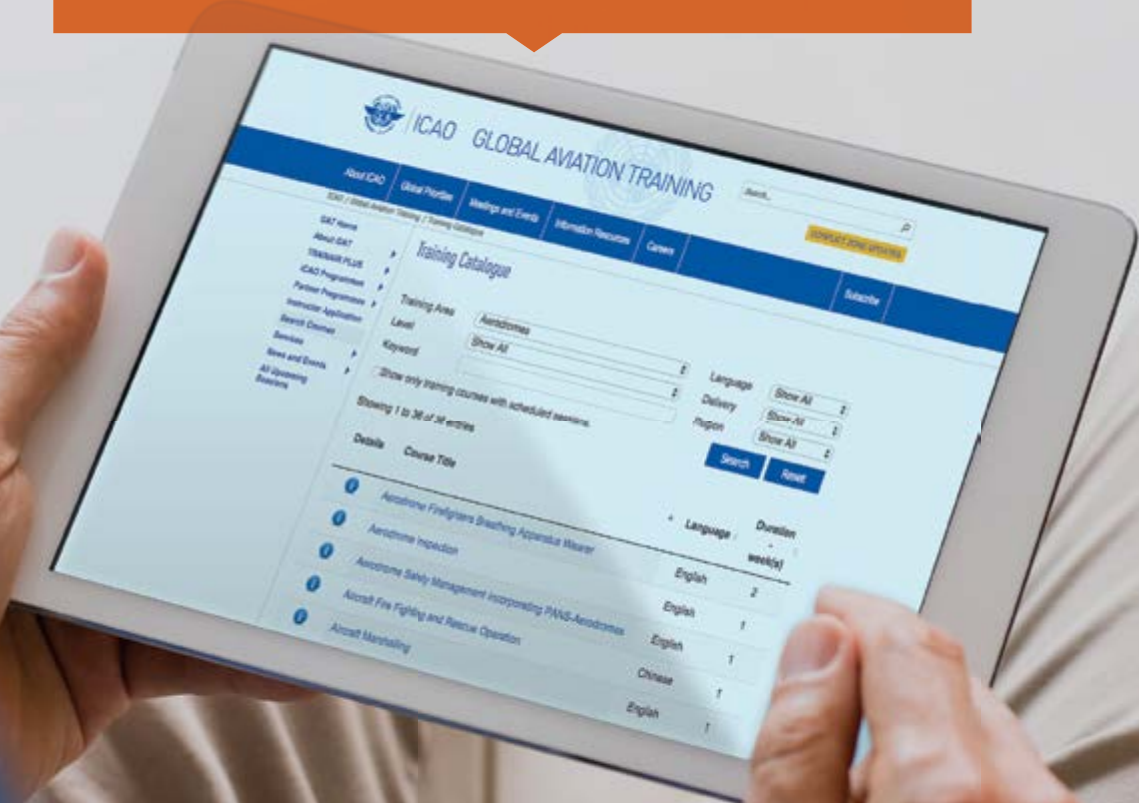


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NEW ICAO AIR TRANSPORT ACCESSIBILITY APP

Measuring People's Access to the International Air Transport System

Aerodromes Accessibility
Percentage of a State's population living within 100 KM of an aerodrome (0)



ICAO's data analysis team has launched a new web-based application ("app") on the iSTARS 3.0 portal that enables authorized users of the Integrated Safety Trend Analysis and Reporting System to quickly determine the percentage of a State's population living within 100 kilometres of an aerodrome.

✈ The "Air Transport Accessibility" app shows that "74 percent of the world population has access to international air transport," noted Mr Marco Merens, Chief, Integrated Aviation Analysis at ICAO. "For Europe, that rises to 90 percent, but for Africa it goes down to 64 percent."

The app allows the user to select one of ICAO's 192 Member States and compare that State's aerodrome accessibility with various groups of States – the entire world, an ICAO Region, a PIRG (Planning and Implementation Regional Group), RAIO (Regional Accident and Incident Investigation Organization), RASG (Regional Aviation Safety Group), or RS00 (Regional Safety Oversight Organization), a continent, Least Developed Countries (LDCs), Land Locked Developing Countries (LLDCs), and Small Island Developing States (SIDS) ... even special-interest groupings such as States with Performance-Based Navigation (PBN) implementation plans or lithium-battery producing States.

After entering the two simple parameters, the app will generate a summary for the State, a comparison with the selected group (in text and graph form), a color-coded choropleth map of the group, and a bar chart which can optionally show the percentage of accessibility for every State in the group. "You can generate a report for any country and any region and get a PDF. Try it," said Merens.

The methodology: "We took worldwide population data per square kilometres as published by the SocioEconomic Data and Application

Center (SEDAC) of NASA. That's a huge database, coherent with UN census data. We then took our own airport data, and filtered from the SEDAC database those areas close to international aerodromes and secondary aerodromes feeding into international ones. Our cloud computer took two days to calculate the ratios for each State."

The Air Transport Accessibility app is one of more than 25 apps on the iSTARS 3.0 secure portal. Other apps deliver information on air navigation implementation, airworthiness, accidents and incidents, route networks, dashboards such as the Conflict Zones Risk

"It's important that the information is reliable, can get there fast, and is available at any time"



MARCO MERENS
Chief, Integrated Aviation
Analysis, ICAO

Information repository and Universal Safety Oversight Audit Programme Continuous Monitoring Approach (USOAP-CMA) results, a Map Builder for data such as USOAP Effective Implementation (EI) scores, State and Regional Safety briefings, and more.

"At ICAO, we're doing a lot of predictive analysis, trying to find the future needs of aviation globally," Mr Merens said. "We have users of information all around the world. It's important the information is reliable, can get there fast, and is available at any time." ■

THIRD ICAO / UNOOSA SYMPOSIUM FOCUSES ON SPACE HARMONY

“Given the growing number of benefits derived from space science and technology applications, the conduct of space activities by all the main players continues to expand rapidly,” Ms Simon Di Pippo, Director, United Nations Office for Outer Space Affairs (UNOOSA), told the gathering of representatives from States, industry, and international and regional aerospace organizations.

“Space tools are fundamental to meeting the challenges to humanity and sustainable development and the overarching space security environment in its broader sense caters for global space governance.”



SIMONETTA DI PIPPO
Director, United Nations Office for
Outer Space Affairs (UNOOSA)

✈ Space 2017 was a continuation and culmination of the series of Aerospace Symposiums on sub-orbital commercial operations. started in Montréal, Canada in 2015, with the second held in Abu Dhabi, United Arab Emirates, in 2016.

The Vienna Symposium explored existing regulatory mechanisms and operational practices in aviation and space transportation, challenges and opportunities related to emerging space activities (in particular, future space traffic management), and protection of systems, assets and infrastructures.

Mr Hajime Yoshimura, President of the ICAO Air Navigation Commission, said, “This exciting new frontier of transport probably represents one of the most multi-disciplinary challenges ahead of us. It cuts across every technical subject in both aviation and space. But it also requires a necessary level of harmonization between the governance of international civil airspace and outer-space.”

He noted that “70 years of aviation standards-setting has clearly demonstrated that such harmonization is a critical enabler to ensure a high degree of safety, security and regularity. It also makes sure that the people of the world have access to all aspects of the sector. In other words, harmonization, makes it fair for everyone.”

Mr Yoshimura observed that there are many existing interface issues between airspace and outer space, including space and air law, operational challenges such as management of space debris, segregation of traffic, space weather information, protection of frequency spectrum, utilization of ground facilities, cybersecurity, and application of safety management.

In technology areas, regulatory approvals for licencing and certification must be considered. “Risk-based performance standards need to be developed in order that spaceplane operations can be more predictable and transparent for all stakeholders.” However, “we should keep in mind that over regulation should not kill this young industry.”

“Space tools are fundamental to meeting the challenges to humanity and sustainable development.”



EVENT

ICAO / UNOOSA AEROSPACE SYMPOSIUM (SPACE 2017)

29-31 August 2017, Vienna, Austria

HOSTS

International Civil Aviation Organization (ICAO)

United Nations Office for Outer Space Affairs (UNOOSA)

KEY DISCUSSIONS

- Trends in aviation, space activities, commercial space transportation and sub-orbital operations
- Sustainability of aerospace activities
- Regulatory and practical perspectives for aerospace operations and cooperation with aerospace stakeholders
- Air traffic management and future space traffic management

BUSY SPACE

Mr Nico Voorbach, Director ICAO and Industry Affairs for the Civil Air Navigation Services Organisation (CANSO), said, “Space is getting busier than ever,” growing 5-8 percent annually with 1,400 satellites already in operation and more than 80 new launches a year.

“Clear rules need to be developed and agreed by all stakeholders, to accommodate the requirements of users in traditional airspace, as well as space-bound vehicles travelling to and from space,” Mr Voorbach stated. “Close cooperation and collaboration with organizations responsible for space traffic management (STM), airspace/space users and ATM, and the global regulators, including ICAO and the United Nations Office for Outer Space Affairs.”

Ms Dorothy Reimold, US Federal Aviation Administration (FAA) Director of Strategic Operations, Commercial Space Transportation, and Chair, Space Learning Group, said, “Commercial space transportation is an innovative global industry. Public and private sectors are working together in new ways, and States can learn from each other and help each other.”

She noted that several States currently have independent orbital launch capability (Russia, United States, Europe, Japan, China, India, Israel, Iran, South Korea, North Korea), and the first six of those are competing in the commercial market. The US (Virgin Galactic, Blue Origin), Europe (Airbus), United Kingdom, Spain, others have reusable launch vehicles in development (both sub-orbital and orbital). And several countries are considering legislation or national frameworks for commercial sub-orbital launch (human space flight), orbital launch, and launch sites.

Mr Stefano Ferretti, European Space Policy Institute (ESPI) Resident Fellow, asked, “Are we on the verge of sub-orbital flights?” Within three

years, he explained, “It will be possible to fire airbreathing engines with the potential to revolutionize space launches, powering vehicles that can take off and land like aircraft, and allowing for flights up to five times the speed of sound, opening up the frontier of hypersonic air travel.”

However, he cautioned, “At this point in time, in the absence of even a clear definition of the air-space interface, the regulatory and legal aspects of sub-orbital flights and hypersonic travel are still far from being addressed in a comprehensive and exhaustive manner.”

“Considering the current status and the potential benefits, it is probably the right time to promote wider initiatives that encompass sub-orbital flights and hypersonic travel, and that may create synergies among different sectors and actors on a global scale, ultimately making this dream a reality,” Mr Ferretti concluded.

Mr Naser AlRashedi, Director of Space Policy and Regulation, UAE Space Agency, emphasized the need for an international mechanism for space accident and incident investigation. “Such a mechanism should build on the long experience by the aviation sector, while considering the differences, and should also cater for areas of common interest by space and aviation.”

UNISPACE+50 IN 2018

The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), the only global intergovernmental platform for international cooperation in space activities, has set in motion a roadmap toward the 50th anniversary of the first UN conference on space exploration and cooperation, which was held in 1968. Branded as UNISPACE+50, this effort aims to become a major milestone for the strengthening of global governance of outer space activities.



SIERRA NEVADA CORPORATION PHOTO

Space 2017 addressed elements related to the process toward UNISPACE+50 and beyond:

- Legal regulatory mechanisms under international air law and space law to ensure safe and sustainable operation of civil aviation; suborbital operations, and space activities;
- Air traffic management and future space traffic management;
- Assessing capacity-building needs.

These are also relevant to the long-term perspective toward Space2030, which will connect space governance with the global agendas for development. The core pillars of space economy, space society, space accessibility and space diplomacy will define the outputs for considering space as a tool for sustainable development. ■

Under the UNOOSA Human Space Technology Initiative (HSTI), the United Nations “Dream Chaser” Mission will provide member countries, especially developing countries, the opportunity to fly payloads for applications such as microgravity science, remote earth sensing, and space hardware qualification

الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY



MOHAMMED BIN RASHID (MBR) 'GLOBAL AVIATION AWARD'



AWARD OBJECTIVES

- PROVIDE A PLATFORM TO CONNECT AND IMPROVE RELATIONS WITH LEAST DEVELOPED STATES (LDS).
- SUPPORT THE “GLOBAL AVIATION PLAN FOR DEVELOPMENT”.
- SUPPORT THE ICAO OBJECTIVE OF INCREASED GLOBAL CONNECTIVITY.
- PROMOTE INNOVATION AND LIBERALIZATION ACROSS THE INDUSTRY GLOBALLY.

AWARD CATEGORIES

- STATE WITH MOST IMPROVED QUALITY OF AVIATION.
- INFRASTRUCTURE OUTSTANDING GLOBAL CONNECTIVITY AWARD.
- OUTSTANDING INTERNATIONAL CO - OPERATION PROGRAM
- OUTSTANDING RESOURCE CONTRIBUTION TO ICAO PROGRAMS.
- AVIATION PERSONALITY OF TRIENNium.
- INNOVATION AWARD (ENCOMPASSING AVIATION SAFETY, SECURITY, SUSTAINABILITY, PASSENGER EXPERIENCE).



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RPAS 2017 & DRONE ENABLE EVENTS EMPHASIZE GLOBAL FRAMEWORK

EVENTS

SECOND GLOBAL REMOTELY PILOTED AIRCRAFT SYSTEMS SYMPOSIUM (RPAS 2017)

19-21 September 2017, Montréal, Canada

DRONE ENABLE, ICAO'S UNMANNED AIRCRAFT SYSTEMS (UAS) INDUSTRY SYMPOSIUM

22-23 September 2017, Montréal, Canada


HOST

International Civil Aviation Organization (ICAO)

OUTCOMES

- Recognition of the need for an international regulatory framework
- ICAO needs to be the focal point, ensure global harmonization, standardization
- Unregulated operations in complex environments are resulting in aviation safety risks
- Harmonized categorization can assist in addressing regulatory challenges
- Collaboration by all is crucial

“Literally thousands of small drones are being sold daily, and these are deeply diverse in their characteristics and features,” ICAO Council President Dr Olumuyiwa Benard Aliu told the licensing authorities, regulators and industry representatives gathered in Montréal for the 2nd Global Remotely Piloted Aircraft Systems Symposium (RPAS 2017). “We are already seeing new businesses and humanitarian operations leveraging these technologies and the opportunities they offer. This is occurring in ways that we had not envisioned even just a decade ago, and this evolution and innovation will only continue as more and more people allow their imaginations to take off, literally and figuratively.”

 Dr Aliu stressed the importance of a globally coherent regulatory framework for the management of unmanned air traffic as well as the complexity of this task and the need to place safety first. “States are facing increasing pressure to open the door widely for unmanned aircraft, and while their socio-economic benefits seem clear, we must avoid the tendency to rush headlong into unmanned aircraft system operational frameworks which have not benefited from all due diligence and the careful regard required for existing airspace users.”



“This is a very exciting and rapidly evolving area of activity, and one which is presently requiring us to define hundreds of new amendments to no less than 18 of our Convention’s 19 Annexes,” the Council President noted. “This broad scope of work led ICAO to very carefully prioritize and schedule the SARP (Standards and Recommended Practices) development process. As a first step, we are addressing the Annexes related to the issuance of certificates. This includes the Remote Pilot Licence, Remotely Piloted Aircraft Systems Operator Certificate, and Certificate of Airworthiness. This initial phase will be followed by the amendment of other Annexes that will support the safe, secure and efficient integration of remotely piloted aircraft into non-segregated airspace and aerodromes.”

Dr Aliu said it is important to understand and distinguish between the different types of unmanned aircraft – and which ones ICAO is specifically addressing in its SARPs.

Any aircraft intended to fly without a pilot on board is an unmanned aircraft. However, those that will fully integrate with manned aircraft, particularly when conducting operations in accordance with instrument flight rules, require all the same basic certificates and equipment as manned aircraft. This highly capable part of the unmanned aircraft family is referred to officially as “remotely piloted aircraft” (RPA).

“In order to integrate seamlessly, new technologies are demanded. Some of which are yet to be invented,” Dr Aliu stated. “We can also expect that these technologies will bring benefits to not only the unmanned aircraft industry, but lead to new safety performance improvements throughout the aviation system.”

The RPAS 2017 Symposium provided an international platform to exchange ideas and share best practices for the further development of an RPAS regulatory framework. Topics of the event included the new Remote Pilot Licence (RPL), implementation of approved training programmes, RPAS operations in the air traffic management (ATM) environment, including safety risk management, and impacts on human performance.

FORGING A UTM FRAMEWORK

Immediately following RPAS 2017, ICAO hosted the Drone Enable Unmanned Aircraft Systems (UAS) Industry Symposium – a unique opportunity for States, international organizations, industry, academia and other stakeholders to share their research, best practices

and lessons learned related to unmanned aircraft system traffic management systems (UTM).

Mr Brian Wynne, President and CEO of the Association for Unmanned Vehicle Systems International (AUVSI), said, “We are at the dawn

“In order to integrate seamlessly, new technologies are demanded. Some of which are yet to be invented.”



DR OLUMUYIWA BENARD ALIU
President of the ICAO Council

of a new renaissance in aviation and technology, one that requires international collaboration and the support of agencies such as ICAO to reach its full potential. Businesses and civil operators should be able to reap the full benefits of UAS technology without unnecessary hurdles. Industry stakeholders and governments must therefore work together on a global level

to identify common solutions to the industry’s greatest challenges.”

Mr Gur Kimchi, Vice President, Amazon Prime Air, when asked, “What do you need from regulators right now?”, responded: “Uniformity. The same civil standards that work worldwide are what’s going to help this industry. Authorities should adopt performance-based guidelines, endorse common technical standards, and embrace future technologies. Industry has to propose and adopt guidelines for interoperability, implement technical standards, and build safe and secure systems.”

Mr Stephen Creamer, Director of the ICAO Air Navigation Bureau, presented a concept for a global drone registry. He said the current situation of drone registration systems lacks consistency between States (the majority of States without any registration system), there is no ability to identify and contact operators and no ability to track drones across borders.



“As the volume of UA increases, with potential for international use, the need for an interoperable, global registry becomes apparent,” Mr Creamer said. “ICAO is the natural and logical international organization to coordinate efforts for global drone registration.”

He said participation in the registry would be optional, but necessary to benefit from a plug-and-play option (for States without an existing drone registry) or API integration (for States with an existing drone registry).

The goal is an operable international registry by the next Drone Enable event, scheduled for September 2018 in China.

AUVSI's Wynne said, “Exploring the concept of a global UAS registry for all users might help create a culture of safety that transcends borders. Registration helps promote accountability and responsibility among operators, and a shared database could provide authorities with critical information no matter where an operator is flying.”

The Drone Enable discussions centred around defining a common UAS traffic management (UTM) framework with core boundaries

for global harmonization, including registration, identification and tracking; communications systems; and geofencing-like systems. “Keep your minds as open as possible to how we address these problems,” said Fang Liu, ICAO Secretary General. Drones are “amazingly versatile tools, and they are also aircraft.” ICAO wants to develop UTM solutions that encourage innovation, but “we need to determine regulatory approaches which are flexible and adaptive so all UAS approaches can make use of them.”

ICAO's UAS Advisory Group (UAS-AG) convened immediately after Drone Enable to create a UTM global harmonization document to be presented at the Second Global Air Navigation Industry Symposium ((GANIS/2) in December. The framework wouldn't be legally binding but could help countries set up a harmonized UTM. ■

FOLLOW UP

To view key sessions of the Drone Enable discussions, check out SkyTalks on ICAO's United Aviation website:

<http://www.unitingaviation.com/sky-talks/skytalk-live-streaming-drone-enable-icaos-unmanned-aircraft-systems-industry-symposium/>

MARK YOUR CALENDAR

3RD GLOBAL REMOTELY PILOTED AIRCRAFT SYSTEMS SYMPOSIUM (RPAS 2018)

10-12 September 2018, Chengdu, China

DRONE ENABLE

13-14 September 2018, Chengdu, China





MANAGEMENT CERTIFICATE IN CIVIL AVIATION

Offered by Concordia University's John Molson School of Business in partnership with the International Civil Aviation Organization (ICAO), this business program is clearly set on advancing your aviation management skills and career.

OVERVIEW

The objective of this aviation-centric management programme is to enhance the competencies of qualified personnel in the civil aviation community while promoting best practices with ICAO's TRAINAIR PLUS Programme and global aviation training activities. The programme will be taught at a level equivalent to that of a graduate business programme and will consist of three certificates: Strategic Management, Human Resources Management and Business Planning and Decision-Making. Successful completion of all three certificates will lead to a Management Certificate in Civil Aviation.

WHO IS THIS PROGRAMME FOR?

Aviation professionals and managers from Civil Aviation Authorities (CAAs), airlines, aerodrome operators, and other service providers.

MODE OF DELIVERY

Courses will be delivered using a hybrid format combining classroom sessions and e-learning, allowing participants to continue to meet their career responsibilities. Classroom sessions will be offered in all regions to accommodate large participation from ICAO Member States and aviation industry, and to keep course fees at reasonable level.

ADVANCE YOUR AVIATION MANAGEMENT SKILLS AND CAREER

MORE INFORMATION

concordia.ca/jmsb/aviation



MANAGEMENT CERTIFICATE IN CIVIL AVIATION

THE CURRICULUM

Certificate in Business Planning and Decision-Making

Online – November 6 to December 17, 2017

- Business Analytics
- Marketing Management
- Management Accounting and Budgeting
- Managing Information Technology

Classroom (ICAO, Montreal) – December 4 to 8, 2017

- Business Planning and Forecasting
- Project Management
- Creative Problem Solving
- Risk Management
- Simulation

Certificate in Strategic Management

Online – December 11, 2017 to February 9, 2018

- International Civil Aviation System
- Strategic Planning and Innovation
- Reputation Management
- Finance for Strategic Decision-Making

Classroom (ICAO, Montreal) – January 29 to February 2, 2018

- Crafting and Implementing a Winning Strategy
- Leading Change
- Managing Across Cultures
- Business Ethics
- Integrative Group Assignment and Presentation

Certificate in Human Resources Management

Online – February 9 to March 30, 2018

- Introduction to Human Resources Management
- Organizational Behavior
- Training and Development
- Staffing and Succession Planning

Classroom (ICAO, Montreal) – March 19 to 23, 2018

- Leading Self
- Leading and Mobilizing Teams
- Cross-Cultural Communication
- Performance Management
- Leading Change

PARTICIPANT'S TESTIMONIAL

"Great learning experience, positive, inspiring."



Alexis Brathwaite
Manager ANS Safety and Air Traffic Services
Trinidad and Tobago Civil Aviation Authority

DURATION

Six (6) weeks per certificate
Four (4) online, one (1) in person and one (1) for final exam

LANGUAGE

English

INDIVIDUAL RATE

\$3,000 USD per certificate

CORPORATE RATE

Register four paid at regular price of \$3,000 USD

Get a fifth seat at no charge

REGISTRATION

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aviation@concordia.ca

Tel.: + 1 514-848-3960
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GACS2 PROMOTES AVIATION TECHNICAL COOPERATION

EVENT

THE SECOND GLOBAL AVIATION COOPERATION SYMPOSIUM (GACS2)

11-13 October 2017, Athens, Greece

HOSTS

International Civil Aviation Organization (ICAO)

Hellenic Civil Aviation Authority

Athens International Airport

KEY DISCUSSIONS

- Managing change: building a safe, secure, and sustainable aviation community
- Determining unique solutions for capacity-building through technical cooperation and assistance projects
- Promote the role of ICAO's Technical Cooperation Programme in assisting States to achieve their goals
- Strengthen institutional and cross-industry relationships

Goal number one is “managing change,” ICAO Secretary General Dr Fang Liu told the gathering of government representatives, airport operators, air navigation service providers (ANSPs) and other industry professionals at GACS2 in Athens. “The aviation system has evolved over the decades to become an irreplaceable global network connecting the world’s cultures and economies. It brings together families and friends, and businesses and their customers, to the tune of 10 million passengers daily on over 100,000 flights. Our sector today supports 63.5 million jobs globally, fully one third of world trade by value, and contributes more than 2.7 trillion dollars annually to global GDP. It also carries over half of the 1.4 billion tourists who travel across international borders each year.”



However, by the early 2030s, ICAO projects that today’s flight and passenger volumes will double. “This growth presents challenges to States and industry in terms of how to manage the expansion of their local capacity to optimize air transport’s socio-economic benefits.”

Sectoral growth, the Secretary General cautioned, “cannot be permitted to negatively impact our key strategic performance targets. Existing levels of aviation safety, security, efficiency, passenger facilitation, and environmental protection must also improve even as we expand.”

Goal 2 of the Symposium was “determining unique solutions.” ICAO’s Technical Cooperation Programme, overseen by Director Ivan Galan and his team, “is fully



DR FANG LIU
Secretary General, ICAO

“The intrinsic value of cooperation in air transport ... impacts every stakeholder in our very broad and inclusive global community.”

aligned with this tradition,” Dr Liu commented. “It seeks to enable States to attain the highest possible standards of effective ICAO compliance, whether through new infrastructure deployment, human resources development, or other aviation development priorities.”

ICAO’s Technical Cooperation Programme is presently assisting more than 100 States and organizations annually with various aviation projects, mainly in support of their capacity-building and infrastructure development objectives, human resources training programmes, the recruitment of expert consultants, and the procurement of civil aviation equipment and services.

Recognizing that many governments in attendance at the Athens event are engaged toward achieving the UN Sustainable Development Goals (SDGs) under the 2030 Agenda for Sustainable Development, Dr Liu noted that aviation cooperation must begin with States’ commitments and suitable demonstrations of political will. “Ultimately it leads to the physical, human and regulatory resources being put in place which permit States to expand their route networks, improve foreign market and supply chain access for local suppliers, and in the end brings wide-ranging and sustainable prosperity benefits to their local populations,” Dr Liu explained.

Mr Giancarlo Buono, Regional Director, Europe Safety and Flight Operations for the International Air Transport Association (IATA), suggested the collaborative approach to aviation safety requires “balancing compliance with performance” and “managing by fact and not guess.” He called for less bureaucracy and more expert analysis

(evolving the role of inspectors (“from compliance checkers to system assessors”) and a common understanding of hazards (using data for hazard identification and risk assessment). “Organizations are different; we need to understand the uniqueness of each organization.”

Dr Dimitrios J. Dimitriou, Chairman of the Board of Directors for Athens International Airport and an Economics Professor in Planning, Management & Economics of Air Transport Infrastructure, addressed key challenges in cooperation. He said the 1990s era, which he characterized as ‘the mathematization of business,’ “did not always enhance understanding of real-life business.”

In this century, aviation is leading in the concept of effective decision making, including auditing and monitoring and key performance indicators (KPIs). Voices are rising toward effective decision making, authorization and independency, including:

- More open regulatory framework
- Flexibility in long-term contracts
- Authority to managers
- Less complexity in legal framework
- Standardization in competition and contacts framework
- Use the benefits of globalization, digitalization and new technologies

The first GACS symposium in 2014 in Montréal, Canada raised awareness on the need for improved dialogue and openness regarding the needs and contributions of States, ANSPs, Security and Safety entities, and other aviation stakeholders. ■





DIRECTORS GENERAL DISCUSS ASIA-PACIFIC SAFETY, SECURITY, CAPACITY, EMISSIONS

“While the Asia-Pacific presently leads the world in terms of traffic growth, it also faces attendant challenges with respect to managing and sustaining it, safely, securely and efficiently,” ICAO Council President Dr Olumuyiwa Benard Aliu told the 300 delegates at the 54th Asia-Pacific Directors General of Civil Aviation (APAC DGCA) event.

EVENT

54TH ASIA-PACIFIC DIRECTORS GENERAL OF CIVIL AVIATION (APAC DGCA)

7-11 August 2017, Ulaanbaatar, Mongolia

HOSTS

International Civil Aviation Organization (ICAO)
Civil Aviation Authority of Mongolia

KEY DISCUSSIONS

- The Challenge of Managing Outcome-Focused and Risk-Based Regulations for Asia-Pacific States
- Aviation Safety and Air Navigation
- Economic Development of Air Transport
- Aviation and Environment
- Technical and Regional Cooperation

✈ Asia-Pacific is a unique region in terms of cultural diversity and socio-economic development with the largest aviation market in the world. Considering the ever-changing global socio-economics and aviation development, a new approach is required to address safety priorities of States through introduction of risk-based regulations. While coping with the rapid aviation development and challenges faced in implementation of ICAO Standards and Recommended Practices (SARPs), States need to cooperate and collaborate more closely.

Dr Aliu underscored the need to manage demand against capacity of airport and air traffic management (ATM) systems and the urgent need for APAC States to apply the Safety Enhancement Initiatives (SEIs) set out by its Regional Aviation Safety Group (RASG). He also discussed the challenges to infrastructure from volatile regulatory environments, as well as inadequate training capacity for skilled aviation professionals.

The ICAO Council President drew attention to the region’s capacity challenges: “ICAO is leading efforts to increase the number of new air routes, implement an Asia-Pacific Air Traffic Flow Management System, and to realize a more flexible local approach to the sharing of airspace by civil and military operators.”

He also addressed the essentialness of air transport connectivity for the Pacific Island States, mainly arising from their remoteness and small populations, and to the resource challenges they face in optimizing aviation’s

ICAO Council President Dr Olumuyiwa Benard Aliu (centre) and ICAO Secretary General Dr Fang Liu (right) exchange gifts and greetings with Mongolia's Minister and Chief of Cabinet for the Secretariat of the Government, Mr Jimiyan Munkhbat.



MONGOLIAN PARLIAMENT BUILDING

benefits. "A reliable network of air links within and among island countries, and to major air transport hubs, is essential to the viability of these countries from humanitarian, political and economic perspectives."

ICAO Secretary General Dr Fang Liu highlighted how the ICAO Regional Office in Bangkok, led by Regional Director Arun Mishra, has been ramping up efforts to assist Asia-Pacific States with their ICAO compliance. "We've been greatly encouraged by the enthusiasm and commitments from these States as the Combined Action Teams (CAT) process has gotten underway, and are already seeing solid results," the Secretary General said.

She also commented on ICAO's efforts to reinforce the global aviation security framework, pointing to partnerships with the World Customs Organization and relevant UN bodies, and "the need to evolve a common security approach while maintaining a keen focus on our complementary goals for a more streamlined and unobstructive passenger and cargo facilitation experience."

In their Conference Declaration, the Directors General committed to:

- Implement an effective State Safety Programme (SSP) by 2022, achieve a USOAP EI score higher or equal to the global average by 2022; certify all aerodromes used for international operations by 2020; and implement programmes relating to runway safety, loss of control in flight and controlled flight into terrain;
- Timely implementation of the Asia/Pacific Seamless Air Traffic Management (ATM) Plan to enhance ATM capacity and harmonization in the region;
- Establish an accident investigation authority that is independent from State aviation authorities and other entities that could interfere with the conduct or objectivity of an investigation or where appropriate develop a bilateral, sub-regional or regional partnership to support the establishment of accident investigation capabilities to serve the region or sub-region; and
- In line with the ICAO initiative on Next Generation of Aviation Professionals (NGAP), accord priority to human capital development to provide sufficient qualified and competent aviation professionals to support the Region's growing needs. ■

To see the conference presentations, go to:
<http://dgca54.mn/presentations/>

MONGOLIA AVIATION AT IMPORTANT JUNCTURE

In the heart of Central Asia, Mongolia, the fifth largest country in Asia, is surrounded by High Altai Rocky Mountains in the west, dense forested areas in the north, vast plain in the east, and Gobi desert in the south.

Mongolia's aviation market is at an important juncture as the country prepares to open a new international airport at the capital Ulaanbaatar in 2018. The new airport will have capacity to handle up to 12 million passengers once construction is fully complete. The Mongolian market has huge potential, and increased tourism would have an overall economic benefit.

The Mongolian Civil Aviation Authority (MCAA) signed a memorandum of understanding with the Civil Aviation Administration of China (CAAC) on increasing cross-border air routes during the ICAO Conference of Asia-Pacific DGCA's.

ICAO Council President Dr Olumuyiwa Benard Aliu highlighted Mongolia's civil aviation and infrastructure commitments, and lauded it for the exemplary results it achieved in its most recent safety and security audits. He reiterated the commitment of ICAO to work closely with Mongolia, saying that together they would improve and augment the contributions of its civil aviation sector to the socio-economic development and prosperity of its citizens and businesses.

Mr Dangaa Ganbat, Minister of Road and Transport Development of Mongolia, highlighted the State's current focus on the training of its civil aviation personnel and the new airport in development. "For Mongolia, a landlocked country with vast territory, air transportation is one of the key sectors of national economy. Advantageously located between Asia and Europe, Mongolia is duly following the ICAO policy recommendations and continues to upgrade its air navigation systems by acquiring the latest technical and technological innovations. We have succeeded in establishing a reliable and safe air navigation service framework and became one of the main base platforms of the international transit flights," the Minister noted.

DREAM




SOAR

The most important number to remember about 30-year-old Shaesta Waiz's record-setting round-the-world flight is not the 24,816 nautical miles flown in 176 flight in 2017 hours across 145 days, not the 30 stops in 22 countries, but the 3,000 young lives she touched in 32 outreach events.



“ICAO has been a huge help since Dreams Soar was first conceived, introducing me to aviation officials in so many of the countries ... providing flight safety and route advice, and helping to organize the global support and cooperation.”

ICAO’s support for Dreams Soar is part of its Next Generation of Aviation Professionals (NGAP) programme, focused on attracting young people to fill the hundreds of thousands of career positions coming available for new pilots and other skilled air transport personnel.

 “Every time I open the door of an aircraft, I ask myself, ‘How did a girl with my background become so lucky? The truth is, anyone can be me,’” remarks Captain Shaesta Waiz.

Born in a refugee camp into a family fleeing the Afghan-Soviet war. Grew up in an underprivileged neighborhood in northern California in the United States. Took her first ride on an airplane at age 19.

“I went inside the airplane. I sat down. I was sweating. I was thinking that the plane was probably going to launch into the sky like a rocket and it was going to be like a roller coaster. But when the plane took off – my life completely changed. I fell in love with aviation,” she recalls.

That led her to Embry-Riddle Aeronautical University in Florida, where she founded the Women’s Ambassadors Program in 2011 to increase female enrollment, which grew from 13 to 22 percent in less than three years through a modeled mentor program.

Then came the idea for Dreams Soar, a mission to inspire the next generation of Science, Technology, Engineering and Math (STEM) and aviation professionals.

“I was able to get in front of 3,000 kids from all over the world and talk about Dreams Soar. The most important part of all these events was that the kids, especially the young girls, could see that you can come from nothing and achieve your wildest dreams if you work hard at it, and you work persistent, and you apply yourself,” Capt. Waiz says.

“When I went to Afghanistan, I was blown away. There were about 300 people, mostly women, with flowers.” Capt. Waiz is considering starting a school in her native country that will allow young girls to pursue STEM educations. “It would enable and empower women in the country,

and they can use their knowledge to help Afghan people with many difficulties they face.”

The first stop on her global circumnavigation was Columbus, Ohio, hometown of the late Geraldine “Jerrie” Mock, the first woman to fly solo around the world in 1964 and who had been an inspiration and mentor to Capt. Waiz.

On 17 May, to celebrate the 90th Anniversary of the first nonstop transatlantic flight by Charles Lindbergh, she landed her 2001 Beechcraft Bonanza A36 in Montréal, Canada to participate in the International Aviation Women’s Association Connect event at ICAO Headquarters.

“ICAO has been honoured to be a main Dreams Soar supporter throughout Shaesta’s campaign,” commented ICAO’s current (and first female) Secretary General, Dr Fang Liu. “Shaesta’s objectives align so well not only with our established NGAP programme, but also the new Gender Equality Programme we have recently launched. We have been very grateful for this unique opportunity to help her inspire so many young, enthusiastic women and girls.”

According to Boeing and the International Society of Women Airline Pilots, only 6 percent of airline pilots worldwide are women.

“I have a very strong passion for aviation that I want to share. I want to show women that they can succeed in anything – including flying around the world,” Capt. Waiz says. “My aviation dreams have had a huge impact in making me the pilot and the woman I am today, and I’m very grateful for ICAO’s recognition and support.”

Dreams Soar’s historic global solo flight departed 13 May 2017 and returned 4 October 2017 to Daytona Beach, Florida. ■

For more about Capt. Waiz’s Dreams Soar adventure, visit <http://dreamssoar.org/>

For more information about ICAO’s Next Generation of Aviation Professionals (NGAP) programme, visit <https://www.icao.int/safety/ngap/Pages/default.aspx>

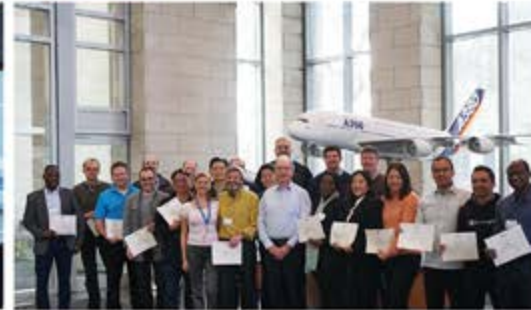
“It’s important that people actually see a woman pilot flying in the aircraft. Seeing is believing.”

CAPTAIN SHAESTA WAIZ

Youngest woman to fly solo around the globe in a single-engine plane



-  5 days
-  40 hours
-  Delivered by an approved ICAO PBN Instructor



Performance-Based Navigation PBN Operational Approvals Workshop

ICAO's latest workshop simplifies guidance from the perspective of air operators and state regulators. State regulators will learn how to guide the air operator through the operational approval process. Air operators will learn: how to carry out a PBN operations approval assessment efficiently; their obligations for PBN approvals; the tasks required in each step of the process; the validity of a foreign operator's approval within a state; and when an airline should apply and where the approval will be valid. The workshop also includes the learnings and findings from States that have been early to adopt PBN.

2018 Workshops - New Dates and Locations



19 - 23 February
Nairobi, Kenya

5 - 9 March
Montréal, Canada

12 - 16 March
Paris, France

16 - 20 April
Dakar, Senegal

14 - 18 May
Bangkok, Thailand

28 May - 1 June
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BILINGUALISM IN THE SKY

Pilot and Air Traffic Controller Communication in a Foreign Language

*DR FRANCOIS GROSJEAN INTERVIEWS
DR JUDITH BÜRKI-COHEN.*

There are some 100,000 commercial flights each day in the world, which means that literally millions of interactions take place between pilots and air traffic controllers, very often in a foreign language since English is the international language of civil aviation. This entails a special form of bilingualism as it is very domain-specific and has to be optimal at all times. How does it take place? How efficient is it? Are there breakdowns and if so, what are they due to? What still needs to be improved?

Dr. Judith Bürki-Cohen, formerly a senior scientist at the U.S. Department of Transportation's Office of the Secretary, Research and Technology, has worked extensively on these questions.

 **What percentage of communication between pilots and air traffic controllers involves English as a foreign language for one or both parties, would you say?**

In non-English speaking countries, near 100 percent, because few air traffic controllers and only some pilots are native speakers of English. In countries where English is the official language, it will depend on the percentage of international flights or international student pilots. This will vary according to region.

Who is responsible for making sure that both air traffic controllers and pilots are sufficiently proficient to talk to one another in English?

The civil aviation authorities in each country, which are affiliated with the International Civil Aviation Organization (ICAO) headquartered in Canada. For all pilots and air traffic controllers, it requires proficiency in aviation phraseology. Since March 2011, ICAO also requires general English language proficiency for pilots and controllers flying internationally or interacting with international flights.

Is English always respected or do pilots and controllers who share the same language, e.g. a German pilot speaking to a German controller, slip into their native language?

Well, they really shouldn't. One important reason is the so-called party line, i.e. a source of information for pilots and for air traffic controllers. The airspace is divided into sectors that communicate on the same radar frequency. As a pilot, I can increase my situation awareness by listening to who else is on the same frequency. This tells me who is near me and whether they encounter any weather that I should know about. I may even catch an air traffic controller's mistake, such as clearing me for the same runway as another airplane.

Pilots and controllers speaking in languages other than English deprive non-English speaking pilots flying in the same airspace of the information in the party line, and they thus diminish their situation awareness.

Flying is one of the safest ways of traveling so communication in English, even though it is in a foreign language for many, seems to work very well. What are the procedures that are in place to make it so efficient?

The most important aspect is the strictly regulated phraseology and communication procedures that aim at avoiding misunderstandings. That is why it is so critical that all pilots and air traffic controllers adhere to these procedures, which afford multiple occasions to catch errors.

One procedural requirement, for instance, is careful “readback” by the pilot of what the controller has said, and “hearback” by the controller. The latter is supposed to listen to the pilot’s readback and catch any readback errors.

Of course, errors can go unnoticed, especially in a congested airspace. Efforts are underway to shift routine conversations to “datalink” via satellite, where air traffic controllers can communicate with pilots via text messages.

There are some instances where communication between pilots and air controllers break down though. Can you tell us how much is due to faulty English as compared to other reasons?

In addition to readback and hearback errors, there are many reasons why communication breakdowns happen. Faulty English is just one of them and restricted to areas with international flights or pilots. Use of non-standard phraseology may or may not be due to lack of English proficiency. There are also stuck microphones which block an entire frequency and there is frequency congestion where a pilot cannot get a word in.

“As a pilot, I can increase my situation awareness by listening to who else is on the same frequency.”

Another problem is airplane callsign confusions, where a pilot may take a clearance for another airplane with a similar sounding callsign. Certainly, all these issues are not helped with lack of English proficiency as a compounding factor.

How important is accent in communication breakdown since a controller and a pilot might each have a different English accent? Would you have an example of an incident due to this?

There are certainly complaints from both pilots and controllers, and incidences where accents may have played a role. A quick search of an official reporting system in the United States for “foreign accent”

yields just 10 reports filed in the past 10 years. However, there are many unreported incidents involving pilots flying into non-English speaking territory, pilots using airports with foreign students, pilots communicating with non-native English speaking crew, and of course air traffic controllers communicating with international flights or pilots.

Not only may pilots and air controllers have different first languages influencing their English but they might also come from different cultures. How does this affect communication?

You may be thinking of the 1990 Avianca crash near JFK airport, where 73 of the 158 passengers died. This is a perfect example of James Reason’s Swiss Cheese Model, where several “holes” in the system have to line up to result in an accident. Yes, the Avianca copilot may have been intimidated by the controller’s assertive manner, and a certain “macho” culture may have prevented him from successfully communicating the seriousness of the situation. This is all conjecture, however.

The facts are that the crew did not use the correct phraseology, which would have required them to declare a fuel emergency and request an emergency landing. Also, the crew had failed to obtain weather information before and during the flight and were unaware of the serious weather around JFK airport. Thus, they did not have enough fuel to handle the resulting delays at this notoriously busy airport. Moreover, the captain missed the first approach and had to go around for a second try. Finally, a less busy controller might have further inquired after hearing the non-standard phrase “we’re running out of fuel,” especially with an international crew.

You give specific recommendations for how air traffic controllers should talk to foreign pilots speaking English. What are they?

Controllers should be aware that international pilots may be less familiar with the phraseology or that regional phraseologies may differ. Controllers should be especially careful with numbers and stick to giving them in single digits instead of grouping them, that is, “eight” “three” instead of “eighty three.” Grouping occurs differently for different languages (three and eighty in German, or four times twenty and three in French). Units for weights, distances, barometric pressure etc. may also be different in different countries.

Controllers should speak “staccato,” that is, break the instruction up into its component words by inserting short pauses. Recognizing where one word ends and the next begins is notoriously difficult for listeners of a foreign language. And, of course, controllers should pay extra attention to complete and correct readback. Finally, keeping instructions short will facilitate correct readback and save time over trying to cram too much information into one clearance. ■

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UAE CREATES GLOBAL AVIATION AWARDS

Supporting the *No Country Left Behind* programme,
initial awards to be presented at ICAO Assembly 40 in 2019



SAIF MOHAMMED AL SUWAIDI
Director General, UAE General
Civil Aviation Authority

✈ From the first commercial flight arriving in the United Arab Emirates (UAE) in 1932, the UAE aviation sector has flourished. The UAE is now home to one of the world's busiest international airports and the largest international airlines. The aviation industry is a major contributor to the UAE economy and has the potential to become a major source of the UAE's post-oil-diversification portfolio. Recently the UAE announced that the Emirates Flight Information Region (FIR) will be transformed into the world's first airspace structure to be completely based on Performance-Based Navigation (PBN). The UAE has also been exhibiting regional and international leadership through its Cooperation Programmes and by maintaining a seat at the ICAO Council. The State is also ranked as the top ICAO Member State in compliance level with ICAO requirements under the Universal Safety Oversight Audit Programme (USOAP).

The UAE's global aviation success story is thanks in large part to the visionary leadership of the UAE's Vice President and Prime Minister, Sheikh Mohammed bin Rashid Al Maktoum, and his passion for aviation and the significance placed on aviation toward wider global economic development.

In just a few decades the aviation sector has had a transformative effect on the UAE economy, and we believe that it is time to celebrate the achievements of the aviation industry globally and to acknowledge and promote the far-reaching impacts that aviation has on global trade thanks to the connectivity that it affords.

We believe that ICAO's *No Country Left Behind* (NCLB) initiative presents an opportunity for an award scheme that rewards the development of the aviation industry across the board. With this in view, we have launched the Mohammed Bin Rashid "Global Aviation Awards" that coincide with the triennial ICAO Assembly in Montréal, Canada.

The objective of the award scheme is to provide a platform to connect and improve relations with Least Developed States (LDS), support the ICAO Strategic Objective of increased global connectivity, support global aviation plans for development, and promote innovation and liberalization across the industry globally.

The award scheme consists of six distinct categories, each designed to support these objectives and represent the unique mix that is the aviation business. The categories include:

- State with Most Improved Quality of Aviation Infrastructure
- Outstanding Global Connectivity Award
- Outstanding Resource Contribution to ICAO Programmes
- Outstanding International Cooperation Programme
- Aviation Personality of the Triennium
- Innovation Award (encompassing aviation safety, security, sustainability, passenger experience) ■



THE EMERGING ERA OF ELECTRICS

No need for headphones nor avgas. Companies large and small are revving up electric aircraft projects. Realistic? For some aviation applications, yes. For others, perhaps a little premature. ICAO Journal Editor Rick Adams looks at the field of power brokers.

Aside from glass cockpits and digital fly-by-wire, basic commercial aircraft technology has changed little in the past three or four decades. But the next 5-10 years could see a revolution of sorts. Researchers are racing to design, develop and commercialize passenger aircraft that reduce emissions and noise pollution with Tesla-type battery power or cruise above the congested ground traffic of megacities.

What's the status of electric aircraft dreams? Where might they fit into the future commercial aviation scheme?

AB INITIO TRAINERS?

Despite the hype of recent announcements about regional airline-size aircraft, the initial application of electric propulsion is more likely ab initio flight training. “The transition from training on an electric airplane is ideally aligned with a turbine aircraft like an airliner,” said George Bye, founder of Bye Aerospace in Englewood, Colorado, US, and designer of the transonic Javelin advanced jet. He was also FlightSafety International’s project manager for the US Air Force T-6 turboprop trainer programme.

“Electric airplanes behave much more like a turbine aircraft than an internal combustion engine Cessna or Piper. The turbine aircraft is very smooth; the electric aircraft is very smooth. We manage RPM, torque, temperatures – just like the turbine aircraft does.”

Bye Aerospace subsidiary Aero Electric Aircraft Corp. (AEAC) is developing a four-seat version of its Sun Flyer, which it hopes will be the first all-electric trainer aircraft to be certified by the US Federal Aviation Administration (FAA) under Part 23 regulations. Bye told me they expect to fly the prototype “this winter” and “the certification will take a couple of years” with deliveries commencing shortly after.

AEAC is working with Redbird Flight Simulations (Austin, Texas, US) to offer a comprehensive training system for the Sun Flyer. Redbird founder Jerry Gregoire said, “I got interested in the project because we were looking for less expensive solutions for flight training. We loved the simplicity.”

Redbird has built a couple of prototype simulators for the Sun Flyer, based on their three-axis MCX multi-crew trainer, and is developing a training curriculum. Delivering a cockpit-specific replica of the aircraft will require further aircraft performance data.

“As simulators go, this is going to be a pretty simple one. It’s basically an electric fan with a rheostat on it. It ought to be a pretty easy-handling aircraft,” Gregoire said.

There will, of course, be transition training required for pilots to move to a piston or turboprop aircraft. “This aircraft is a highly simplified environment. A motor with no propulsion latency or a torque curve. We don’t have to worry about how long it takes to spin an engine up or how do you keep from cold-shocking it. It can’t be over-revved,” Gregoire explained.

He added: “It does, however, provide the ideal platform where a pilot can learn all the really important things about flying and aircraft

handling. Then make the transition to a more complicated propulsion system afterward.”

“I would think there’d be a fair amount of simulator training to get them used to a larger, heavier aircraft,” noted Bye. “But the transition is much smoother when you’re using an electric propulsion system leading into turbine than it would be managing an internal combustion engine trainer – there’s mixture, prop and a number of things that make it a challenge.”

AEAC has about 100 deposits for the US\$350,000 aircraft, including an order of 25 from Spartan College of Aeronautics and Technology in Tulsa, Oklahoma, US, as well as the New York-based Academy of Aviation Part 141 flight school.

“... the ideal platform where a pilot can learn all the really important things about flying ...”

JERRY GREGOIRE

Founder, Redbird Flight Simulations

A Slovenian light aircraft manufacturer, Pipstrel (from the Latin word for bat), is already producing a two-seat, all-electric trainer aircraft, the US\$117,000 Alpha Electro – originally branded the WattsUp. Pipstrel reports “substantial interest” from flight training operations based in Minneapolis, Florida and Indiana.

A training programme targeted for veterans and low-income youth in California’s Central Valley has ordered four Alpha Electro aircraft, but is currently stymied from starting because of a preamble clause in the FAA’s 2004 Light Sport Utility rule that requires LSA aircraft to have “a single, reciprocating engine, if powered.”

A Part 61 flight school known as Aero Squad, operated by Tomorrow’s Aeronautical Museum in inner-city Los Angeles, has petitioned the FAA



to change the definition to “a single, non-turbine engine, if powered” on the premise that the word reciprocating was included “to avoid the complications of turbine and jet aircraft being introduced into the light sport aircraft category ... of low-performance, simple, easy-to-operate aircraft.” European Aviation Safety Agency (EASA) versions of LSA and ultralight rules make no mention of propulsion type, so electric powerplants are acceptable.

Thus far, though, the FAA has not budged, claiming, “The technological and training issues for certification and operation of electric engines go beyond the intent for simple, easy-to-maintain, recreational aircraft.”

X-FACTOR REVIVED

Test pilots and engineers at NASA’s Armstrong Flight Research Center (Edwards, California, US) are flying a simulator designed to the specifications of the new X-57 aircraft, which features a unique electric propulsion system and is NASA’s first X-plane project in two decades. The X-Plane programme was introduced in the 1940s to develop a plane that could fly faster than the speed of sound, eventually achieved by Chuck Yeager in the X-1.

Also known by the unwieldy name, SCEPTOR (Scalable Convergent Electric Propulsion Technology Operations Research), the X-57 “Maxwell” is named for Edinburgh, Scotland-born physicist James Clerk Maxwell, best known for his theory of electromagnetism. The X-57 design includes 14 motors, seven on each wing. During takeoff and landing, six small motors on each wing kick on for about 30 seconds. Once moving, the propellers of those 12 engines fold back flush with the wing and two larger end-wing propellers take over.

The NASA Armstrong team has designed multiple failure modes into the simulation scenarios to evaluate aircraft performance, as well as reaction time. This helps develop emergency procedures specific to the experimental aircraft. Sean Clarke, principal investigator for the X-57,

said, “This is a critical activity, so that the pilots get experience with our experimental wing, and experimental motors before we actually put them on the airplane. That way, we are optimizing the time in the flight test phase of the project so that the aircraft is not tied up with the pilots learning the performance at that time.” The simulator will be updated as the X-57’s configuration goes through design transitions. The Maxwell is expected to fly as early as next year using a modified P2006T fuselage from Italian manufacturer Tecnam.

IN THE INTERIM, HYBRIDS

Boeing has put a toe into the electric waters via its HorizonX joint venture capital backing of Zunum Aero (Kirkland, Washington, US), which hopes to certify and deliver a hybrid-electric 12-passenger aircraft by 2022 to serve regional point-to-point and hub feeder routes. “Back in 1980, there were close to 300 small carriers in this country. They averaged about 20 seats and about 150-mile stage lengths. A lot of secondary cities have seen their air service decline as the airlines have pulled out of hubs or combined their hubs,” said Matt Knapp, Zunum Aero chief technology officer and co-founder. JetBlue’s Technology Ventures arm is another investor in Zunum, whose name comes from the Mayan word for hummingbird.

Airbus has a roadmap for future electric-powered aircraft designs, including the E-Fan 2.0, a hybrid/electric collaboration with Siemens, and eventually “an electrically powered airliner.” Airbus Group’s E-Aircraft System House near Munich, Germany is planned to open by late 2018.

EasyJet announced in September a partnership with US firm Wright Electric (Cambridge, Massachusetts) for a battery-powered aircraft to handle flights under two hours, or 335 miles, which represent 20 percent of the European regional carrier’s flights. Wright has built a two-seater prototype; the next step is a 10-seater aircraft, then a single aisle with 120-passenger capacity. Timeframe? “Within a decade.”



“Electrical aircraft will come, just not as fast as many think.”

BJORN FEHRM
Aeronautical Consultant

ELECTRIC SCEPTICS

Will electric aircraft eventually replace today's turbine-powered commercial aircraft? Richard Anderson, Director of Embry-Riddle Aeronautical University's flight research center and professor of aerospace engineering, noted, "A lot of the technical advances that happen start in smaller airplanes. There will be a market for smaller, fully electric airplanes."

Teal Group Vice-President Richard Aboulafia calls the electric aircraft concepts "1950s Popular Mechanics cover stories." He added, "The essence of futurism is the tendency to overstate the impact and readiness of exciting new technologies."

Aeronautical consultant Bjorn Fehrm predicted, "Electrical aircraft will come, just not as fast as many think." He cautions that current battery technology "leaves a lot to be desired. A battery needs 20 times more space than jet fuel for the same energy content. The inefficiencies make the battery virtually impossible as an energy store for longer-range aircraft. In addition, the battery has four times higher maintenance costs than gas turbines; it needs replacement after 1,500 charge cycles. The consequence is a battery-driven aircraft can only be used for short-range operations."

'ROUND THE NEIGHBORHOOD

"Electric aircraft (and quad-copters) will make sense as urban commuters at first," Fehrm opined. "They can be made quieter and more neighbor-friendly than gas turbine or piston aircraft (no noise, no fuel or exhaust odors)."

Indeed, in October, the Volocopter VC200, claiming to be the world's first certified multicopter, flew its two-seat, all-electric 18-rotor "flying taxi" in Dubai, UAE, for the first time (in an unmanned flight). Volocopter GmbH (Bruchsal, Germany) has attracted Florian Reuter as CEO (formerly Siemens) and CTO Jan-Hendrik Boelens (formerly Airbus Helicopters), along with investments from Daimler and Intel.

Dubai aims to have 25 percent of its passenger transportation via "autonomous means" by 2030. Singapore has also announced its intent to deploy air taxis.

Others in the race for urban airspace are Chinese company Ehang, which has had one-seater, 100-kilometre per hour passenger drones hovering above the sand dunes near Dubai during test flights, and the Russian flying motorcycle, Hoversurf Scorpion.

On-demand ride service Uber, which has been experimenting with autonomous automobiles, ambitiously aims to deploy electric vertical takeoff and landing (VTOL) "Uber Elevate" air taxis by 2020 in Dubai and Dallas, Texas, US. Uber is partnered with Pipistrel, Brazil's Embraer, Mooney International (Kerrville, Texas), and Bell Helicopter (Fort Worth, Texas), as well as Aurora Flight Sciences (Manassas, Virginia), which is being acquired by Boeing. Aurora has a US Defense Department contract to develop an unpowered electric VTOL, the LightningStrike, which generates 3 megawatts (4,000 horsepower) to power 24 ducted fans on its wings.

Airbus is developing an e-VTOL aircraft for its CityBus initiative called Vahana through A3, its Silicon Valley outpost. The Airbus air taxi uses multiple rotors for hover capability, plus wings and a rear-mounted propeller for forward flight.

Few experts expect aviation authorities to approve free flight of low-altitude "commuter aircraft" in urban canyons. Most likely, air taxis will operate similar to aerial rail systems – passengers will board an aircraft at one "station" and be deposited at another station or heliport in the network.

However, a California company known as Passenger Drone will allow you to "take over any time via the joystick on board or using the touch avionics displays." Normally, a passenger would simply input their destination and leave the driving to the computer. "Our aerial vehicles can be 100 percent remotely controlled by 4G technology, allowing an operator located as far away as the EU or Asia to fly a North America-based aircraft safely and efficiently," the company claims. The car-size aircraft with 16 rotors has a range of 25 minutes at speeds up to 45 miles per hour. ■

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Rick Adams, Editor of ICAO Journal, is a Fellow of the Royal Aeronautical Society (FRAeS).



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