



# Global Aviation and Our Sustainable Future

International Civil Aviation Organization Briefing for RIO+20



**RIO+20**  
United Nations Conference  
on Sustainable Development



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## **CIVIL AVIATION HELPED SHAPE OUR GLOBAL SOCIETY. THE TARGET IS NOW SUSTAINABLE DEVELOPMENT.**

Air transport has become essential to our global society. It is a driver of economic, social and cultural development worldwide and has totally changed how we travel, interact with others and do business. It would be difficult to envisage a world without aviation.

Thanks to the democratization of international air travel, the real cost of flying has fallen by 60% over the last 40 years making it more accessible to more people. During the same period, aircraft have become 70% more energy efficient and 75% quieter.

Many sectors of our global economy would be envious of such a track record. But because we estimate that by 2030 the number of domestic and international passengers will reach six billion, travelling on approximately 50 million flights (roughly double the levels of 2011), we know that more must be done.

The International Civil Aviation Organization (ICAO), its Member States and industry stakeholders have, for almost 70 years, pooled their collective expertise and wisdom to create a regulatory framework that has stood the test of time. It is for this reason that international civil aviation is as safe, secure and environmentally sound today as it has ever been.

Since the 1970s, ICAO's work on environmental protection has emphasized the value of a globally harmonized approach to address the impacts of noise

and local air quality around airports, and the much broader challenge of climate change.

In addition to its work on technological and operational measures, ICAO is now focusing on four key areas to address aviation's greenhouse gas emissions: State action plans; sustainable alternative fuels; Market-based Measures (MBMs); and global aspirational goals to ensure the long-term sustainability of aviation.

Initiatives deriving from this work will require resources for their implementation. The current proliferation of taxes and proposals to divert funds from the aviation sector is bound to have an adverse impact on the sector's ability to finance these initiatives and could therefore jeopardize plans for the sustainable future for aviation.

Rio+20 will focus on critical issues such as access to sustainable energy, sustainable transport, poverty eradication and sustainable development goals. The role and impact of international aviation is central to these issues.

The document you hold in your hands outlines ICAO's key messages for decision-makers assembled in Rio. Our strategic partnerships and concrete initiatives are highlighted to demonstrate the significant activity taking place behind the scenes which will lead us to this globally sustainable future.

It is our responsibility to future generations.



A handwritten signature in blue ink, which appears to be 'Raymond Benjamin'. The signature is fluid and cursive, written over a white background.

**Raymond Benjamin**  
ICAO Secretary General

## EXECUTIVE SUMMARY: ICAO's Key Messages for Rio+20

1. ICAO and its Member States are committed to the development of global solutions for the sustainable future of international civil aviation, in cooperation with industry, sister United Nations agencies and Non-governmental Organizations. While fulfilling its role as a catalyst for economic and social development, air transport is focused on reducing its environmental footprint, under the guidance and leadership of ICAO.
2. ICAO expects Rio+20 to strike a balance among the three pillars of sustainability – social, economic and environmental. This will allow air transport to grow in an environmentally sustainable manner, while continuing to ensure freedom to travel by air.
3. The democratization of air travel is one of the wonders of our age. Access to sustainable air transport must be guaranteed for future generations.
4. Rio+20 must set clear objectives and establish strong frameworks to address the new energy challenges as we transition to a green economy. Sustainable alternative fuels represent one of the most promising win-win-win solutions for aviation's future. Availability of these fuels must be guaranteed through policies that incentivise their development and their deployment.
5. Increasing the price of air transport should not be considered as a means to achieve sustainability. The sector is pressing to meet its environmental commitments through its own resources.
6. ICAO calls for better co-ordination of activity at the international level, elimination of duplication in all areas, and to build upon the work of specialized agencies and existing sustainable development frameworks.

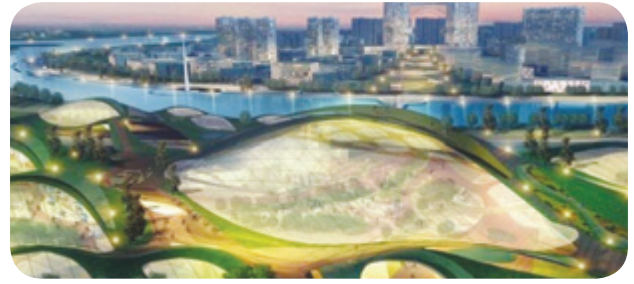


## AVIATION'S ROLE IN THE RIO+20 DISCUSSIONS

The aviation sector plays a vital role in many of the Rio+20 critical issues, including sustainable cities, disaster readiness, jobs, poverty eradication, finance and energy. In all of these areas, ICAO's contribution to international governance aiding in the development of a green economy is paramount.

### SUSTAINABLE CITIES

Sustainable cities cannot thrive without a sustainable, efficient and integrated transportation system. Such an inter-modal approach stimulates job creation, business development, recreation, cultural activities and services. It also favours a more effective and efficient use of existing transport capacities and facilities, while ensuring connectivity among major urban centres, remote island communities and other destinations served by air.



### DISASTER READINESS

The timely delivery of aid is essential for the humanitarian community to respond to emergencies and to undertake life saving missions. In emergency situations, aviation's speed and reliability are critical to the timely delivery of food, medicine, organs, support staff, and other necessities to those affected. In these cases, international airports constitute strategic facilities for repatriation and rescue flights, refugee transfers and cargo deliveries.



### JOBS & POVERTY ERADICATION

The air transport sector directly employs 8.4 million people and supports many tens of millions more through indirect and induced employment. It is an integral part of the world's largest industry, travel and tourism, and the sector also offers significant education and specialized training opportunities for young people. Empowerment of women is another success story, where the number of female pilots has risen to 4,000 worldwide. Also, scaling-up existing sustainable transportation technologies can open the door to high-level jobs and drive long-term, sustained economic growth.



## ENERGY

Aviation is totally dependent on liquid fuels, in contrast with ground transportation where a range of alternative energy sources is available. For safety and technical considerations, the use of renewable wind and solar power, or even hydrogen, is not an option for the foreseeable future. Aviation, however, is increasingly turning to sustainable alternative fuels to achieve environmentally sound mobility from renewable energy. Certified 'drop-in' alternative fuels – where a biofuel can be blended with traditional jet fuel without having to bring changes to aircraft design or airport fuelling systems – are now a reality. Airlines already use biofuels to power regular, commercial flights. As we overcome the technical barriers, the impetus must shift to facilitating the necessary political and financial support to ensure sufficient availability of such fuels, at a competitive price and in a timely manner.



## FINANCE

Three myths continue to skew discussions on international aviation finance:

- a) Aviation is for the rich.
- b) Aviation is not taxed.
- c) Aviation is a profitable industry.

The reality is that through market deregulation, air fares have consistently declined over time, while living standards and wages have increased overall, to the point where consistently more people have access to air travel. Moreover, contrary to public perception, the international aviation sector is substantially taxed by States. For example, taxes, fees, charges and surcharges on many international routes are greater than the ticket price. Finally, the net profit margin of global scheduled airlines was 1.3% in 2011, and is forecast to be 0.5% in 2012.

Misconceptions overshadow the formidable contributions of air travel to everyday life. One case in point: 30 years ago, many Brazilians migrated from

rural areas to urban centers. These journeys took days on uncomfortable buses and cost the equivalent of a week's salary. Today, when these migrants return home, they can use air transport in just a few hours and for the equivalent of a day's salary. This improvement in their everyday lives is a tangible success story which the aviation sector empowered.

In order for the international aviation sector to meet its ambitious CO<sub>2</sub> emissions goals and respond effectively to the climate change challenge, the funds required to meet those targets must remain within the sector. Suggestions have been made to place international aviation in the category of alternative sources of climate finance. This is ill advised because it would result in a financial burden disproportionate to the sector's contribution to global CO<sub>2</sub> emissions, i.e. a levy of up to four times the forecast net profit of the airline industry in 2012.

Such a policy would limit the ability of the sector to address its own emissions and could adversely impact demand for air travel, thereby reducing the economic benefits that international aviation delivers, ultimately a lose-lose scenario.

## INTERNATIONAL GOVERNANCE

Progress on international issues may be improved through enhanced coordination within the UN system itself, recognizing and building upon the mandate and available expertise of each of its agencies. In particular, legal powers arising from the potential change in the mandate of existing (or newly created) entities should be compatible with the provisions of Conventions, protocols and agreements in force.



## GREEN ECONOMY

Innovative thinking and cooperation have made it possible to overcome aviation's biggest challenges and it will be no different as we tackle the sustainability issues before us. In the transition to a green economy, the driving forces from an air transport perspective include environmentally motivated pressure from consumers and the increase in unilateral environmental regulations, rules and policy measures. ICAO is determined to lead the sector through the sustainable development agenda and to ensure globally-harmonized solutions.



## TOOLS FOR POLICYMAKERS

A number of ICAO activities, initiatives and measures constitute what are known as policy tools, or a tool suite. These include aircraft environmental certification, regulation of air transport, market-based measures, State action plans, new technology and sustainable alternative fuels.

In addition, ICAO has developed a suite of concrete technical tools that are publically available, such as:

- A CO<sub>2</sub> emissions calculator for passenger flights.
- Fuel savings estimation tool (IFSET).
- Green meetings calculator.

ICAO's work across the sustainability agenda has the potential to support decision and policy makers globally as they implement a suite of policy tools to address sustainability and environmental issues. These are explored in the following section.



## ICAO'S ACTIVITIES ACROSS THE SUSTAINABLE DEVELOPMENT AGENDA

**Sustainable development seeks to secure the well-being of present and future generations by striving for a balance among social, economic and environmental objectives. The three pillars of sustainable development are especially relevant to the international aviation sector that, by offering a safe and efficient means of mass transportation, is universally recognized as an essential component of the global economy and universal social progress.**

### SOCIAL & ECONOMIC PILLARS

Air transport is committed to meeting its responsibilities for sustainable development, maximising its support for economic development, reducing its impact on the environment and consolidating its social benefits. Through the increased use of low-carbon technology, environmentally friendly materials, new aircraft systems and sustainable energy sources, the air transport sector is making significant advances across a range of sustainability issues. It does so by making sure that its actions around the world are based on the economic, environmental and social pillars of sustainable development.

This can be illustrated by the complex and growing network of around 1,000 airlines offering scheduled services connecting 3,850 commercial airports worldwide. They link major and minor city pairs, facilitating the movement of people, goods and services. From fresh fish to diamonds, aviation underpins nearly every aspect of modern life, carrying 35% of goods by value and supporting 3.5% of global GDP.

Other, less evident benefits of aviation include: 1) critical transportation and logistical links to hinterlands, islands and remote communities; 2) essential services, such as healthcare, mail, education; 3) emergency aid and humanitarian assistance and; 4) data collection for scientific research and meteorology.

### ENVIRONMENT PILLAR

As early as the 1970s, ICAO emphasized the value of a globally harmonized approach to addressing the impact of air transport operations on noise and local air quality around airports, then focusing its attention on the much broader challenge of climate change. It addressed those challenges through a series of activities described below.

### TECHNOLOGY & OPERATIONS

ICAO global standards were adopted in the past for noise and local air quality (CO / NO<sub>x</sub> / HC) and a new standard for CO<sub>2</sub> emissions is expected in 2013. Aircraft today are 70% more fuel-efficient and 75% quieter than they were four decades ago. New double-decker and composite aircraft that have recently entered into service have raised the bar even higher in terms of design and performance.

Operational measures have also resulted in significant enroute savings in fuel consumption, through new procedures and technology adopted by air navigation service providers. ICAO's Committee on Aviation Environmental Protection (CAEP) continues to develop guidance and tools to assess the environmental benefits of operational measures across the air transport system.

ICAO's Fuel Savings Estimation Tool (IFSET), approved by CAEP, is intended to assist States in estimating fuel savings from operational improvements.



## COORDINATING INTERNATIONAL POLICY

The global agreement on aviation and climate change reached at ICAO's 37th Assembly in 2010 was an important step towards a sustainable air transport future and makes international aviation the first sector to agree on a 2% annual fuel efficiency improvement, while stabilizing its global CO<sub>2</sub> emissions at 2020 levels – with carbon neutral growth from 2020. It provides a concrete framework for ICAO and its member States, in collaboration with the air transport industry, to continue to identify and pursue global solutions to address GHG emissions from international aviation.

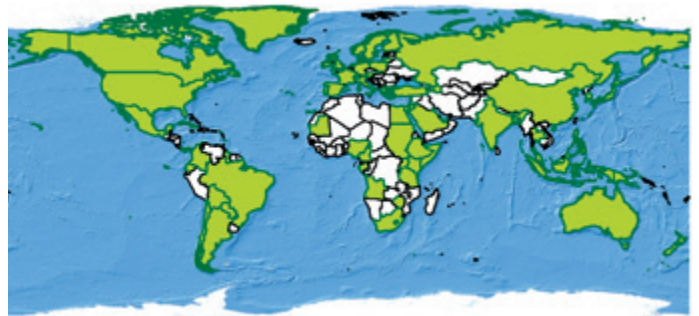
With this objective in mind, in addition to its technical and operational work, ICAO is focusing on four key areas:

- State action plans.
- Sustainable alternative fuels for aviation.
- Market-based Measures (MBMs).
- Global aspirational goals.

## STATE ACTION PLANS

Member States have agreed to develop national Action Plans to reduce emissions from international aviation and submit them to ICAO by June 2012. The action plans allow States to identify a basket of measures tailored to their circumstances and assistance needs. They also enable ICAO to assess progress in achieving the global aspirational goals adopted by the Assembly and to identify and address the specific assistance needs of States.

Comprehensive guidance material and a web-based interface have been developed and six hands-on training workshops were held in 2011 to assist focal points nominated by States in the preparation and submission of their Plans. To date, ICAO has trained more than 200 representatives from 81 States representing 92.4% of global revenue tonne-kilometres.



**ICAO Training Workshops for States' Action Plans on CO<sub>2</sub> emissions reduction. Green areas indicate States which have already received training.**

Building on information contained in State Action Plans, ICAO will hold a special event in October 2012; 'Assistance for Action – Aviation and Climate Change'. The aim of this seminar is to share information with States and other stakeholders on the assistance needed to implement actions to address CO<sub>2</sub> emissions, including the identification of potential sources for assistance, as well as possible processes and mechanisms under ICAO to facilitate the provision of assistance.

## SUSTAINABLE ALTERNATIVE FUELS (SUSTAF)

Fundamental to international aviation's climate change strategy are Sustainable Alternative Fuels (SUSTAF). They address the three pillars of sustainable development by reducing greenhouse gas emissions, improving local air quality and providing new sources of employment. SUSTAF can also help to reduce fuel price volatility, while providing a source of economic development in non-traditional fuel producing regions of the world.

While many airlines are now operating regular commercial flights using alternative fuels, availability of biofuel feedstock remains a major obstacle to more widespread use.

Aviation stakeholders are concerned about competition from other transport modes for biofuels, which could limit aviation's ability to grow in a sustainable manner over the long term.

There is a desire among States, airlines and other organizations to see a significant scale up of biofuel production, although they want to be sure that biofuels do not compete with food supplies and that they are truly sustainable in that they actually reduce CO<sub>2</sub> emissions.

In cooperation with States, industry and other stakeholders, ICAO is developing policy recommendations to promote and further facilitate the development and deployment of SUSTAF. This may include harmonization of sustainability criteria and model legal and regulatory policies. Policies and incentives need to be targeted to specific barriers to enhance production efficiency, ensure global consistency, reduce investment risk, and confirm workable certification and qualification programs.

To stimulate further progress, ICAO maintains an online platform showcasing hundreds of global activities and initiatives related to SUSTAF: the Global Framework for Aviation Alternative Fuels.



For more information please visit:

[www.icao.int/environmental-protection/Pages/GlobalFramework.aspx](http://www.icao.int/environmental-protection/Pages/GlobalFramework.aspx)



Airline	Aircraft	Fuel Stock	Route
Aeroméxico	B777	Jatropha	Mexico City – Madrid
Aeroméxico	B737	Camelina	Mexico City – San Jose
Aeroméxico	B777	Jatropha, camelina and used cooking oil	Mexico City – São Paulo
Air Canada	A319	Used cooking oil	Toronto Pearson - Mexico City
Air France	A321	Used cooking oil	Toulouse – Paris
Alaska Airlines	B737	Used cooking oil	Seattle – Washington
Alaska Airlines	Q400	Used cooking oil	Seattle – Portland
Finnair	A319	Jatropha	Amsterdam – Helsinki
Iberia	A320	Camelina	Madrid – Barcelona
Interjet	A320	Jatropha	Mexico City – Tuxtla Gutierrez
Jetstar Airways	A320	Used cooking oil	Melbourne – Hobart
KLM Royal Dutch Airlines	B737	Used cooking oil	Amsterdam – Paris
KLM Royal Dutch Airlines	B777	Used cooking oil	Amsterdam – Rio de Janeiro
LAN Airlines	A320	Used cooking oil	Santiago – Concepcion
Lufthansa	A321	Jatropha, camelina and animal fats	Hamburg – Frankfurt
Lufthansa	B747	Jatropha, camelina and animal fats	Frankfurt – Washington
Porter Airlines	Q400	Camelina	Toronto City – Ottawa
Porter Airlines	Q400	Camelina	Montreal - Toronto City
Qantas Airways	A320	Used cooking oil	Sydney – Adelaide
Thai Airways International	B777	Used cooking oil	Bangkok – Chiang Mai
Thomson Airways	B757	Used cooking oil	Birmingham – Arrecife

**Airlines having operated commercial flights employing biofuels, as of June 2012.**

## MARKET-BASED MEASURES (MBMS)

Although there is general agreement among States that Market-based Measures (MBMs) would be a cost-effective approach to address aviation emissions, views differ as to their implementation. A number of initiatives from individual States or groups of States have recently been put into place or are under consideration. It is imperative that a patchwork of uncoordinated MBMs, which could hinder the efficiency of air transport, be avoided.

At the 37th ICAO Assembly in 2010, States agreed on the guiding principles for the design and implementation of MBMs, deciding to develop a framework and explore a global scheme for MBMs in international aviation. ICAO is accelerating its work in this area and will be presenting a report at the 38th ICAO Assembly in 2013.

## GLOBAL ASPIRATIONAL GOALS

ICAO's Member States have agreed to review the medium-term aspirational goal of carbon neutral growth from 2020, and to explore a long-term goal for international aviation. With the improved ICAO fuel burn data collection system, the ICAO carbon emissions calculator, the ICAO Fuel Savings Estimation Tool and the modelling efforts of ICAO's Committee on Aviation Environmental Protection, the Organization is building a solid basis of reliable data from which informed decisions can be made.

## OUTREACH

ICAO has a responsibility to facilitate coordination and cooperation among States, the aviation industry and other stakeholders concerned on all aspects of international civil aviation. It collaborates closely with other international organizations and bodies active in areas of relevance to ensure people are properly informed and aware of the specificities of the sector and various initiatives being undertaken by ICAO.

**The global policy adopted at the ICAO 37th Assembly reflects the collective determination of the Organization's Member States to contribute to global efforts on climate change. It provides an ambitious work programme to continue on the path towards the sustainable future of international aviation.**



## ICAO'S COLLABORATIVE EFFORTS TOWARDS SUSTAINABILITY

### WITHIN THE UN SYSTEM

As a UN specialized agency, ICAO and its Member States have been diligently pursuing the limitation or reduction of greenhouse gas emissions from international aviation. ICAO maintains a close relationship with the United Nations Framework Convention on Climate Change (UNFCCC) and other UN agencies in this regard and works with them on aircraft noise, local air quality emissions and other relevant environmental issues.

#### UNFCCC

ICAO provides the UNFCCC with regular updates on its developments with bunker fuels and international civil aviation CO<sub>2</sub> emissions. The Organization's expectation for a future global climate change agreement under the UNFCCC is that it recognizes the special role of ICAO in developing a global solution to a global industry.

#### WMO

ICAO has worked with the WMO to establish a global programme to enable commercial aircraft take meteorological measurements. This collaboration has now become a vital part of the global atmospheric observing system, with approximately 250,000 observations per day typically being made available via this method to scientists, researchers and weather forecasters. These observations provide invaluable data that contribute to a better understanding of weather, volcanic ash dispersion and climate.

In addition to ongoing research on aviation's impact on the climate, the aviation sector is also interested on how a changing climate may impact aviation operations.

#### IMO

As is the case with ICAO for international aviation, the International Maritime Organization (IMO) is the UN specialized agency responsible for the prevention of marine pollution from international shipping. ICAO and the IMO cooperate and share good practices in developing climate policies, including GHG mitigation measures and actions, in connection with the ongoing UNFCCC negotiation process.

#### IPCC

ICAO's collaboration with the Intergovernmental Panel on Climate Change (IPCC) resulted in the IPCC Special Report on Aviation and the Global Atmosphere in 1999 and the IPCC Fourth Assessment Report (AR4) in 2007. These reports collated and updated the science on aviation's climate impact, briefing policymakers on the challenges ahead and highlighting key mitigation options. ICAO is now contributing to the development of the IPCC Fifth Assessment Report (AR5), which will be completed in 2014.

#### WHO

The World Health Organization (WHO) and ICAO have a close working relationship, especially in the ICAO Committee on Aviation environmental protection (CAEP). The WHO has a particular interest in local air quality and noise issues and the CAEP is responsible for managing related technical standards, updating guidance and reviewing best practices.

## Other ICAO Partners

In addition to its work with the specialized agencies noted above, ICAO also partners with the following UN and international bodies on technical and policy issues:

- Commission on Sustainable Development (CSD)
- Convention on Biological Diversity (CBD)
- International Telecommunication Union (ITU)
- Montreal Protocol on Substances that Deplete the Ozone Layer
- Organisation for Economic Co-operation and Development (OECD),  
*including International Energy Agency and International Transport Forum*
- UN Department of Economic and Social Affairs (UNDESA)
- UN Economic and Social Council (ECOSOC)
- UN Economic Commission for Europe (UNECE)
- UN Environmental Programme (UNEP)
- UN Institute for Training and Research (UNITAR)
- Universal Postal Union (UPU)
- World Food Programme (WFP)
- World Tourism Organization (UNWTO)

## EMG

As part of the UN system, ICAO, along with other UN agencies, funds and programmes, is a member of the UN Environment Management Group (EMG), which was established to coordinate environmental issues throughout the UN system.

ICAO has been actively involved in the EMG work on the UN climate neutral initiative and the ICAO Carbon Emissions Calculator was approved by the EMG to calculate CO<sub>2</sub> emissions from air travel. It is complimented by the ICAO Green Meetings Calculator which calculates the optimal location for a meeting in terms of CO<sub>2</sub> emissions from air travel, based on the number of participants and their city of origin.



**The ICAO Carbon Emissions Calculator was approved by the UN Environment Management Group (EMG) to be used for calculating CO<sub>2</sub> emissions from air travel.**

## WITH INDUSTRY GROUPS

ICAO works with industry groups to help guide policymaking, provide support to its members and coordinate actions across the sustainable development agenda. These groups include the Air Transport Action Group (ATAG), Airports Council International (ACI), the Civil Air Navigation Services Organisation (CANSO), the International Aviation Transport Association (IATA) and the International Co-ordinating Council of Aerospace Industries Associations (ICCAIA). All promote aviation's role as a key component of the global economy, working hard to minimize its environmental impact, while maximising its social and economic output.

As a whole, industry groups promote aviation's sustainable growth for the benefit of the global society by investing in technology, improving operational efficiency, building and using efficient infrastructure and positive economic instruments to provide incentives.

ICAO supports a number of industry-led initiatives and projects. One example is the airport carbon accreditation programme, currently underway in Europe and Asia. The programme is a carbon management and certification standard for airports. Airports are independently assessed and given recognition of their efforts to manage and reduce their carbon emissions in accordance with ISO14064.

ICAO works with a number of relevant stakeholders to improve operational efficiency. The ICAO Global Air Navigation Plan and the Operational Opportunities to Minimize Fuel Use and Reduce Emissions (Circular 303) provide guidance on such operational improvements, as well as a list of available tools to measure their impact.

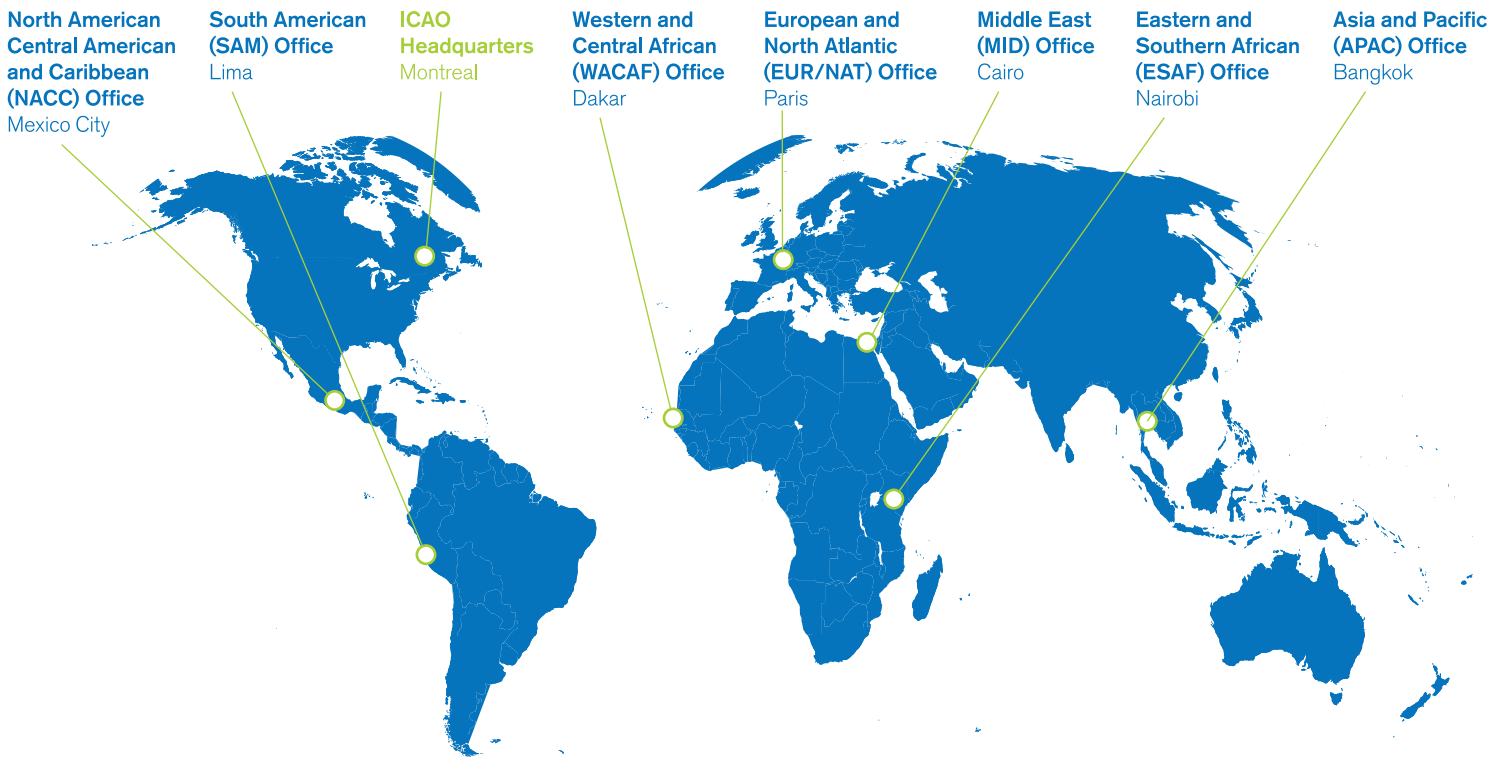
## WITH NON-GOVERNMENTAL ORGANIZATIONS

The International Coalition for Sustainable Aviation (ICSA) is a structured network of environmental NGOs who share a common concern with civil aviation's contribution to air quality, climate change and noise issues. As an observer to ICAO's CEAP, ICSA brings an NGO perspective to developing and providing technical expertise, policy positions and strategies to reduce emissions and noise from the aviation sector .



## International Civil Aviation Organization (ICAO)

999 University Street, Montreal, Quebec • H3C 5H7 • Canada  
Tel.: +1 (514) 954-8219 • Fax: +1 (514) 954-6077 • SITATEX: YULCAYA



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