The Triennium in Review: Paving the Way to a Green Future

By Ms. Jane Hupe, Deputy Director, Environment

Over the past three years, the progress and pace of change in international aviation environmental protection has been unprecedented, driven by key decisions from ICAO Member States, technological progress and societal expectations. The ICAO Environmental Report 2019 is the result of our efforts and consolidates the progress in a single reference publication, through various articles and case studies that can best inform the public of the work conducted by the ICAO Secretariat, ICAO Member States, aviation industry and the many other stakeholders involved in this fast evolving topic.

Major steps have been taken since the 39th Session of the ICAO Assembly in 2016, in order to support States in the implementation of key activities on international aviation environmental protection. In 2016, the world turned to ICAO and applauded the adoption of the first ever global market-based measure for an entire sector, the Carbon Offsetting and Reduction Scheme for International Aviation – CORSIA. With this decision, ICAO Member States demonstrated an unprecedented level of leadership on environmental protection and confirmed their commitment to progress collectively towards the aspirational goal of carbon neutral growth from 2020. At the Assembly, they also started the countdown to the implementation of CORSIA requirements on CO_2 monitoring, reporting and verification (MRV) from 1 January 2019.

Indeed, CORSIA represents a new area of work for a number of aviation stakeholders, and for ICAO Member States. Ensuring timely implementation of CORSIA has required one of the most ambitious capacity building initiatives amongst Member States, under the umbrella of ICAO. 15 States provided training to 98 States, and successfully enhanced their preparedness for the implementation of the newly developed ICAO Standards and Recommended Practices (SARPs) – Annex 16, Volume IV required for making CORSIA MRV fully operational across the world from 2019, and thus ensuring that *No Country is Left Behind*. Although the roadmap to CORSIA implementation was extremely challenging, we are pleased to report that CORSIA implementation is on track.

Under ICAO's policy for climate change, CORSIA is one element of the "basket of measures" agreed by Member States to meet our aspirational goals of a two per cent per annum fuel efficiency improvement, and carbon neutral growth from 2020 onwards. During the past three years, ICAO and its partners have made great strides in progressing further the implementation of the other elements of the "basket of measures", namely innovative technologies, more efficient operational procedures and sustainable aviation fuels.

The new ICAO SARP on CO_2 emission certification for aeroplanes was adopted in 2017, as reflected in Volume III of Annex 16. Its role is to ensure that the best technologies

are included into aeroplane designs and will apply to new aeroplane type designs from 2020, and to aeroplane type designs already in-production as of 2023. It will prevent any backsliding of aircraft environmental performance and allow aircraft and engine manufacturers to continue exploring ground-breaking technologies to address CO_2 emissions.

The new CO_2 emissions standard is complemented by more efficient flight operations, and in this regard, ICAO Member States adopted a Global Air Navigation Plan in 2016, which outlines a performance improvement and technology roadmap towards shorter routes and less emissions-intensive takeoffs and landings, through performance-based navigation (PBN) and the ICAO Aviation System Block Upgrades (ASBUs). ICAO has been active in assessing the CO_2 emissions saved, as a result of the implementation of the ASBU concepts. Such work is critical to supporting States and operational stakeholders build the necessary business case prior to initiating such operational changes.

A positive business case remains a key trigger for the implementation of environmental measures by airlines and, in the last years, many important steps have been taken to make the more than 200,000 commercial flights using a mix of sustainable fuels a reality in our skies. ICAO has taken a number of initiatives aimed at removing the outstanding barriers to the large-scale commercial use of sustainable aviation fuels by airlines, and organized the Second Conference on Aviation Alternative Fuels (Mexico City, Mexico, 11-13 October 2017), adopting the "2050 Vision for Sustainable Fuels". In order to make progress on the quantification of the 2050 Vision, the First ICAO Stocktaking Seminar (Montréal, Canada, 30 April-1 May 2019) was held to further trigger actions, synergies and partnership for the development and deployment of sustainable aviation fuels. Both events have confirmed the commitment of the international aviation sector and sustainable aviation fuel producers to this element of the ICAO Basket of Measures. ICAO has also demonstrated its leadership role in facilitating discussions on the most relevant policy framework for the development of such fuels and on establishing a global framework for its use within CORSIA. In addition, on the technical side, many feasibility studies were developed in the context of ICAO's capacity building projects, which can be used as a blueprint to be replicated in other ICAO Member States.

One of ICAO's Environmental Protection Strategic Objectives involves limiting or reducing the impact of aircraft engine emissions on local air quality. Since the late 70's, ICAO established SARPs to certify aircraft engines for emissions that affect local air quality (NOx, HC, CO and Smoke Number). Since visible smoke has been eliminated from aircraft engine exhaust, ICAO has increased the NOx standards stringency many times as combustion technologies evolved, and recently, a new standard to limit the emissions of non-volatile Particulate Matter (nvPM) from aircraft engines was developed and recommended for consideration by the ICAO Council. This new ICAO standard will ensure that the best technologies are included in engine designs in order to limit nvPM, which in turn will minimize the potential environmental and health impacts of these pollutants. Its final adoption is expected by 2020.

Regarding noise, 2019 marks the celebration of 50 years since the adoption of the first global standards for aircraft noise certification. After half a century of existence, these standards led to aircraft that are 75% quieter than the first jets. Reduction of noise at source is the first pillar of the ICAO Balanced Approach to Aircraft Noise Management, which also comprises land-use planning, noise abatement procedures and operating restrictions as a last resort. Over the past years, ICAO has also intensified its work on an emerging, yet essential aspect of noise management, i.e. community engagement. A key challenge is to ensure that the guidance and best practices developed by ICAO, through the collaboration of hundreds of the world's best experts, find their way to implementation.

Indeed, capacity building and assistance remains a cornerstone of ICAO's activities on environmental protection. This triennium marked the implementation of two dedicated capacity building and assistance projects, one funded by the European Union (EU), and the other in partnership with the United Nations Development Programme (UNDP) with financing from the Global Environment Facility (GEF). Both projects have benefitted a total of fifteen ICAO Member States in Africa and in the Caribbean, but their environmental results have gone beyond these States. Indeed, the development of guidance material for the implementation of low carbon aviation measures, the implementation of solar-at-gate pilot projects, and the design of tools to assess the financial

costs and environmental benefits of mitigation measures, provided opportunities for all States to concretely engage in the reduction of international aviation emissions.

With the implementation of all these activities, ICAO has consistently delivered on the ambition set by successive Assembly Resolutions on environmental protection, and is committed to maintaining its efforts by working together with Member States on the path towards a greener future.

Over the next triennium, ICAO and Member States, in collaboration with industry and other stakeholders, will move forward by continuing the implementation of measures to address aviation noise, and emissions that affect local air quality and the global climate; as well as undertaking work on new emerging technologies and forms of energy, such as all-electric and hybrid aircraft, supersonic aircraft, green and resilient airports, and adaptation to climate change, just to mention a few. Aviation is in essence a technology-driven sector that has fulfilled humankind's dreams of flying. The next chapter for aviation will be to fulfil the societal aspiration of an environmentally sustainable flying future. The fourth industrial revolution offers an enormous opportunity, and innovation is at the forefront of the breakthrough needed to deliver fully sustainable air transport.

The future of mobility is in the air, and "urban flying vehicles" are now a reality. With the unprecedented pace of technological development, this is an inspiring time for aviation and ICAO will continue to be gearing progress towards providing the next generation with access to sustainable travel, and facilitate their connection to people and cultures of this global village without affecting the environment. An exciting new era is starting and with it our collective challenge and incommensurable opportunity, for a brighter future where the sky is not the limit. I do hope you enjoy the report.

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CHAPTER ONE

Aviation and Environment Outlook