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FOURTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 26 August to 6 September 2024

Agenda Item 3: Air navigation system performance improvement
3.3: Eighth Edition of the Global Air Navigation Plan (GANP)

GLOBAL STRATEGIC LEVEL OF THE GANP: RECOGNITION OF A41 PRIORITY AREAS

(Presented by the Secretariat)

CHALLENGES AND OPPORTUNITIES

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Emerging, new and adapted business models

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Editorial Note.— Beginning of new text.

Supporting climate goals through innovation and efficiency

The 41st Session of the ICAO Assembly adopted a global long-term aspirational goal (LTAG) for international aviation of net-zero carbon emissions by 2050 in support of the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement's temperature goal[1], recognizing that each State's special circumstances and respective capabilities (e.g. the level of development, maturity of aviation markets, sustainable growth of its international aviation, just transition and national priorities of air transport development) will inform the ability of each State to contribute to the LTAG within its own national timeframe. Meeting this goal will require the collective efforts of the aviation community to adopt innovative solutions to improve operations and reduce CO_2 emissions.

Operations of new types of aircraft are forecast to grow significantly in the coming years. These new types of aircraft are wide-ranging and include, unmanned aircraft, aircraft for higher airspace operations and future aircraft with new engine, propulsion and fuel technology such as electric and hydrogen. It is essential that the environmental impacts of these new aircraft are understood.

Maintaining operational performance through improved resilience

[1] To hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels.

Aviation serves as the connector of the world, an important supporter of jobs and economies, and is essential for connectivity during crises, enabling the swift transport of aid and personnel to where they are needed. Due to the importance of aviation to society, disruptions to operational performance can have broad impacts. These impacts could be mitigated by improved resilience. Resilience can be in relation to the day-to-day operations or the impact of more significant or longer-term events.

Disruptions that affect aviation will continue to happen. Such disruptions have highlighted the vulnerability of the aviation system and the challenges it can face during the disruptions, during the recovery and post-recovery, and when operations and supply chains are disrupted, and knowledge and experience are lost.

How we learn from past experiences and invest in resilience to future threats, will determine the success of the recovery efforts, no matter the nature of the disruptions themselves. Addressing resilience includes designing systems and system architectures that embed resilience considerations, and having robust contingency and business continuity plans that consider a wide range of factors.

Editorial Note.— End of new text.

TURNING CHALLENGES INTO OPPORTUNITIES: TRANSFORMATION

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Unlike other modes of transportation, air transport has historically been self-sustaining in terms of infrastructure costs and has not been financed through taxation, public investment or subsidies. Infrastructure costs are covered by user charges, most of which are added to airfares. In 2016, it was estimated that airlines and passengers paid USD 125.9 billion[14] to airports and ANSPs.

Aviation has chosen a proactive approach to address climate change. The aviation system can contribute to meeting climate goals by:

1) *Improving operational efficiency*

   Improvements in the efficiency of operations in all phases of flight (including ground operations), e.g., reducing airborne delays and improving flight profiles, have the benefit of reducing fuel burn, CO_2 emissions and the associated impacts on the climate.

2) *Efficiently accommodating increasing diversity in the skies*

   As new types of aircraft are introduced, air navigation services will need to manage increasingly diverse air traffic operations; they will need to be flexible and adaptive to accommodate and integrate these operations both on the ground and in the air, while preserving flight efficiency of all operations.

3) *Leveraging new and emerging technologies enabled by regulatory frameworks that facilitate and encourage innovation*

   As innovations are introduced into operations, procedures and aircraft, environmental benefits in terms of reduction in fuel burn and CO_2 emissions can be realized sooner with the evolution of a performance-based regulatory framework that ensures safety, interoperability and efficiency.

Due to the critical factor of aviation safety, the pace and uptake of innovation can be slow. However, the aviation industry is beginning to look at other industries where emerging technologies may be applied to

aviation. These tried and tested technologies have the potential to reduce innovation life cycles and accelerate change in aviation, while ensuring that the net cost per passenger remains steady or is reduced.

An aviation system that is at the forefront of innovation, and that actively addresses cybersecurity and ensures adequate integration of military requirements needs to be capable of providing suitable and timely responses to threats and attacks. The aviation system can enhance resilience by:

1) *Ensuring human capability and enhancing human performance to support resilience.*

   Human assets continue to be critical to aviation infrastructure, which is why it is important to continue promoting the next generation of aviation professionals. Addressing staff well-being, competency retention and providing training to enable new services or modes of delivering services is critical. The ability to better diagnose and handle disruptions will continue to rise in significance as operations and systems become more sophisticated and interdependent.

2) *Reducing the impacts caused by threats and failures with agile and diverse capabilities.*

   Implementing system architectures and digital solutions that can offer redundancy, “soft failure modes”, or alternative solutions can help reduce the impact of disruptions.

3) *Providing cost-effective and scalable services in line with demand through a service-oriented architecture.*

   Demand is not constant. A system that scales with increases and decreases in demand is more resilient in the long term and provides for cost-effectiveness. As improved digital capabilities are introduced or enhanced, investments in the underlying architecture will boost resilience. However, the increase of digitalization and usage of new technologies could also introduce new risks and be a new source of disruption. In particular, regarding capabilities in cyber-resilient technologies, system redundancies, a highly trained workforce, good communications and proper planning will increase the value in the investment in a globally harmonized aviation industry.

4) *Ensuring effective lessons learned are captured from how disruptions, recovery and post-recovery complications have been addressed by industry and authorities.*

   These lessons learnt can lead to recommended practices for contingency planning, resilience planning, as well as communications planning. Thus, when another disruption to aviation is encountered, these plans can be put into place with effective communication, training and continued post-recovery review (i.e., what went well and what needs improvement).

The system must be capable of maximizing human capacity and strongly supported by technology. Since aviation consists of a system where the servicing of mobile assets, including large aircraft, small manned aircraft and unmanned vehicles, is the primary objective, ensuring the integrity of all information is of utmost importance. Embracing mainstream information and network technology can lead to a more cost-effective and rapid modernization of the aviation system.

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