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WORKING PAPER

ASSEMBLY — 42ND SESSION

TECHNICAL COMMISSION

Agenda Item 24: Aviation Safety and Air Navigation Priority Initiatives

SPECTRUM RESILIENCE: BALANCING SPECTRUM EFFICIENCY WITH AVIATION SAFETY

(Presented by International Air Transport Association (IATA), International Federation of Air Line Pilots Associations (IFALPA) and Civil Air Navigation Services Organization (CANSO) and International Business Aircraft Council (IBAC))

EXECUTIVE SUMMARY

The aviation industry stands at a pivotal juncture, where the sustainable management of the existing aeronautical spectrum faces challenges from other industries. Despite these challenges, the continued management of this spectrum remains paramount to ensuring flight safety and optimizing efficiency. As technologies such as 5G and 6G emerge, they present opportunities for enhanced communication and operational capabilities. However, they also introduce challenges related to potential interference with critical aeronautical systems, such as radio altimeters.

Action: The Assembly is invited to:

a) request the council to regularly assess the evolution of radio frequency interference (RFI) with aeronautical safety systems;
b) strengthen support for the ICAO policy on radio frequency spectrum by amending Resolution A41-7: Support of the ICAO policy on radio frequency spectrum matters as proposed in this paper;
c) reiterate the responsibility of all member States to ensure that aviation safety continues to be a matter of highest priority, and to maintain interference-free operation of aeronautical safety systems amid the introduction of new or additional services;
d) recommend that relevant ICAO expert groups implement strategies aimed at facilitating safe but faster innovation, development, certification, and implementation of 21st-century avionic systems; and
e) request ICAO to continue organizing interactive workshops with the support of Member States, aviation organizations, and industry, with special attention given to the continued protection of aeronautical safety services.

Strategic Goals:	This working paper relates to the Strategic Goals *Every Flight is Safe and Secure;* and *Aviation Delivers Seamless, Accessible and Reliable Mobility for All*..
Financial implications:	N/A

[1] English, Arabic, Chinese, French, Russian and Spanish versions provided by IATA.

References:	Assembly Resolution A41-7: Support of the ICAO policy on radio frequency spectrum matters Doc 9718, *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation*

1. INTRODUCTION

1.1 The invisible asset underlying all commercial aviation operations is the frequency spectrum, specifically the allocations granted by the International Telecommunications Union (ITU) to "safety of life" flight operations. It underpins the communications, navigation, and surveillance (CNS) systems critical to safe flight. Therefore, interference-free access to this spectrum is essential for the seamless operation of air traffic, ensuring that pilots, air traffic controllers, and ground personnel can exchange crucial information without disruptions.

1.2 As the telecommunications industry accelerates innovation and delivery of diverse applications powered by 5G, telecommunications operators are pressuring governments to release additional spectrum. This demand is leading to the allocation or reallocation of frequency bands adjacent to those used in aviation, increasing the threat of radio frequency interference (RFI) to legacy avionic systems.

2. DISCUSSION

2.1 Recently, the telecommunications industry deployed networks based on 5G C-band technology in the spectrum below the radio altimeter band (4.2-4.4 GHz), which challenges the interference-free use of that segment of the aeronautical spectrum by legacy avionics. Some states activated 5G mitigation measures (with sunsets in 2026 and 2028) concurrent with the rollout of 5G C-band operations at or near airports.

2.1.1 New radio altimeter standards are in development by RTCA and EUROCAE. However, new radio altimeters built to this standard are unlikely to be widely available until the early 2030s. In addition, supply chain and aircraft downtime issues point to operational disruption over the next decade. Consequently, it is essential to continue mitigation of 5G RFI beyond the current sunset dates to ensure protection of RAD ALT systems.

2.1.2 Deployment of 5G is often mischaracterized as a national issue. In reality, airlines operate across multiple regulatory jurisdictions as commercial aircraft routinely fly across international borders. Therefore, varying requirements and mitigation measures may affect flight safety and operational efficiency.

2.2 Substantial regional efforts are underway to ensure continued safe coexistence between aviation operations and 5G deployments in the spectrum below the RAD ALT band. Concurrently, preparatory studies for ITU WRC-27 Agenda Item 1.7 are actively examining the potential introduction of International Mobile Telecommunications (IMT) services in the C-band segment at 4 400 - 4 800 MHz (above the radio altimeter band).

2.3 Consideration of IMT or other services above the radio altimeter band must be preceded by comprehensive studies incorporating operational scenarios during all phases of flight, including off-nominal flight profiles. Aviation safety must not be compromised by spectrum decisions made in the

absence of rigorous technical and operational validation. A precautionary approach should be non-negotiable: spectrum policy must be guided by worst-case interference scenarios, validated safety margins, and a clear commitment to preserving the integrity of critical aeronautical systems.

2.4 Dynamic evolution of the global regulatory environment highlights a need for early, continuous, and structured collaboration between aviation and radio regulatory authorities. Such coordination is essential to ensure that future spectrum management decisions are fully aligned with the highest standards of aviation safety, operational resilience, and system integrity.

2.5 To ensure ongoing provision of safe and efficient global air navigation services (ANS) by balancing spectrum efficiency with the needs of aviation safety, this paper proposes that ICAO investigate and implement measures to significantly expedite a process for the development, standardization, and certification of novel 21st century avionic systems capable of harmonious spectrum coexistence with the telecommunications industry and other users of spectrum. IATA has published a Whitepaper highlighting such an evolution with respect to Future Aircraft Communications.

2.6 Accelerated deployment of more spectrum efficient CNS technologies are crucial in an electromagnetic environment where substantial telecommunications advancements typically have a deployment cycle measured in years rather than decades (e.g., 4G to 5G and soon 6G - while aviation continues with Marconi era DSB-AM as its primary voice communications technology). This disparity in innovation and deployment timelines must be effectively addressed at ICAO level as governments look to spectrum auctions as a significant source of funds.

2.7 Interference-free access to the aeronautical frequency spectrum is crucial for ensuring the safety, efficiency, and growth of the aviation industry. It supports seamless CNS, enabling the sector to operate reliably and profitably. To preserve these capabilities, it is imperative that governments, regulatory authorities, and industry stakeholders collaborate to continue protecting the aeronautical frequency spectrum and ensure interference-free access. To this end, the Assembly is invited to amend Resolution A41-7 to guide and support effective action by States, ICAO, and industry.

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APPENDIX

RESOLUTION A41-7: SUPPORT OF THE ICAO POLICY ON RADIO FREQUENCY SPECTRUM MATTERS

~~A41-7~~ A42-xx: Support of the ICAO policy on radio frequency spectrum matters

Insert and amend resolution accordingly;

. . .

Recognizing that unresolved spectrum issues relating to aeronautical safety services have resulted in flight cancellations, degradations of air traffic management services, and interruptions of flight operations;

Recognizing that commercial aviation seamlessly spans across international borders and operates under diverse regulatory frameworks, unresolved spectrum issues relating to aeronautical safety services cannot be treated as a purely national issue while overlooking their impact on international flight operations.

Recognizing that to ensure optimal use of the frequency spectrum allocated to aviation, efficient frequency management and use of best practices are required;

. . .

The Assembly:

1. *Urges* Member States, international organizations and other civil aviation stakeholders to support firmly the ICAO frequency spectrum strategy and the ICAO position at WRCs and in regional and other international activities conducted in preparation for WRCs, including by the following means:

. . .

2. *Urges* Member States to actively engage with their radio regulatory authorities in order to realize harmonization of aviation interests with other national interests in preparation for and during ITU WRC;

~~2~~3. *Urges* Member States to consider, as a priority, public and aviation safety when deciding how to enable new or additional services, and to consult with aviation safety regulators, subject matter experts and airspace users, to provide all necessary considerations and to establish regulatory measures to ensure that incumbent aviation systems and services are free from harmful interference;

~~3~~4. *Requests* the Secretary General to bring to the attention of ITU the importance of adequate radio frequency spectrum allocation and protection for the safety of aviation;

~~4~~5. *Instructs* the Council and the Secretary General, as a matter of high priority within the budget adopted by the Assembly, to ensure that the resources necessary to support the development and implementation of a comprehensive aviation frequency spectrum strategy, as well as increased participation by ICAO in international and regional spectrum management activities are made available; and

~~5~~6. *Declares* that this resolution supersedes Resolution ~~A38-6~~A41-7.

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