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- Agenda Item 2: Timely and safe use of new technologies**
2.2: Addressing safety risks related to evolving aviation technologies

CONTINUED SAFE OPERATIONS IN THE PRESENCE OF ANTICIPATED RF INTERFERENCE

(Presented by the International Coordinating Council of Aerospace Industries Associations (ICCAIA)
and International Federation of Air Line Pilots Associations (IFALPA))

EXECUTIVE SUMMARY

This paper presents the current state of coexistence of 5G operations in the C-band and radio altimeters. The continued safety of global airspace will require international cooperation, collaboration between United Nations bodies, regulators (aviation and telecommunications) and relevant industries, to ensure that future spectrum reallocation is determined in transparent and thoughtful manner.

1. INTRODUCTION

1.1 Radio altimeters (RA) operate in the globally allocated 4.2 – 4.4. GHz aeronautical band. These altimeters are integral to numerous safety systems on board tens of thousands of aircraft around the world. In an environment where RAs are not reliable, flight operations would be significantly disrupted, which would result in economic impacts to affected areas as well as potential safety concerns.

1.2 Existing RA performance standards are not robust enough to allow for effective RA operation when confronted with interference from mobile wireless operations in adjacent frequencies. Interference results from two sources. First, high powered transmissions within the allowable broadcast frequencies overwhelm RA receivers. Second, spurious emissions from mobile wireless operators are allowed to extend into the RA-specific frequencies at levels that exceed the RA's ability to distinguish between the RA signal and the spurious emission signal.

1.3 The minimum operational performance standards (MOPs) for RA have not been updated in over forty years; Radio Technical Commission for Aeronautics (RTCA) and European Organisation for Civil Aviation Equipment (EUROCAE) are in the process of developing new RA standards that will protect from potential interference from current and future 5G operations in the nearby bands.

1.4 RA compliant to the standards that are being developed are not anticipated to be operable in environments with interference levels allowable under current regulations.

1.5 While the United States and other countries have implemented numerous mitigations, to include retrofits of RA and operational limitations on 5G networks, we must use the lessons learned over the past several years to plan for future technical evolution.

2. DISCUSSION

2.1 ICAO State letter SP 74/1-21/22, dated 25 March 2021, noted that “harmful interference to the function of the radio altimeter during any phase of flight may pose a serious safety risk to passengers, crew and people on the ground” and encourages “Administration[s] to consider as a priority, public and aviation safety when deciding how to enable *cellular broadband/5G services in radio frequency bands near the bands used by radio altimeters*”.

2.2 The United States’ aviation industry and the Federal Aviation Administration (FAA) were not successful in their efforts to demonstrate continued safe operations in the presence of anticipated radio frequency (RF) interference in advance of the initial implementation of networks operating in the 3.7-3.8 GHz range 5G network implementation, leading to an extensive and aggressive campaign to retrofit more than 8 000 United States registered aircraft, containing more than 20 000 RAs. Without further coordination between the aviation industry and telecommunications industry as use of the bands around 4.2 to 4.4 GHz evolves, impacts to aviation, both safety and economic, could be substantial.

2.3 While the United States is unique in its 5G C-Band implementation, telecommunications evolution and aviation safety is a global surety and, thus, must find a way to coexist. The success of these two industries is vital for ICAO Member States.

3. CONCLUSION

3.1 The international aviation community must continue to collaborate to ensure that the global aviation system remains safe in the face of evolving technologies.

3.2 Standards and Recommended Practices for radar altimeter RF characteristics are being developed by the ICAO Frequency Spectrum Management Panel (FSMP) based on the RTCA/EUROCAE MOPS work. A high-level RF Standard defined at ICAO will help inform States globally, and also assist with any necessary updates to relevant International Telecommunication Union (ITU) Radiocommunication Sector documents. ICCAIA and its members will continue to support this work to the greatest extent possible.

3.3 The international aviation community must also work closely with the telecommunication industry to coordinate spectrum allocations and identify and mitigate technical risks to avoid unintended safety and economic impacts and should be done within and surrounding ICAO, ITU and ITU World Radiocommunication Conference (2027) (WRC-27) activities.

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