



**GREPECAS Programmes and Projects Committee (PPRC) Fourth Virtual Meeting
 (ePPRC/04)
 Online, 21 – 22 April 2022**

**Agenda Item 2: Follow-up on the CAR/SAM Planning and Implementation Regional Group
 (GREPECAS) Programmes and Projects**

INTERFERENCE TO RADIO ALTIMETERS DUE TO 5G TECHNOLOGY

(Presented by the Secretariat)

EXECUTIVE SUMMARY	
<p>The working paper presents a summary of the activities carried out by the ICAO NAM/CAR/SAM regions in coordination with ICAO Headquarters to analyse the impact of the implementation of 5G technology in radio altimeters in aircrafts and the recommendations that as ICAO to implement mitigation measures for our operations.</p>	
Action:	Suggested actions are presented in Section 3.
<i>Strategic Objectives:</i>	<ul style="list-style-type: none"> • Air Navigation Capacity and Efficiency • Safety
<i>References:</i>	<ul style="list-style-type: none"> • NAM/CAR/SAM Workshop on the ICAO Position for the International Telecommunication Union (ITU) World Radiocommunication Conference (2023) (WRC-23), on line, 20 October 2021 https://www.icao.int/NACC/Pages/meetings-2021-cmr23.aspx • ICAO Frequency Spectrum Management Panel (FSMP) and 2023 World Radiocommunication Conference (WRC-23) Workshop, on line, 21 - 22 February 2022 https://www.icao.int/NACC/Pages/meetings-2022-wrc23.aspx

1. Introduction

1.1 The radio altimeter is a mandatory and critical safety system in many aircrafts that is used to determine the altitude of an aircraft over the field. Its information is essential to allow different flight operations (approximations and take-offs, principally) and functions that support navigation safety, installed in all the commercial aircrafts, as well as in a wide range of other non-commercial civil aircrafts. These functions of the system imply terrain awareness, aircraft ground collision prevention, flight control data and supportive functions for the automation for landing of aircrafts. If not mitigated adequately, the interference in frequencies, it alters the functioning of the radioaltimeter during any flight phase and can represent a serious risk to the operations, and consequently to passengers, crew, people and facilities on the ground.

2. Analysis

2.1 The International Telecommunication Union (ITU) stated that “[5G is] an opportunity for policymakers to empower citizens and businesses. 5G will play a key role in supporting governments and policymakers in transforming their cities into smart cities, enabling citizens and communities to realize and participate in the socio-economic benefits brought by an advanced and energy-intensive digital economy. data”.

- 5G deployments need frequency spectrum, a very limited and finite resource
- In the recent 5G spectrum bidding, the telecom industry spent more than \$80 billion to obtain a 10-year spectrum lease from the US government.
- Immense political and economic pressure often affects aviation safety arguments.

2.2 A serious risk to aviation safety implies potentially catastrophic consequences.

- ICAO State Letter **SP 74/1-21/22** encourages "Administrations to consider aviation and public safety as a priority when deciding how to enable cellular/5G broadband services in radio frequency bands close to the bands used by radio altimeters".
- "If not adequately mitigated, harmful interference to the operation of the radio altimeter during any phase of flight can pose a serious risk to the safety of passengers, crew and people on the ground."
- An undetected failure of the radio altimeter can lead to catastrophic results for people on board the aircraft and on the ground (ICAO); and false alarms have the potential to reduce confidence in avionics systems. (IATA and IFALPA)
- Similar concerns have been formally expressed by the International Coordinating Council of Aerospace Industries Associations (ICCAIA), the Radio Technical Commission for Aeronautics (RTCA), and the US Department of Transportation.

2.3 Considerations if not mitigated:

- Limitation/suspension of precision approach and landing capabilities: this limitation/suspension will reduce security and the airline access to airports in low visibility conditions and/or complex ground conditions.
- Limitation/suspension of night operations, particularly for airports with challenging natural and artificial complex terrain - The radio altimeter is critical to the terrain and obstacles awareness warning system which is mandatory for all air transport aircraft.
- Failure to issue state regulations to the modifications and recertification of aircraft radio altimeters and of the related functions.

2.4 ICAO has received studies from various States and Organizations on the potential for interference to radio altimeters. These studies generally conclude that some radio altimeters will be affected if high power cellular systems are deployed near the frequency band used by the radio altimeters. Several States have already implemented temporary technical, regulatory, and operational mitigations on new 5G systems in order to protect radio altimeters while more permanent solutions are designed.

2.5 It is important that States analyse this impact and integrate mitigation measures with the objective to assure safety.

3. Suggested actions

3.1 The States are invited to:

- a) Carry out risk analysis at the different airports, especially at international airports.
- b) Carry out an approach with the airlines to learn about their fleet and how the implementation of 5G technology could affect their operations.
- c) Carry out a rapprochement with the national providers of 5G technology and coordinate the implementation with them, preventing any possible conflict with aviation operations.
- d) Implement all the corresponding mitigation measures.
- e) Any other corresponding activity.