



INFORMATION PAPER

RASG-PA /12 — IP/06
01/11/22

Twelfth Regional Aviation Safety Group — Pan America Meeting (RASG-PA/12)

Salvador, Bahia, Brazil, 14 – 15 November 2022

Second GREPECAS–RASG-PA Joint Meeting

Salvador, Bahia, Brazil, 15 November 2022 (13h00 local time)

Agenda Item 4: Status of RASG-PA Safety Improvement Projects and Initiatives (SEI)

PROPOSAL FOR ICAO NACC/SAM REGIONAL 5G INTERFERENCE WORKSHOP

(Presented by Boeing)

EXECUTIVE SUMMARY	
<p>The introduction of 5G mobile services in frequency bands near the 4.2-4.4 GHz band raised concerns about potential interference to radio altimeters.</p> <p>This paper proposes the presentation of a workshop similar to the one currently being deployed in the ICAO Asia Pacific and Middle East regions and as a best practice we would like to bring to the Latin America and Caribbean region.</p> <p>Action: The meeting is invited to contribute with other 5G related subjects that would be of regional interest for the proposed workshop. The meeting is invited to encourage civil aviation regulators to work together with telecommunications regulators to exchange best practices with respect to mitigation strategies.</p>	
Strategic Objectives:	This working paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objectives.
Financial implications:	Taking advantage of the same infrastructure from the RASG-PA Executive Steering Committee meeting would reduce costs with installations and internet virtual platform arrangements. Some presenters would still have to travel to the physical location.
References:	<ul style="list-style-type: none"> IATA Press Release (21-Jun-2022); Ensuring Safe Rollout of 5G Networks https://www.iata.org/en/pressroom/2022-releases/2022-06-21-01/#_edn1 ICAO State Letter, LT 21/1 – SA210 (31-May-2022); Possible safety concerns regarding potential interference to radio altimeters caused by 5G systems

1. Introduction

1.1 The radio altimeter is a critical instrument on board an aircraft that determines the height of the aircraft over the terrain directly below it. The radio altimeter feeds essential data to the functioning of several aircraft systems and subsystems such as ground proximity warning system (GPWS), wind shear detection, flight controls and the automatic landing functions of some models of aircraft.

1.2 There is a potential risk that 5G telecom systems that operate in spectrum bands adjacent to the 4.2-4.4 GHz Radio Altimeter operating frequency band, could cause harmful interference to the radio altimeters on board certain aircraft.

1.3 This potential interference to the radio altimeter operation may pose a safety risk to passengers, crew and persons on the ground, and measures to mitigate this risk are available.

2. Discussion

2.1 This full-day workshop is aimed at raising awareness on potential safety hazards due to 5G interference and equipping aviation regulators with key technical and regulatory knowledge to manage this risk proactively in their respective countries.

2.2 The workshop could involve a series of presentations from ICAO, IATA, FAA, ANAC-Brazil, and Member States within the affected region. Proposed presentations could cover the perspectives from the regulators, original equipment manufacturers (OEMs) and the industry to provide a holistic view of this topic. Member States from Latin America and Caribbean will be encouraged to present the mitigations they have adopted in their countries to create a mindshare on best practices in the region, and to include the telecommunications regulators in the discussion.

2.3 In the afternoon session, Member States are encouraged to break out into small groups to discuss the situation in their own countries and potentially learn from other Member States who have started addressing this issue earlier than other States. The workshop will conclude with the discussion of ideas and the next steps which Member States intend to take to address the 5G interference issue in the Latin America and Caribbean region.

2.4 The invitation to participate is open to the Civil Aviation Authorities of ICAO Member States. Representatives from the States' telecommunications regulators are also welcome to participate in this workshop due to the cross-industry nature of this topic.

3. Example Agenda

3.1 The example agenda is taken from the APAC ICAO planned event scheduled for 16 November 2022 to be held in Bangkok. We can modify as needed from the lessons learned, post-event.

Wednesday, 16 November 2022	
Time (Bangkok Time)	Session
09:00 – 09:05	Opening remarks by ICAO NCAA/SAM Office Representative
09:05 – 09:25	Introduction of Participants and Photo Taking
09:25 – 10:10	Presentation 1 by OEM e.g. Airbus or Boeing + questions
10:10 – 10:30	Break (20 Minutes)
10:30 – 11:15	Presentation 2 by IATA + questions
11:15 – 12:00	Presentation 3 by FAA or Member State (to share their mitigation strategy) + questions
12:00 – 13:00	Lunch Break (1 Hour)
13:00 – 13:45	Presentation 4 by Member State (to share their mitigation strategy) + questions
13:45 – 14:30	Presentation 5 by ICAO NCAA or SAM + questions
14:30 – 14:50	Break (20 Minutes)
14:50 – 15:50	Breakout Session <i>Member States to gather in groups of 3 to 4 to brainstorm potential mitigation strategies and the next steps to address the 5G Interference issue in the region.</i>
15:50 – 16:30	Sharing of Ideas from the Breakout Session
16.30 – 17:00	Review of Working Paper and Closing Remarks
17:00	End of Workshop

4. Brief Technical Summary

4.1 The radio altimeter is the only mandatory sensor on-board aircraft capable of providing a direct measurement of the clearance height above terrain and obstacles. It sources information that is the main enabler of several safety-critical aircraft functions and systems.

4.2 C-band 5G telecommunications systems operating without proper mitigations in the frequency bands adjacent to aircraft radio altimeters have the potential to cause harmful interference to radio altimeters on all types of civil aircraft during any phase of flight - most critically during approach and landing phases. Such interference poses a serious safety risk to aircraft, passengers and crew on-board, and people on the ground.

4.3 The most effective measure aviation regulatory authorities can take to reduce interference is to cooperate with the government and telecommunication regulatory / management with regards to the following mitigation measures:

4.4 These mitigation measures include:

- a) Adequate Buffer Zones: limiting the installation of 5G stations within 2-3 km of the approach ends of runways; declaring 'no-go zones' in the vicinity of airports; establishing permanent buffer zone safeguards.
- b) Restricting Transmission Characteristics: limiting 5G transmission power and the angle of antennas, i.e., low power transmission around airports with a downward-tilt radiation pattern for 5G transmitting station masts.
- c) Timely Assessment: conducting timely surveillance and test flights to proactively ascertain the actual levels of 5G transmissions and potential harmful interference effects.

4.5 These mitigating measures can be temporary until the aircraft radio altimeter systems can be modified to be more resistant to interference from 5G and other future frequency band changes.

5. Conclusion

5.1 The changes to the frequency spectrum use by other areas besides aviation can pose a risk of interference to existing wave-based equipment in the aircraft. The rapid adoption of 5G with a frequency bandwidth close to the radio-altimeter frequency operating range poses an immediate risk that should be mitigated. Therefore, maintaining continuous coordination between aviation and telecommunication authorities is essential.

5.2 Assembling State civil aviation regulators and the telecommunication regulators to discuss mitigation strategies for the 5G potential interference risk in a workshop is a way to develop a regional and harmonized response to this threat. Additionally, some states can share their experience and their lessons learned through this process.