



International Civil Aviation Organization

MIDANPIRG/19 and RASG-MID/9 Meetings

(Riyadh, Saudi Arabia, 14-17 February 2022)

Agenda Item 3.3: Air Navigation Subjects of interest to RASG-MID including RVSM operations and Monitoring

GNSS & RADIO ALTIMETER INTERFERENCES

(Presented by the Secretariat/ IATA)

SUMMARY

This paper informs States about GNSS Radio Frequency Interference (RFI) resolution process through ITU radio-communications bureau (BR) and actions taken by the ICAO MID Office on frequent GNSS incidents reports, and provides brief on Potential safety concerns regarding interference to radio altimeters.

Action by the meeting is at paragraph 3.

REFERENCES

- The outcome of HLCC-2021(12 to 22 October 2021)
- ICAO SL (SP 74/1-21/22) dated 25 March 2021
- The summary of discussion of Special Coordination meeting on GNSS Interferences for Iraq and Turkey
- ATM SG/7 Report

1. INTRODUCTION

1.1 GNSS is a key technology of the Communications, Navigation, and Surveillance (CNS) infrastructure. GNSS can support navigation applications in all phases of flight as well as surveillance application like ADS-B. GNSS is also used in safety nets like the GPWS (Ground Proximity Warning Systems) and provides the time reference that is used to synchronise systems and operations in ATM.

1.2 The aviation community has already informed ICAO about the Radio Frequency Interference (RFI) concerns at the 40th Assembly, resulting in the publication of an associated State Letter calling for appropriate mitigation actions (ICAO State Letter 089, Ref AN 7/5-20/89 dated 28 August 2020).

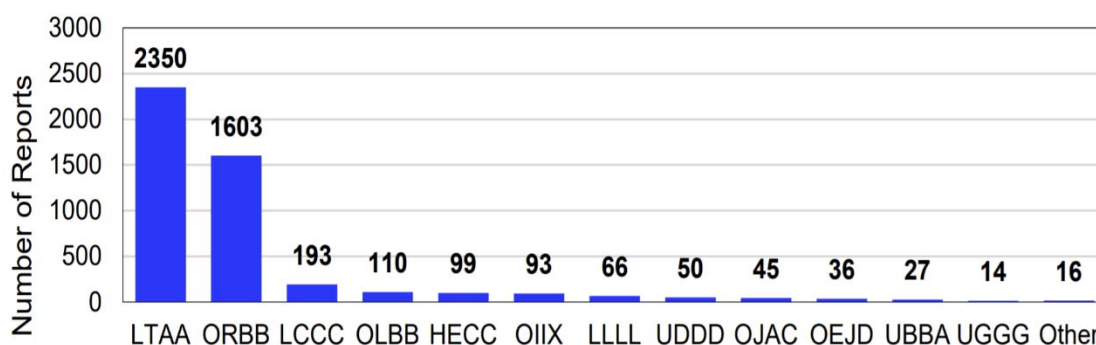
1.3 The RASG-MID/7 meeting, through Conclusion 7/1, endorsed the RSA on GNSS Vulnerabilities (RSA-14).

2. DISCUSSION

GNSS Interferences

2.1 GNSS interference has been identified as a major safety issue as GNSS is embedded in numerous critical infrastructures. The intentional interference presents a substantial safety threat to aircraft and passengers.

2.2 A substantial number of GNSS interferences were reported across international borders, reaching boundaries out of the MID Region. IATA MENA has been providing regular update on incidents reported by Airspace users. The majority of GNSS interference incidents were reported in the Ankara FIR (LTAA), Baghdad FIR (ORBB) and their respective borders, which equates to 83.8% of total reports received, followed by Nicosia (LCCC), Beirut (OLBB), Cairo (HECC) and Tehran (OIIX) FIRs.



**Aggregated Data from IATA GADM*

2.3 In connection with the above, the ICAO MID Office conducted a Special Coordination meeting on GNSS Interference for Iraq and Turkey, virtually, on 7 October 2021, jointly with IATA MENA, IATA Europe and ICAO EUR/NAT Office.

2.4 The objectives of the meeting was to discuss the issue of frequent losses of GPS signal in Ankara & Baghdad FIRs, consequences from Airspace Users' perspective, and the status of implementation of preventive and corrective measures taken by concerned States.

2.5 The meeting noted that CNS resiliency needs to be addressed with a holistic approach, ensuring that an efficient and coordinated evolution between the radio regulatory authorities, operational procedures and civil-military coordination. In this regard, the meeting agreed to address the issue of GNSS Interferences during the Civil-Military Webinar planned in 2022.

2.6 The meeting noted that the issued NOTAMs have variant Q codes and terminologies (GPS unreliable, GPS Signal interference, GPS Jamming, Loss of GPS Signal, etc.) making it difficult for operators to filter and search through the NOTAMs. Therefore, the meeting agreed on the need to develop a standard template for NOTAM text in coordination with ICAO MID AIM SG.

2.7 The MID Office was informed that EUROCONTROL has initiated communication with ITU radio-communications bureau (BR) regarding the GNSS RFI cases, and that a resolution process exists through the BR, and emphasized the importance of reporting infringements of the ITU radio regulations, as this is a continuing issue affecting operations on a significant scale.

2.8 Based on the above, States are invited to report GNSS radio frequency interferences to ITU, describing GNSS RFI effect either in their State or reported by their registered aircraft. Therefore, the following Draft Conclusion is proposed:

Why	To improve coordination on the GNSS RFI with ITU-BR for further resolution
What	To report GNSS radio frequency interferences to ITU – BR
Who	States
When	2022

DRAFT MIDANPIRG/19 CONCLUSION19/XX: REPORTING OF GNSS RFI TO ITU

That, States are invited to report GNSS radio frequency interferences to ITU radio-communication bureau (ITU-BR), describing GNSS RFI impact either in their State or reported by their registered aircraft.

Radio Altimeter Interference

2.8 The radio altimeter is a mandated critical aircraft safety system used to determine an aircraft's height above terrain. Its information is essential to enable several safety related flight operations and navigation functions on all commercial aircraft as well as a wide range of other civil aircraft. Such functions and systems include terrain awareness, aircraft collision avoidance, wind shear detection, flight controls, and functions to automatically land an aircraft. If not properly mitigated, 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.

2.9 ICAO issued a SL (SP 74/1-21/22) dated 25 March 2021 on Potential safety concerns regarding interference to radio altimeters. ICAO received studies generally conclude that some radio altimeters will be impacted if high power cellular systems are implemented near the frequency band used by radio altimeters. States were encouraged 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.

2.10 The meeting may wish to recall that the HLCC-2021 adopted recommendation 5/5 related to Radio Altimeters:

Recommendation 5/5 — Mitigating the risk of 5G implementation to safety-critical radio altimeter functions

That States:

- a) consider, as a priority, public and aviation safety when deciding how to enable cellular broadband/5G services.
- b) consult with aviation safety regulators, subject matter experts and airspace users, to provide all necessary considerations and regulatory measures to ensure that incumbent aviation systems and services are free from harmful interference; and

That ICAO:

c) continue coordinated aviation efforts, particularly at the International Telecommunication Union (ITU), to protect radio frequency spectrum used by aeronautical safety

2.11 The second meeting of the Frequency Management Ad-hoc Working Group (FM WG/2), held virtually (7 June 2022) proposed to establish action group to:

- collect and share information on the best practices implemented by States and Regional Organizations to mitigate 5G potential interference that may impact the radio altimeters; and
- develop MID guidance material on concrete actions and steps to protect the aircraft operations from any 5G potential interference associated with the deployment of ground infrastructure to enable cellular broadband/5G services in radio frequency bands near the bands used by radio altimeters.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) agree on Draft Conclusion in para 2.8;
- b) task the AIM SG to develop a standard NOTAM text to be used for GNSS Interference and to be attached to the RSA-14;
- c) urge States to ensure implementing the preventive and reactive mitigation strategies mentioned in the RSA-14; and
- d) note HLCC-2021 Recommendation 5/5, and take actions, as appropriate.

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