International Civil Aviation Organization

Thirty-Fifth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/35)

Bangkok, Thailand, 25 to 27 November 2024

Agenda Item 2: Global and Inter Regional Activities

IDENTIFYING ACTIVITIES TO RESPONSE TO GNSS RFI

(Presented by Republic of Korea)

SUMMARY

Global Navigation Satellite System (GNSS) Radio Frequency Interference (RFI) has emerged as a critical safety issue, impacting both the safety and efficiency of international air navigation. ICAO and the APAC Regional Office have made significant efforts to support Member States in managing the risks associated with GNSS RFI.

Building on these efforts, the Republic of Korea continues to identify safety activities applicable to Air Navigation Services (ANS), emphasizing the leverage of well-established existing operating procedures. Core operating procedures in Flight Information Services, Aeronautical Information Services, and Air Traffic Services have been introduced as relevant safety activities to address GNSS RFI challenges. Recognizing that many States may have limited experience with this emerging risk, active discussions among APAC member States are encouraged to promote effective safety measures at both national and regional levels. Enhanced collaboration will facilitate knowledge-sharing and the development of best practices, strengthening the region's resilience to GNSS RFI challenges.

Strategic Objectives:

A*: **Safety** – Enhance global civil aviation safety*

B: ***Air Navigation Capacity and Efficiency*** *— Increase the capacity and improve the efficiency of the global aviation system*

1. INTRODUCTION

1.1 Global navigation satellite system (GNSS) radio frequency interference (RFI) has emerged as a global safety issue impacting both safety and efficiency of international air navigation. Significant efforts have been made by ICAO and APAC Regional Office to support Member States in managing risks associated with GNSS RFI issues. During the last year APANPIRG/34, GNSS interference was identified one of the regional CNS challenges and in addition, the 14th Air Navigation Conference recommended comprehensive actions in relevant aviation domains including Air Navigation Services (ANS). In response, in 2024 saw progress within the relevant CNS expert group, along with the formation of an ad hoc group in ATM domain to address these challenges.

1.2 Based on the outcomes of the above-mentioned activities, the Republic of Korea is continuing its efforts to identify safety activities that can be applied to operations in ANS. Given that GNSS RFI remains as an emerging risk factor, challenges persist in identifying all necessary response measures. This working paper aims to share insights and facilitate discussion on safety activities in ANS to address GNSS RFI issues.

2. DISCUSSION

2.1 Recognizing that the primary safety risks of GNSS RFI affect aircraft in flight, the Republic of Korea (ROK) believes the most urgent response should focus on real-time support for operating aircraft. ROK views that understanding the specific situations faced by flight crews during operations and, based on these insights, to identify necessary measures within Air Navigation Services. The activities were mainly identified in three ANS sub-domains, utilizing existing operating procedures. For information, the Flight Information Region serviced by ROK (Incheon FIR) does not have oceanic or remote airspace, however, there are many long-haul flights destinating all around the world.

2.2 **Flight Information Services**. The role of the Flight Information Service (FIS), which delivers essential safety information to aircraft in real time, is recognized as highly important. As outlined in *Annex 11 - Air traffic services* (Chapter 4. Flight information service), information on the availability of radio navigation services, which includes GNSS services, is crucial information that directly impacts aircraft in flight. Providing GNSS RFI related information proactively to controlled aircraft must be emphasized as a critical role for FIS personnel. For airports and airspace in vicinity where applicable, including this information in the Automatic Terminal Information Service (ATIS) would further highlight the situation to aircrafts arriving and departing from this airport.

2.2.1. In addition to disseminating information, receiving reports of GNSS RFI encounters from aircraft in flight is also critical. For systematic collection of these reports, reporting procedures for flight crews are needed for efficient gathering of the reports. Furthermore, a standardized reporting format should be developed to ensure that information collected in these reports, such as position, encounter altitude, type of interference, etc. is consistent for analysis as discussed during the ATMSG/12.

2.3 **Aeronautical Information Services**. In addition to GNSS RFI information provided by aircraft in flight, it is essential to collaborate with organizations, such as military and scientific authorities, that can collect or identify sources of GNSS RFI activities. As specified in Annex 11, provisions 2.19, when interference sources, such as scheduled military exercises or from any other external sources, are planned or known in advance, it is crucial to provide this information to aircraft as aeronautical information beforehand, allowing awareness prior to flight operations.

2.3.1. In line with provisions in *Annex 15 - Aeronautical information services*, it is important to continuously issue NOTAMs for safety advisories as needed, along with providing pre-flight information service that includes key information related to GNSS RFI. Expanding the arrangements for collecting additional GNSS RFI reports from flight crews as part of the post-flight information service could enhance the reliability and relevance of pre-flight information services.

2.4 **Air Traffic Control Services**. For Air Traffic Controllers (ATCOs), it is important to understand the impact of GNSS RFI on onboard equipment for immediate reaction to safety critical situations. Understanding the consequences of GNSS RFI such as loss of positioning accuracy, interruption of NAVAID signals, is important to prevent collisions and expedite and maintain an orderly flow of air traffic. For example, false Enhanced ground proximity warning system (EGPWS) warning during approach and/or even in higher altitudes, deviations from course could have significant impact in maintaining separation minima. Continuous surveillance on air traffic and close coordination with adjacent ATC facilities are crucial to maintain safe air traffic condition. In addition, GNSS RFI can be considered as a risk factor in deciding Air traffic control capacity for Air traffic flow management, if necessary.

2.5 Continuous effort to identify unknown situations and engaging in discussions with flight crews and ATCOs is needed to fully understand GNSS RFI risks and to respond effectively. Given the unique operating environments of each State, the necessary activities may vary. Tailored risk mitigation strategies to align with specific national context will allow each State to address the interference more effectively. However, as some States may have limited experience and information regarding this emerging risk, active discussions among APAC member States are encouraged to foster effective safety measures at both national and regional levels. Enhanced collaboration will support knowledge-sharing and the development of best practices, strengthening the region's overall resilience to GNSS RFI challenges.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to:

a) Note the information contained in this paper;

b) Note that active collaboration amongst adjacent ANSPs is necessary for safe and efficient air navigation;

c) Encourage collaboration amongst Member States and stakeholders in sharing experience and information; and

d) Discuss any relevant matters as appropriate.

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