

**58<sup>th</sup> CONFERENCE OF  
DIRECTORS GENERAL OF CIVIL AVIATION  
ASIA AND PACIFIC REGIONS**

*Dhaka, Bangladesh  
15 to 19 October 2023*

**AGENDA ITEM 4: AIR NAVIGATION**

**LESSONS FROM 5G DEPLOYMENT**

(Presented by IATA and AAPA)

**SUMMARY**

This paper highlights lessons learned from the initial deployment of 5G telecommunications infrastructure and recommends actions to mitigate the impact of future telecom deployments such as 6G.

## LESSONS FROM 5G DEPLOYMENT

### 1. INTRODUCTION

1.1 A **Radio Altimeter (RadAlt)** is a mandated aircraft safety system used to determine height above the surface immediately below an aircraft. In addition to being displayed on flight crew instrumentation, its output is utilized by several other safety-critical avionic systems. The RadAlt operates in the 4.2 to 4.4 GHz part of the frequency spectrum.

1.2 In some countries, 5G telecommunications use a range of frequencies adjacent to the RadAlt band. This proximity in operating frequency can lead to interference with the RadAlt.

1.3 The ICAO MIDANPIRG/19 meeting held in Riyadh, Saudi Arabia, from 14<sup>th</sup> to 17<sup>th</sup> February 2022, through Decision 19/23, established a RadAlt Action Group (AG) to develop guidance material.

1.4 At the 57<sup>th</sup> Conference of Asia-Pacific DGCA held in Incheon during July 2022, IATA presented a paper urging aviation safety regulators to coordinate with relevant telecommunication regulators prior to decisions being made on the further deployment of 5G and in the future, 6G.

1.5 In this paper, IATA and AAPA highlight some aspects of 5G deployment, regulations, and actions taken, and provide recommendations for mitigation of future infrastructure rollouts, including 6G, with the aim of finding common ground through consultations and avoiding or minimizing the impact of the unilateral imposition of regulations without considering inputs from aviation stakeholders.

### 2. DISCUSSION

2.1 IATA has developed a dashboard providing an overview of global 5G implementation accessible at <https://www.iata.org/en/programs/ops-infra/air-traffic-management/5g/>. IATA has been proactively engaging with telecom regulators and updating the dashboard accordingly.

2.2 In the USA, the FAA issued 5G-related Notices of Proposed Rulemaking (NPRM) and Airworthiness Directives (AD). Other States are also implementing rules and regulations to mitigate the negative impact of 5G on aeronautical operations. The USA mitigation plan required retrofitting or modifying aircraft RadAlts.

#### 5G / RA Coexistence Timeline



Source: 'Stakeholder Update on Radio Altimeters and 5G-C Band Deployment in the United States', FAA, June 29<sup>th</sup>, 2023

2.3 The aircraft retrofit plan launched by the FAA was structured in 4 groups targeting 7425 aircraft. By 28<sup>th</sup> June 2023, 4400 aircraft had been retrofitted. The financial impact of retrofitting aircraft, equipment and manpower resources has been significant and borne solely by airspace users.

**Retrofit Plan**

Group	Target Completion Date	Retrofit Status
Group 1 E145/E170/E190 regional fleet retrofits	Nov 1, 2022	Target: 75%
Group 2 A320 fleet A330/340 (international)	Dec 1, 2022 - Power up at airports not served by Group 2 aircraft Jan 1, 2023 - All airports	Target: 75% (domestic) Target: 40% (international)
Group 3A A380/B777 fleet retrofits All international carriers	Mar 1, 2023 - Power up at all airports	Target: 40%
Group 4 Aircraft with retrofits will be acceptable in full 62dBm environment	July 1, 2023	Target: 75% (domestic) Target: 40% (international)

**Fleet Retrofit Snapshot- Part 121, 6/28/2023**

Fleet Group	Fleet Size	Number complete	% Complete	Change (since M21 report)	Target
Group 1 (to Group 3)	160	122	77.2%	+0	75% by 11/1/2022
Group 1 (to Group 4)	745	666	89.7%	+2	75% by 11/1/2022
Group 2	645	568	87.9%	+1	75% by 12/31/2023
Group 3	4080	3066	75.2%	+226	End indications 7/1/2023
Group 4	1700				
Unknown	5				
<b>Total</b>	<b>7425</b>	<b>4440</b>	<b>78.9%</b>	<b>+228</b>	

As reported by OEMs/airlines

Source: 'Stakeholder Update on Radio Altimeters and 5G-C Band Deployment in the United States', FAA, June 29<sup>th</sup> 2023

**LESSONS LEARNED FROM THE DEPLOYMENT OF 5G TO DATE**

2.4 IATA and AAPA understand the value of frequency spectrum usage for commercial purposes and the need to auction segments of spectrum to enable telcos to provide services. However, legacy spectrum allocations, especially those associated with safety of life flight operations, require that deployment of new services such as 5G or 6G be done with consensus through industry consultations to assess implications and, where necessary, implement mitigation measures to counter radio frequency interference (RFI). This could also help to minimize the financial impact on telcos and airspace users, avoiding as much as possible the complexities and risks suffered during initial 5G infrastructure deployment.

2.5 Within the next decade, industry will develop and implement 6G technology. IATA, ICAO and other organizations, such as Aviation Spectrum Resources Inc. (ASRI), have identified that, as currently envisaged, 6G will potentially challenge airborne Weather Radar systems (WXRDR). Other systems might also be affected.

2.6 The ICAO Frequency Spectrum Management Panel (FSMP) will address the potential impact of 6G on existing aircraft systems and develop a common industry position to counteract WXRDR RFI.

2.7 Prior to further developments of 6G infrastructure worldwide, we believe that common standards among ICAO member states would be a positive step to counteract potential future decisions by spectrum regulators that could intrude on the aviation spectrum for safety of life flight operations.

2.8 In summary, IATA and AAPA would like to highlight:

- Telecommunications regulators have a duty to regulate for the good of all spectrum users, not just one.
- Aviation regulators must adopt a data-derived approach to addressing the concerns of airspace users.
- During initial implementation of 5G, neither RadAlt performance data nor 5G base station radio frequency (RF) performance information (at a sufficiently fine granularity) was readily available. Proactively gathering and appropriately sharing this data is foundational to future success.

- National spectrum allocation strategies must account for aviation needs and protection of spectrum for safety of life flight operations.
- Airspace users and aircraft / avionic manufacturers can provide the data needed to assess interference risks and verify proposed mitigation measures and should therefore be engaged in the planning stages by the telecom regulators.
- There is need for a collaborative approach to allocation (or re-allocation) of radio frequencies by users of the frequency spectrum.

### **3. ACTION BY THE CONFERENCE**

3.1 The Conference is invited to:

- a) note the information contained in this paper;
- b) consider the critical importance of safeguarding aviation spectrum, particularly in the context of emerging 5G and future 6G technologies; and
- c) recognize that States and their telecommunications regulators need heightened sensitivity to RFI considerations, given the lessons learned from the initial 5G deployment and potential challenges to airline operations posed by technologies such as 6G.

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