International Civil Aviation Organization
Frequency Management Working Group

Fifth Meeting (FM WG/5)
(Doha, Qatar, 10 – 11 May 2026)

Agenda Item 2: Frequency Congestion

FREQUENCY CONGESTION

(Presented by Secretariat)

SUMMARY

This paper addresses issues related to the reduction of frequency congestion in the MID Region through the revision of the MID Region allotment plan, enhancement of the ICAO database quality to support more accurate frequency assignment and separation, and consideration of additional measures to increase available spectrum capacity, including the implementation of 8.33 kHz channel spacing and various approaches to optimize the use of the DME spectrum.

Action by the meeting is at paragraph 3.

References

- ICAO Doc 9718 – Handbook on Radio Frequency Spectrum Requirements for Civil Aviation
- MIDANPIRG/20 Report
- Outcome of ACAO/ICAO ACAO/ICAO Frequency Management Workshop (Casablanca, Morocco, 6-10 September 2022)
- AIRBUS & EUROCONTROL Study “Analysis of DME stations usage based on airborne recordings”
- EUROCONTROL Study “DME Spectrum Optimization”

1. INTRODUCTION

1.1 The MID Region is experiencing sustained growth in air traffic and airport infrastructure, including new runways and upgraded approach capabilities. This growth increases the demand for frequency assignments for VHF communication and navigation facilities.

1.2 Frequency congestion issue arises when a new or modified NAV facility cannot be assigned without creating a potential incompatibility with an existing facility.

2. DISCUSSION

MID Region Allotment Plan

2.1 In order to increase the amount of available spectrum that can be used for Aeronautical services (VHF COM), MIDANPIRG/20 tasked the Frequency Management Working Group (FM WG), through Decision 20/35, to further review and amend, as deem necessary, the regional frequency allotment plans at ***Appendix A***

MIDANPIRG DECISION 20/35: REVIEW OF THE MID REGION ALLOTMENT PLAN

That, in order to increase the amount of spectrum that can be used for Aeronautical Services, the FM WG should adopt the revised planning Principle for Aeronautical Frequency Bands of 117.975-137 MHz and review and update, as deem necessary, the current MID allotment plan by Q1 2024.

2.2 The review of the allotment plan may increase the amount of spectrum that can be used for ATC Services; current sub-bands that are not allotted (135.825 – 136.475) MHz and also band that is currently allotted for AOC (ex. 128.900 – 132.075) MHz.

2.3 MIDANPIRG/21 endorsed again the review of the MID Region allotment plan and extended the deadline to Q1 2025, through Decision 21/23. The meeting may wish to note that no progress has been made to this regard.

Possible Implementation of 8.33 Channel Spacing

2.4 The meeting may wish to recall that MIDANPIRG/20 supported a recommendation emanated from the ACAO/ICAO Frequency Management workshop to conduct a simulation on VHF COM frequency assignment in the MID Region. The primary purpose of this simulation is to determine, if a congestion in the use of frequencies can be foreseen that would require the implementation of 8.33 kHz channel spacing in any parts of the MID Region.

2.5 MIDANPIRG/20 requested States, through Conclusion 20/36, to provide their Spectrum needs up to 2030 using ***Appendix B.***

MIDANPIRG CONCLUSION 20/36: OPTIMIZATION OF FREQUENCY ASSIGNMENT IN THE MID REGION

That, in order to optimize the frequency assignment planning and mitigate VHF frequency congestion at regional level, States are urged to:

a) coordinate with ICAO MID Office before assigning frequencies for aeronautical services (VHF COM, VHF NAV);
b) perform an update/review of the data in the VHF-COM/NAV module; and
c) Submit Frequency Requirements for the Period 2023 – 2030 using the Guidance Doc. at Appendix 6.6B by 1 August 2023.

2.6 The meeting was informed that in case not all frequency requirements until 2030 can be satisfied using 25 kHz channels, material for the introduction of 8.33 kHz channel will need to be developed or other viable solution in the MID Region or parts thereof. Based on other Regions' experience, the introduction of 8.33 kHz channel separation would require a retrofit of airborne/ground equipment.

2.7 However, feedback from ICAO Frequency Spectrum Management Panel (FSMP) members indicates that this would be a complex undertaking. Several States have noted that, if viable alternatives were available, they would likely prefer those options. This is due to the fact that implementation would require coordinated action across all States, as well as modifications to both airborne and ground systems, resulting in significant costs.

Update of the current Frequency Finder Tool

2.8 The Navigation Module in the current tool is being updated, and a new Surveillance module on improving Mode S Interrogator codes (IC codes including II and SI codes) assignment for surveillance systems is being developed.

2.9 It has been noted that MID Region Navigation data needs to be updated to be aligned with States' data in AIP.

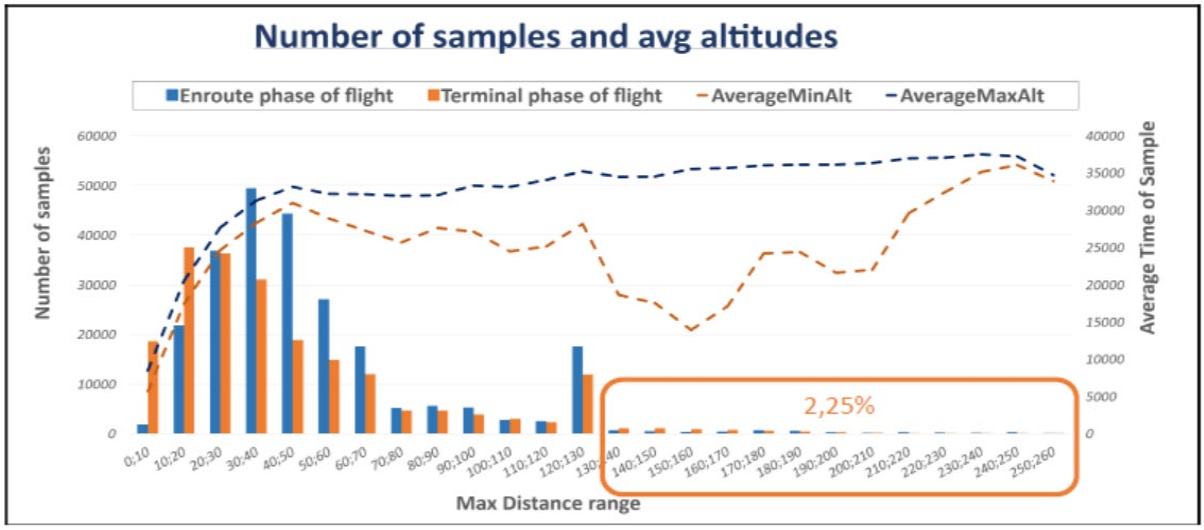
2.10 The key deliverables of the updated NAV Modules will include:

- Simulation Tools: Integrate simulation capabilities specifically for VHF communication and NAV services to model spectrum congestion and assist ICAO regions in frequency planning.
- Keyhole Coverage Visualization for ILS: Replace circular coverage models with keyhole coverage visualization, reflecting real operational scenarios for more accurate frequency assignments.
- Quality control review of existing system functionality: Ensure current functionality aligns with published ICAO guidelines on frequency planning criteria for navigation aids.

DME Congestion

2.11 Due to GNSS RFI concerns, several states have recently installed additional DMEs, which could increase DME spectrum congestion in the Region.

2.12 The meeting may wish to note that a study conducted by Airbus and EUROCONTROL indicated that DME utilization beyond 130 NM is very limited, and that only 2.25% of the flights selected DMEs further than 130 NM, as illustrated in the figure below:



2.13 The meeting may wish to recall that, based on a simulation conducted by ICAO for the MID Region in 2018, several DME congested areas have been identified.

2.14 A study conducted by EUROCONTROL on DME spectrum evolution identified five potential approaches for increasing the availability of DME channels, technical feasibility of each measure needs to be assessed in more detail:

a) Limit Designated Operational Coverage (DOC) range to 130NM (in line with FMS DME selection logic)

b) Tailoring the transmitting power (EIRP) to the DOC range

c) Avionics Un-pairing DMEs from ILS and VORs

d) Utilization of Z-channel

e) Implementation of Double-DOC

3. ACTION BY THE MEETING:

3.1 The meeting is invited to:

a) review and propose update to the MID Region allotment plan as in (2.1);

b) urge States to:

i. provide required data as in 2.5; and

ii. Cooperate with ICAO to validate the NAV Module data; and

iii. consider the potential approaches identified in paragraph 2.14 for the future reduction of DME congestion in the MID Region

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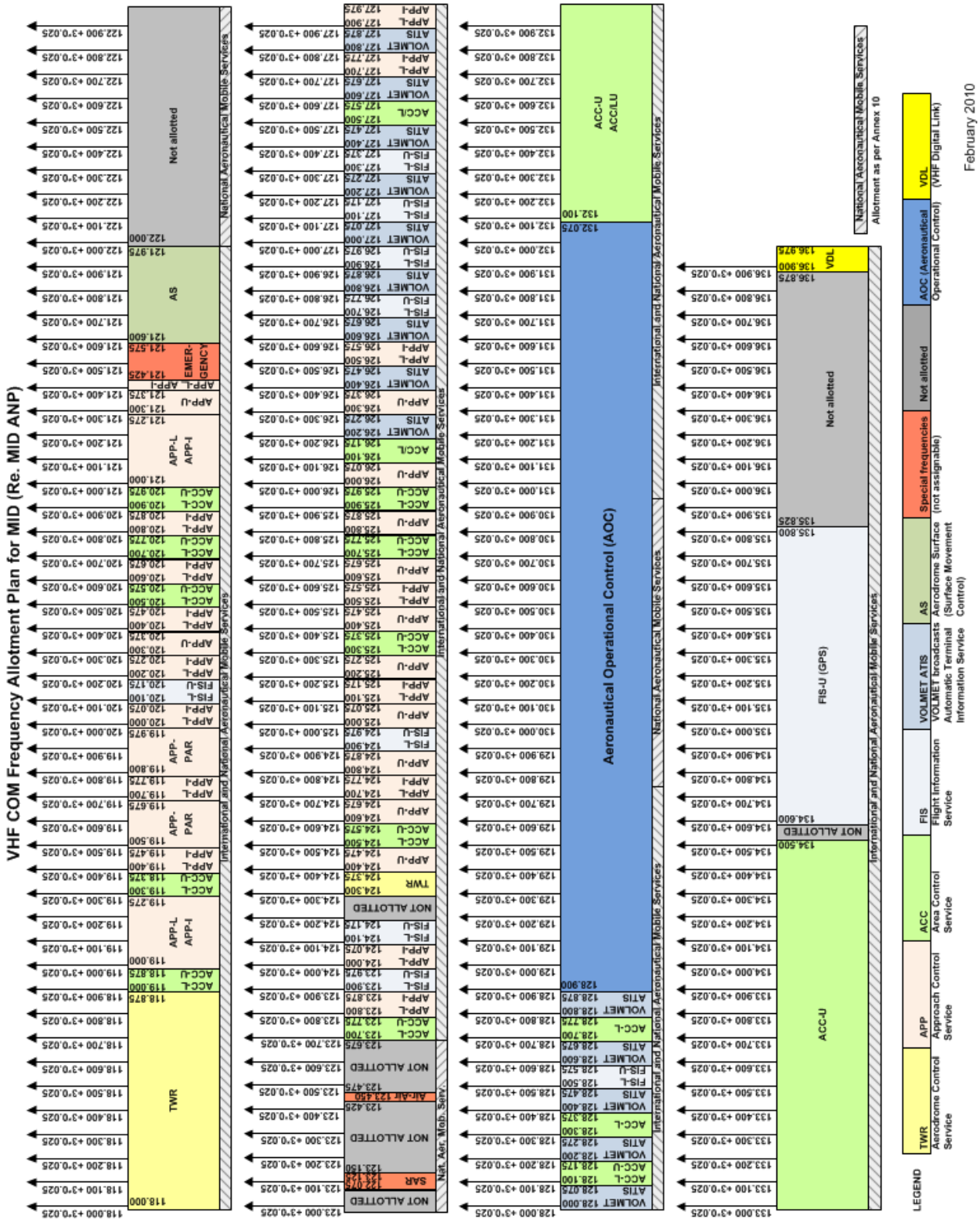
VHF COM Frequency Allotment Plan for MID (Re. MID ANP)
LEGEND
TWR Aerodrome Control Service
APP Approach Control Service
ACC Area Control Service
FIS Flight Information Service
VOLMET ATIS VOLMET broadcasts Automatic Terminal Information Service
AS Aerodrome Surface (Surface Movement Control)
Special frequencies (not assignable)
Not allotted
AOC (Aeronautical Operational Control)
VDL (VHF Digital Link)
National Aeronautical Mobile Services Allotment as per Annex 10
International and National Aeronautical Mobile Services
National Aeronautical Mobile Services
International and National Aeronautical Mobile Services
Aeronautical Operational Control (AOC)
ACC-U
ACC/LU
FIS-U (GPS)
Not allotted
VDL
TWR
APP-I
APP-L
APP-PAR
EMER-GENCY
AS
Not allotted
SAR
Air-Air 121.450
NOT ALLOTTED
TWR
ACC-L
ACC-U
APP-L
APP-I
APP-PAR
APP-U
FIS-L
FIS-U
ATIS
VOLMET
AS
Not allotted
February 2010

SUBMISSION OF FREQUENCY REQUIREMENTS FOR THE PERIOD 2023 – 2030

1.1 The primary purpose of this simulation is to determine if a congestion in the use of frequencies can be foreseen that would require the implementation of 8.33 kHz channel spacing in any parts of the MID Region.

1.2 With the view to determine the medium-term spectrum requirements for VHF communication services, States are invited to submit these requirements to the MID Regional Office by **Q4 2024**. On the basis of these requirements. ICAO will undertake an analysis that is aimed at determining whether these requirements can be assigned a frequency within the available 25 kHz channels.

1.3 In this case, States can introduce the requirements in the local version of Frequency Finder and generate with the button “Export Submissions” an Excel file that can be submitted to the Reginal Office.

1.4 States are able to download the Frequency Finder tool from Frequency Spectrum Management Panel (FSMP) webpage at: https://www.icao.int/safety/FSMP/Pages/Documents.aspx, and ICAO will provide assistance for any difficulties in installation and use of this ICAO tool.

1.5 Precise details not available.

1.5.1 When precise details are not available for future frequency requirements, States can submit such requirements in any format.

1.5.2 Example 1: For a new airport, States can submit the (approximate) coordinates and specify the need for:

x TWR frequencies
x Aerodrome surface frequencies
x APP-U frequencies
x APP-L frequencies
x ACC-U frequencies
ATTM.- 2
x ACC-L frequencies
x VOLMET frequencies
x ATIS frequencies
x VDL frequencies
