

International Civil Aviation Organization

MIDANPIRG Air Traffic Management Sub-Group

Seventh Meeting (ATM SG/7) (Virtual, 15 – 18 November 2021)

Agenda Item 3: Planning and Implementation issues related to ATM/SAR

MID DOC 004 - MID HIGH LEVEL AIRSPACE CONCEPT V1.2 (HLAC)

(Presented by the Secretariat)

SUMMARY

This paper presents the progress of the development of the MID Doc 004 - MID High Level Airspace Concept V1.2

Action by the meeting is at paragraph 3.

REFERENCES

- MID Doc 004 MID High Level Airspace Concept V1.0 (Edition 2015)
- MIDANPIRG/18 and RASG-MID/8 Meetings Report (Virtual, 15 22 February 2021)

1. Introduction

- 1.1 The objective of the High level Airspace Concept is to consolidate the ATM operational requirements agreed on by MIDANPIRG, in order to provide a generic set of characteristics to be applied by States, which would support the harmonization of the ATM operations in the MID Region.
- 1.2 To review and prepare a revised version of the document. MIDANPIRG/18 meeting, through Decision 18/32, established an Action Group to review and prepare a revised version of the MID Doc 004:

MIDANPIRG DECISION 18/32: HIGH LEVEL AIRSPACE CONCEPT ACTION GROUP (HLAC AG)

That, the High Level Airspace Concept Action Group (HLAC AG), composed of the ATM Focal Points from Bahrain, Egypt, Jordan, Oman, Saudi Arabia, UAE, IATA and ICAO MID, be established to review and prepare a revised version of the MID Region High Level Airspace Concept (MID Doc 004), by 31 August 2021, for presentation to the ATM SG/7 meeting and endorsement by the MIDANPIRG/19 meeting.

2. DISCUSSION

2.1 The inputs and comments received from the Action Group members are consolidated in $\bf Appendix \ A$.

2.2 There is an agreement that further efforts are needed to finalize the revised version of the MID Doc 004.

3. ACTION BY THE MEETING

- 3.1 The meeting is invited to:
 - a) review the Draft version of ICAO Doc 004 (V1.1), at **Appendix A** and provide comments/inputs; and
 - b) agree that the HLAC AG continue working on the MID Doc 004 in order to present the Final (revised) version to the ATM SG/8 meeting for final review before submission to MIDANPIRG/20 for endorsement.

MID Doc 004



INTERNATIONAL CIVIL AVIATION ORGANIZATION

MIDDLE EAST AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (MIDANPIRG)

MID REGION HIGH LEVEL AIRSPACE CONCEPT

EDITION June, 2015 2020

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AMENDMENTS

The MID Region High Level Airspace Concept should be reviewed and updated by the ATM Sub-Group and presented to MIDANPIRG for endorsement.

The table below provides a means to record all amendments.

An up to date electronic version of the Plan will be available on the ICAO MID Regional Office website.

Amendment Number	Effective Date	Initiated by	Impacted pages	Remarks

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CHAPTER 1

INTRODUCTION

- An airspace concept provides the outline and intended framework of operations within an airspace. Airspace concepts are developed to satisfy explicit and implicit strategic objectives such as improved safety, increased air traffic capacity and mitigation of environmental impact, etc. Airspace concepts ean-include details of the practical organization of the airspace and its users operations based on particular CNS/ATM assumptions, e.g. ATS route structure, separation minima, route spacing and obstacle clearance.
- 1.2 The airspace concept constitutes a master plan of the intended airspace design and its operations. It should satisfy the following:
 - provides a detailed description of the planned airspace organization and its operations.
 - addresses all the strategic objectives identified for the airspace project.
 - addresses all CNS/ATM enablers.
 - identifies operational and technical assumptions.
- 1.11.3 The objective of the High level Airspace Concept is to consolidate the <u>requirements on airspace operations</u>, <u>navigation applications and CNS/ATM operational requirements enablers</u> -agreed on by MIDANPIRG, in order to provide a generic set of characteristics to be applied by States, which would support the harmonization of <u>the airspace operations</u> the ATM operations in the MID Region.
- The fundamentals of the MID Region High Level Airspace Concept are as follows:
 - a) The use of Implementation of Reduced Vertical Separation Minima (RVSM) between FLs-290 and FL410.
 - b) To the most extent possible iImplementation of parallel ATS route network, when possible, based on two navigation applications RNAV-5 or RNAV-1, across the MID Region.
 - c) Implementation of RNAV 5 area <u>application</u> in the level band <u>between FL160</u>—FL460 (inclusive) for en route navigation.
 - d) A system of <u>linked ATS route network supported by routes based mainly on RNAV applications and connected to RNAV or Conventional SIDs and STARs starting at the nominal TMA boundary.</u>
 - e) <u>RRoute oute</u> spacing <u>used for for RNAV-5 ATS</u> routes <u>based on a standard of 16.5 NM for same-direction traffic and 18 NM for opposite-direction traffic in a radar environment.should not be less than 16.5 NM for unidirectional and 18 NM for bidirection tracks.</u>
 - f) Route spacing used for RNAV-1 <u>ATS</u> routes <u>based on a standard should not be less</u> than a 7-NM in a high <u>density demand en-route systemenvironment</u> providing that required CNS infrastructure is available.
 - g) Implementation of 20–NM Reduced <u>radar_surveillance</u> longitudinal separation, which could be further reduced to 10 NM, where appropriate.
 - h) Implementation of ASBU <u>Modules threads as enablers</u> in accordance with the Air Navigation Strategy, <u>where applicable</u>.
 - i) Implementation of the "Flexible Use of Airspace" concept.
 - j) Implementation of AIDC/OLDI between all-ACCs, according to applicability table (reference to MID Doc xxx).
 - k) Implementation of Continuous Climb Operations (CCO) and Continuous Descent Operations CDO, where appropriate as basis for the operations within TMAs.
 Implementation of Bilateral, Sub regional or regional ATFM services

1.31.5 The MID Region High Level Airspace Concept will be evolving in accordance with the global and regional developments/requirements-to-include use of RNP specifications such as, such as, to include the use of Advanced RNP in enroute and terminal operations, and RNP APCH on for the instrument Approachapproach.

CHAPTER 2

FUNDAMENTALS OF THE MID REGION HIGH LEVEL AIRSPACE CONCEPT

- I. The Use of Reduced Vertical Separation Minima (RVSM) between Flight Levels 290 and 410, inclusive
- 2.1 The provisions for RVSM approval and the monitoring of the height keeping performance are contained in Annex 6. The general requirements for RVSM implementation are contained in the *Manual on a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive* (ICAO, Doc 9754). However, and the Operating Procedures and Practices for Regional Monitoring Agencies in relation to the use of a 300 m (1 000 ft) Vertical Separation Minimum between FL-290 and FL-410 inclusive, are provided in ICAO₃ Doc 9937.
- 2.2 Monitoring of aircraft height-keeping performance was one of the underlying assumptions of the safety studies on which RVSM was based. In all regions where RVSM has been implemented, Regional Monitoring Agencies (RMAs) have been established by the appropriate Planning and Implementation Regional Groups (PIRGs) to carry out this function. The RVSM safety objectives for the implementation of RVSM in the MID Region are set out by MIDANPIRG through MIDANPIRG/12 Conclusion, as follows:

CONCLUSION 12/16: MID RVSM SAFETY OBJECTIVES

That, the safety assessment of RVSM operations in the MID Region be based on the following safety objectives:

- a) Safety Objective 1: The risk of collision in the MID RVSM airspace due solely to technical height-keeping performance meets the ICAO Target Level of Safety (TLS) of 2.5 x 10⁻⁹ fatal accidents per flight hour:
- b) Safety Objective 2: The overall risk of collision due to all causes which includes the technical risk and all risk due to operational errors and in-flight contingencies in MID RVSM airspace meets the ICAO overall TLS of 5 x 10-9 fatal accidents per flight hour; and
- Safety Objective 3: address any safety-related issues raised in the SMR by recommending improved procedures and practices; and propose safety level improvements to ensure that any identified serious or risk-bearing situations do not increase and, where possible, that they decrease. This should set the basis for a continuous assurance that the operation of RVSM will not adversely affect the risk of en-route mid-air collision over the years.
- 2.3 The implementation of RVSM in the MID Region started on 27 November 2003. Currently RVSM is successfully implemented in all the MID Region Flight Information Regions (FIRs) and the ICAO TLS for technical, and overall risks are met.
- 2.4 The MIDRMA and the ICAO Secretariat developed the MIDRMA Manual to provide, for easy reference of interested parties, a consolidation of material related to the administrative management, membership, funding mechanism of the MIDRMA, as well as its activities related to the

sustained RVSM safety assessment and associated requirements for the provision of data. It contains the Terms of Reference (TOR) of the MIDRMA Board and a number of other provisions approved by the MIDRMA Board and MIDANPIRG.

- 2.5 The MIDRMA Manual, in addition to the reports and information related to RVSM implementation in the MID Region are available on the MIDRMA website (http://midrma.com).
- 2.6 In order to standardize and improve the reporting of required data to the MIDRMA, the MIDANPIRG/14 meeting agreed to the following Conclusion which replaces and supersedes the MIDANPIRG/13 Conclusion 13/65:

CONCLUSION 14/35: PROVISION OF REQUIRED DATA TO THE MIDRMA

That, considering the on-going requirement for RVSM safety monitoring in the MID Region:

- a) States provide the required data to the MIDRMA on a regular basis and in a timely manner. The data is to include, but is not necessarily limited to:
 - *i)* approval of operators and aircraft for RVSM operations (on monthly basis or whenever there's a change);
 - *ii)* Large Height Deviations (LHD) (on monthly basis);
 - iii) traffic data (as requested by the MIDRMA Board);
 - iv) radar data as, when and where required; and
 - v) airway structure (above FL 290) and waypoints.
- b) States not providing the required data to the MIDRMA on a regular basis and in a timely manner:
 - i) be included in the MIDANPIRG list of air navigation deficiencies; and
 - ii) might not be covered by the MID RVSM Safety Monitoring Report (SMR).
- 2.7 The MIDRMA developed the LHD Online Reporting Tool to be used by the States, as the only mean, for the submission of their LHD reports to the MIDRMA.
- 2.8 Sates are requested to comply with the above provisions.
- 2.92.8 States are requested encouraged to consult to provide the required data and to consult liaise withthe MIDRMA when carrying safety assessment for the implementation of ATS Routes in the MID RVSM Airspace.
 - II. To the most extent possible iImplementation of parallel ATS route network, based on RNAV-5 or RNAV-1, aeross in the MID Region
- <u>2.102.9</u> Based on operational requirements, States may choose to implement RNAV-1 routes to enhance efficiency <u>and capacity</u> of airspace usages and support closer route spacing, providing that appropriate communication and surveillance coverages are available. Details of these requirements are provided in the PBN manual (Doc 9613) and PANS-ATM (Doc 4444) <u>reference to parallel xxx</u>.
- 2.112.10 The MID Region PBN Implementation Plan offers appropriate guidance for air navigation service providers, airspace operators and users, regulating agencies, and international/regional organizations, on the evolution of navigation applications, as one of the key systems enablers supporting air traffic management, and which describes the RNAV and RNP

navigation applications types that should be implemented in the short, medium and long term in the MID Region. The Plan is endorsed by MIDANPIRG and available on the ICAO MID Regional Office Website (http://icao.int/mid) under eDocuments tabg.

III. Implementation of RNAV 5 area in the level band between FL160 - FL460 (inclusive)

2.12 MIDANPIRG/12 meeting, Amman, Jordan 17-21 October 2010, noted that a number of States have not yet updated their AIPs to change RNP 5 to RNAV 5_and that the RNAV 5 area application is implemented in MID FIR's/States with a different base Flight Level (FL150, FL195, FL245, FL280). Accordingly, the meeting agreed to the following Conclusion:

CONCLUSION 12/9: RNAV 5 IMPLEMENTATION IN THE MID REGION

That, States that have not yet done so, be urged to:

- a) update their AIP to change RNP 5 to RNAV 5; and
- b) take necessary measures to implement RNAV 5 area in the level band FL 160 FL460 (inclusive).
- IV.III. A system of ATS route network supported linked routes based mainly on by RNAV applications and connected to RNAV or Conventional terminal procedures (SIDs and STARs) starting at the nominal TMA boundary
 - 2.132.11 As part of the implementation of an airspace concept, Sates in consultation with the Airspace users should establish an efficient ATS route structure and/network at in the upper airspace connected in an efficient manner to the lower terminal airspace structure, preferably, starting at the nominal Terminal Control Area (TMA) boundary.
 - <u>2.142.12</u> The ICAO Manual, Doc 9992, provides step-by-step guidance on the Use of Performance-based Navigation (PBN) in Airspace Design <u>covering the structure</u>, <u>ATS routes and Instrument Flight Procedures</u>.
- V.IV. Route spacing used for RNAV-5 ATS routes based on a standard of 16.5 NM for same direction traffic and 18 NM for opposite direction traffic with appropriate ATS surveillance should not be less than 16.5 NM for unidirectional and 18 NM for bi-direction tracks
 - 2.152.13 In the MID Region RNAV-5 ATS Routes should be spaced at least by a lateral distance of 16.5NM for unidirectional and 18NM for bi-directional tracks with appropriate ATS surveillance..to be considered as independent from each other.
 - 2.162.14 The provisions for ATS Routes spacing are provided mainly in PANS-ATM Doc 4444, and the PBN Manual 9613.

Note: <u>route-Route_spacing needs</u> to be increased <u>at turning_pointsin_turns</u> because of the variability/<u>spread</u> of aircraft turn performance. The extent of the increase depends <u>the track change (on the turn angle).</u>

VI.V. Route spacing used for RNAV-1 ATS routes <u>-based on a standard a 7 NM in a high density</u> en-route system providing should not be less than 7 NM providing that required CNS

infrastructure is available

- 2.172.15 In the MID Region RNAV-1 ATS Routes should be spaced at least by a lateral distance of 7NM<u>in a high density en route system</u>, to be considered as independent from each other, providing that required CNS infrastructure is available.
- 2.182.16 ___Route spacing of 7-NM for straight and turning tracks (with turns not exceeding 90 degrees) in a high density continental en_route system, using ATS radar_surveillance, has been derived by independent collision risk analyses undertaken by Eurocontrol. (Ref: ICAO PBN manual Volume II. Implementing RNAV and RNP Operations Attachment B page 8).

VII.VI. Implementation of 20-NM Reduced Radar Longitudinal Separation, which could be further reduced to 10-NM, where appropriateapplicable

2.192.17 MIDANPIRG/13 meeting, through Conclusion 13/5 below, encouraged MID States to implement 20–NM longitudinal separation and develop plans for further reduction of longitudinal separation from 20-NM to 10-NM:

CONCLUSION 13/5: IMPLEMENTATION OF REDUCED RADAR LONGITUDINAL SEPARATION IN THE MID REGION

That,

- a) States, that have not yet done so;
 - *i)* be urged to implement the 20 NM radar longitudinal separation;
 - *ii)* be encouraged to further reduce the radar longitudinal separation within the MID Region to 10 NM, where appropriate; and
 - *iii)* be invited to agree with their neighbouring FIRs/States on the date of implementation and updating of the LoAs;

VIII. Implementation of ASBU Modules threads as enablers in accordance with the MID Air Navigation Strategy

- 2.202.18 The MID Region air navigation objectives are set in line with the Global Air Navigation objectives as described in the Global Air Navigation Plan (GANP) and address specific air navigation operational improvements identified within the framework of the MIDANPIRG.
- 2.212.19 The MID Air Navigation Strategy, endorsed by MIDANPIRG, includes the ASBU Modules, threads—with their associated Elements, Area of Applicability, Performance Indicators and Targets, considered as priority for implementation in the MID Region. The ASBU threads and elements are considered enablers for the implementation of airspace concept.
- 2.222.20 States are urged to take into consideration the guidelines/requirements of the GANP, the MID Region Air Navigation Strategy and the MID ANP while planning for the improvement of their CNS/ATM systems, and provide on periodical basis the National Air Navigation Plan to the MID Office.
- <u>2.232.21</u> The monitoring of the implementation of the agreed ASBU <u>Modules threads and elements</u> will be performed through the MID ANP, Volume III, <u>and reflected on the Annual MID Air Navigation Report</u>.

Implementation of the "Flexible Use of Airspace" concept

- 2.242.22 The airspace is a resource common resource to both civil and military aviation activites. The growing civil air traffic and mission-oriented military air traffic would benefit greatly from a more flexible use of airspace used for military purposes and that satisfactory solutions to the problem of cooperative access to airspace have not evolved in all areas.
- The ICAO Global ATM Operational Concept[AA2] emphasized that all airspace should be a usable resource, any restriction on the use of any particular volume of airspace should be considered transitory, and all airspace should be managed flexibly.
- 2.262.24 The flexible use of airspace by both civil and military air traffic may be regarded as the ultimate goal, improvement in civil/military coordination and cooperation offers an immediate approach towards more effective airspace management.
- MIDANPIRG/14 through Conclusions 14/12 and 14/13 urged States to take necessary measures to foster the implementation of Civil/Military Cooperation and to implement the Flexible Use of Airspace (FUA) concept through strategic Civil/Military Coordination, collaboration and dynamic interaction, in order to open up segregated airspace when it is not being used for its originally-intended purpose and allow for better airspace management and access for all users.
- 2.272.26 ASBU xxx are considered as priority 1 for implementation in the MID Region and are included in the MID Air Navigation Strategy.

X.IX. Implementation of AIDC/OLDI between all-ACCs

- 2.282.27 The use of ATS Interfacility Data Communication (AIDC), as defined in the ICAO, Doc 9694, *Manual of Air Traffic Services Data Link Applications* improves the coordination between air traffic service units (ATSUs). The transfer of communication in a data link environment improves the efficiency of this process and the overall air traffic coordination management-.
- <u>2.292.28</u> In accordance with the MID Air Navigation Strategy AIDC/OLDI should be implemented between all adjacent ACCs. <u>This consider as one of the main enabler for airspace concept according to the applicability table (ref CAO MID Doc xxx).</u>
- XI.X. Implementation of Continuous Climb Operations (CCO) and Continuous Descent Operations CDO, as basis for the operations within TMAswhere appropriate
 - 2.302.29 Continuous climb operation (CCO) is an operation, enabled by airspace design, procedure design and ATC operational procedures, in which a departing aircraft climbs continuously, to the greatest possible extent, by employing optimum climb engine thrust and climb speeds until reaching the cruise flight level.
 - <u>2.312.30</u> Continuous descent operation (CDO) is an operation, enabled by airspace design, procedure design and ATC <u>operational procedures</u>, in which an arriving aircraft descends continuously, to the greatest possible extent, by employing minimum engine thrust, ideally in a low drag configuration, prior to the final approach fix/final approach point.
 - 2.322.31 ASBU <u>APTA-B0/4 CDO (Basic) and APTA-B0/5 (CCO basic) B0 Modules CCO and CDO</u> are considered as priority <u>1</u> for implementation in the MID Region and are included in the MID Air Navigation Strategy.
 - 2.332.32 States are encouraged to implement CCO and CDO, where applicable.

XII.XI. Consider the iImplementation of Bilateral, Sub-regional or regional Multi-Nodal ATFM services concept.

- 2.342.33 Air Traffic Flow Management (ATFM) is used to manage the flow of traffic in a way that minimizes delays and maximizes the use of the entire airspace. ATFM can regulate traffic flows involving departure slots, smooth flows and manage rates of entry into airspace along traffic axes, manage arrival time at waypoints or Flight Information Region (FIR)/sector boundaries and re-route traffic to avoid saturated areas. ATFM may also be used to address system disruptions including a crisis eaused by human or natural phenomena constrained airspace, severe meteorological conditions or any other phenomena or event affecting the flights.
- 2.352.34 ATFM and its applications should not be restricted to one State or FIR because of their far-reaching effects on the flow of traffic elsewhere. Doc 4444 *Procedures for Air Navigation Services Air Traffic Management* (PANS-ATM) recognizes this important fact, stating that ATFM should be implemented on the basis of a Regional Air Navigation Agreement or, when appropriate, a Multilateral Agreement.
- <u>2.35</u> A MID Region ATFM service/system should be implemented to manage efficiently the traffic flows within and across the Region. Nevertheless, all initiatives to improve traffic flows should be exhausted before implementation of any ATFM measures in the MID Region. <u>This approach should be capture as part of the airspace concept to be developed by ICAO MID States.</u>
- 2.36 The MID ATFM CONOPS was developed considering many international experiences and current Regional capabilities, in order to provide a regional framework to MID States, and could

be evolved in the future to a centralized ATFM solution.

2.362.37 MID ATM/CDM data exchange process will also foster the exchange of operational data with the basic available tools, in order to support States and ANSPs to improved Airspace capacity/demand management.

- END -