International Civil Aviation Organization

MIDANPIRG Air Traffic Management Sub-Group

Third Meeting (ATM SG/3)
(Cairo, Egypt, 22 – 25 May 2017)

Agenda Item 5: Airspace Management Issues

MID REGION HIGH LEVEL AIRSPACE CONCEPT

(Presented by the Secretariat)

SUMMARY

This paper presents the MID Region High Level Airspace Concept for the meeting review and update.

Action by the meeting is at paragraph 3.

REFERENCES

– MIDANPIRG/15 Report

1. INTRODUCTION

1.1 An airspace concept provides the outline and intended framework of operations within an airspace. Airspace concepts are developed to satisfy explicit strategic objectives such as improved safety, increased air traffic capacity and mitigation of environmental impact, etc. Airspace concepts can include details of the practical organization of the airspace and its users based on particular CNS/ATM assumptions, e.g. ATS route structure, separation minima, route spacing and obstacle clearance.

2. DISCUSSION

2.1 The meeting may wish to recall that the MIDANPIRG/15 meeting (Bahrain, 8-11 June 2015) endorsed the MID Region High Level Airspace Concept as MID Doc 004.

2.2 The MID Region High Level Airspace Concept was initially developed by the ATM SG/1 meeting (Cairo, Egypt, 9-12 June 2014), which was reviewed by the MSG/4 meeting. The objective of the High Level Airspace Concept is to consolidate the ATM operational requirements agreed upon 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.

2.3 The MID Region High Level Airspace Concept includes the following MID Region High Level Airspace Concept fundamentals:

a) The use of Reduced Vertical Separation Minima (RVSM) between FLs 290 and 410.

b) To the most extent possible implementation of parallel ATS route network, based on RNAV 5 or RNAV 1, across the Region.

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

d) A system of linked routes based mainly on RNAV connected to RNAV or Conventional SIDs and STARs starting at the nominal TMA boundary.

e) Route spacing used for RNAV 5 routes should not be less than 16.5 NM for unidirectional and 18 NM for bi-direction tracks.

f) Route spacing used for RNAV 1 routes should not be less than 7 NM providing that required CNS infrastructure is available.

g) Implementation of 20 NM Reduced radar longitudinal separation, which could be further reduced to 10 NM where appropriate.

h) Implementation of the “Flexible Use of Airspace” concept.

i) Implementation of ASBU Modules in accordance with the Air Navigation Strategy.

j) Implementation of AIDC/OLDI between all ACCs.

k) Implementation of Continuous Climb Operations (CCO) and Continuous Descent Operations CDO, where appropriate.

l) Consider the implementation of Bilateral, Sub-regional or regional ATFM services.

3. ACTION BY THE MEETING

3.1 The meeting is invited to review and update, as deemed necessary, the MID Region High Level Airspace Concept at **Appendix A**, taking into consideration the latest developments.

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

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

1.1 An airspace concept provides the outline and intended framework of operations within an airspace. Airspace concepts are developed to satisfy explicit strategic objectives such as improved safety, increased air traffic capacity and mitigation of environmental impact, etc. Airspace concepts can include details of the practical organization of the airspace and its users based on particular CNS/ATM assumptions, e.g. ATS route structure, separation minima, route spacing and obstacle clearance.

1.2 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.

1.3 The fundamentals of the MID Region High Level Airspace Concept are as follows:

a) The use of Reduced Vertical Separation Minima (RVSM) between FLs 290 and 410.
b) To the most extent possible implementation of parallel ATS route network, based on RNAV 5 or RNAV 1, across the Region.
c) Implementation of RNAV 5 area in the level band FL160 - FL460 (inclusive).
d) A system of linked routes based mainly on RNAV connected to RNAV or Conventional SIDs and STARs starting at the nominal TMA boundary.
e) Route spacing used for RNAV 5 routes should not be less than 16.5 NM for unidirectional and 18 NM for bi-direction tracks.
f) Route spacing used for RNAV 1 routes should not be less than 7 NM providing that required CNS infrastructure is available.
g) Implementation of 20 NM Reduced radar longitudinal separation, which could be further reduced to 10 NM where appropriate.
h) Implementation of ASBU Modules in accordance with the Air Navigation Strategy.
i) Implementation of the “Flexible Use of Airspace” concept.
j) Implementation of AIDC/OLDI between all ACCs.
k) Implementation of Continuous Climb Operations (CCO) and Continuous Descent Operations CDO, where appropriate.

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

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, 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 ICAO, 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* $\mathbf{2.5 \times 10^{-9}}$ *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* $\mathbf{5 \times 10^{-9}}$ *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).

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.

2.9 States are requested to consult the MIDRMA when carrying safety assessment for the implementation of ATS Routes in the MID RVSM Airspace.

II. To the most extent possible implementation of parallel ATS route network, based on RNAV 5 or RNAV 1, across the Region

2.10 Based on operational requirements, States may choose to implement RNAV 1 routes to enhance efficiency 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).

2.11 The MID Region PBN Implementation Plan offers appropriate guidance for air navigation service providers, airspace operators and users, regulating agencies, and international organizations, on the evolution of navigation, as one of the key systems supporting air traffic management, and which describes the RNAV and RNP navigation applications 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.

III. Implementation of RNAV 5 area in the level band 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 5and that the RNAV 5 area 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. A system of linked routes based mainly on RNAV connected to RNAV or Conventional SIDs and STARs starting at the nominal TMA boundary

2.13 Sates in consultation with the Airspace users should establish an efficient route structure at the upper airspace connected in an efficient manner to the lower airspace structure, starting at the nominal Terminal Control Area (TMA) boundary.

2.14 The ICAO Manual, Doc 9992, provides step-by-step guidance on the Use of Performance-based Navigation (PBN) in Airspace Design.

V. Route spacing used for RNAV 5 ATS routes should not be less than 16.5 NM for unidirectional and 18 NM for bi-direction tracks

2.15 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.

2.16 The provisions for ATS Routes spacing are provided mainly in PANS-ATM Doc 4444, and the PBN Manual 9613.

Note: route spacing needs to be increased at turning points because of the variability of aircraft turn performance. The extent of the increase depends on the turn angle.

VI. Route spacing used for RNAV 1 ATS routes should not be less than 7 NM providing that required CNS infrastructure is available

2.17 In the MID Region RNAV 1 ATS Routes should be spaced at least by a lateral distance of 7NM, providing that required CNS infrastructure is available.

2.18 Route spacing of 7 NM for straight and turning tracks (with turns not exceeding 90 degrees) in a high density continental enroute system, using ATS radar surveillance, has been derived by independent collision risk analyses undertaken by Eurocontrol.

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

2.19 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 in accordance with the Air Navigation Strategy

2.20 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.

2.21 The MID Air Navigation Strategy, endorsed by MIDANPIRG, includes the ASBU Modules, with their associated Elements, Area of Applicability, Performance Indicators and Targets, considered as priority for implementation in the MID Region.

2.22 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 ATM system.

2.23 The monitoring of the implementation of the agreed ASBU Modules will be performed through the MID ANP, Volume III.

IX. Implementation of the "Flexible Use of Airspace" concept

2.24 The airspace is a resource common to both civil and military aviation. 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.

2.25 The ICAO Global ATM Operational Concept 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.

2.26 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.

2.27 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 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.

X. Implementation of AIDC/OLDI between all ACCs

2.28 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.

2.29 In accordance with the MID Air Navigation Strategy AIDC/OLDI should be implemented between all adjacent ACCs.

XI. Implementation of Continuous Climb Operations (CCO) and Continuous Descent Operations CDO, where appropriate

2.30 Continuous climb operation (CCO) is an operation, enabled by airspace design, procedure design and ATC, 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.

2.31 Continuous descent operation (CDO) is an operation, enabled by airspace design, procedure design and ATC, 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.

2.32 ASBU B0 Modules CCO and CDO are considered as priority for implementation in the MID Region and are included in the MID Air Navigation Strategy.

2.33 States are encouraged to implement CCO and CDO, where applicable.

XII. Consider the implementation of Bilateral, Sub-regional or regional ATFM services

2.34 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 caused by human or natural phenomena

2.35 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.

2.36 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.

- END -