



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**REPORT OF THE SEVENTEENTH MEETING
OF THE MIDDLE EAST REGIONAL
MONITORING AGENCY BOARD**

MIDRMA Board/17

(Virtual, 18 – 19 January 2022)

The views expressed in this Report should be taken as those of the Middle East Regional Monitoring Agency Board (MIDRMA Board) and not of the Organization. MIDANPIRG will be informed of the outcome of this Report and any formal action taken will be included in the Report of the MIDANPIRG.

Approved by the Meeting
and published by authority of the Secretary General

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PART I - HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The Seventeenth meeting of the Middle East Regional Monitoring Agency Board (MIDRMA Board/17) was held virtually on 18 – 19 January 2022, using MS Teams.

2. OPENING

2.1 The meeting was opened by Mr. Mohamed Smaoui, Acting Regional Director, Middle East Office, who welcomed all participants, and highlighted that due the COVID-19 and its variants situation in the Region and the world imposed, this meeting was held virtually, to ensure the continuity of the MIDRMA board programme. He elaborated that the main technical issues emanating from the ATM SG will be discussed during this meeting in addition to financial matters with a limited scope. However, a full scope face-to-face board meeting is planned to be organized in October 2022. Mr. Smaoui thanked the MIDRMA Chairman and Team members for their excellent efforts in making this programme a success.

2.2 Mr. Smaoui highlighted the main role of the MIDRMA Board as well as the importance of the decisions that will be agreed upon by the meeting and their impact on the work of the MIDRMA Team and RVSM implementation in the MID Region. He extended ICAO's gratitude to the MIDRMA Chairman and Team for their dedication, commitment and professionalism in running the MIDRMA as well as for Bahrain for all the support/facilities provided in hosting the MIDRMA Office. Mr. Smaoui encouraged States to use the MIDRMA services, and continuously address the issues raised by the MIDRMA as a result of their monitoring activities and to support its activities.

2.3 In closing, Mr. Smaoui thanked all the participants for their attendance and wished the meeting every success in its deliberations.

3. ATTENDANCE

3.1 The meeting was attended by a total of fifty-six (56) participants from fourteen (14) States (Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan, Syria, UAE and Yemen) and three (3) Organizations (ACAO, IATA and MIDRMA). The list of participants is at **Attachment A**.

4. OFFICERS AND SECRETARIAT

4.1 The meeting was chaired by Mr. Mohamed Zainal, Director Aviation Safety and Security, from Bahrain Civil Aviation Affairs.

4.2 Mr. Ahmad Amireh, Regional Officer, Air Traffic and Management and Search and Rescue, RO/ATM/SAR, was the Secretary of the meeting.

5. LANGUAGE

5.1 Discussions were conducted in English and documentation was issued in English.

6. AGENDA

6.1 The following Agenda was adopted:

- Agenda Item 1: Adoption of the Provisional Agenda
- Agenda Item 2: Follow-up on MIDANPIRG/18 and MIDRMA Board/16 Conclusions and Decisions
- Agenda Item 3: Progress Report on the MIDRMA Project
- Agenda Item 4: RVSM Monitoring and related Technical Issues
- Agenda Item 5: Future Work Programme
- Agenda Item 6: Any other Business

7. CONCLUSIONS AND DECISIONS – DEFINITION

7.1 The MIDANPIRG records its actions in the form of Conclusions and Decisions with the following significance:

- a) **Conclusions** deal with matters that, according to the Group's terms of reference, merit directly the attention of States, or on which further action will be initiated by the Secretary in accordance with established procedures; and
- b) **Decisions** relate solely to matters dealing with the internal working arrangements of the Group and its Sub-Groups.

8. LIST OF DRAFT CONCLUSIONS AND DECISIONS

MIDRMA BOARD CONCLUSION 17/1: PAYMENT OF ARREARS TO THE MIDRMA PROJECT

MIDRMA BOARD CONCLUSION 17/2: BUSINESS CASE/COST-BENEFIT ANALYSIS FOR THE MIDRAS SOFTWARE UPGRADE

DRAFT CONCLUSION 17/1: MID RVSM SMR 2021

DRAFT CONCLUSION 17/2: MID RVSM SMR 2022

PART II: REPORT ON AGENDA ITEMS

REPORT ON AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA

1.1 The meeting reviewed and adopted the Provisional Agenda as at Paragraph 6 of the History of the Meeting.

**REPORT ON AGENDA ITEM 2: FOLLOW-UP ON MIDANPIRG/18 AND MIDRMA BOARD/16
CONCLUSIONS AND DECISIONS**

2.1 The subject was addressed in WP/2 presented by the Secretariat. The meeting noted the status of relevant MIDANPIRG/18 and MIDRMA Board/16 Conclusions and Decisions and the follow-up actions taken by States, ICAO and other parties concerned as at **Appendix 2A**.

REPORT ON AGENDA ITEM 3: PROGRESS REPORT ON THE MIDRMA PROJECT

3.1 The subject was addressed in WP/3 presented by the Secretariat. The meeting recalled the MIDRMA Conclusion 14/3 related to the funding mechanism.

3.2 The meeting reviewed the status of States' contributions to the MIDRMA Project (RAB/05/802), as of 31 December 2021 as reflected at **Appendix 3A**. The meeting noted with concern that several States have arrears for the past years' contributions.

3.3 The meeting noted with concern, that some States are facing difficulties with the transfer of the required amounts to the MIDRMA bank account managed by ICAO HQ in Montreal.

3.4 Based on the above, the meeting agreed to the following Conclusion:

MIDRMA BOARD CONCLUSION 17/1: PAYMENT OF ARREARS TO THE MIDRMA PROJECT

That,

- a) States, that have not yet done so, pay their contributions/arrears to the MIDRMA Project Prior to 1 September 2022; and*
- b) States facing difficulties with the transfer of the required amounts to the MIDRMA bank account managed by the ICAO TCB, coordinate with the ICAO MID Office and/or MIDRMA, to find alternate means.*

3.5 The meeting reviewed and approved the financial report of the MIDRMA project (RAB/05/802) for the years 2020 and 2021, as at **Appendices 3B** and **3C**, respectively.

3.6 The meeting noted that the balance of the funds available in the MIDRMA account managed by ICAO HQ (RAB/05/802) were as follows:

- Fund Balance as at 31 December 2018:	US\$ 374,592
- Fund Balance as at 31 December 2019:	US\$ 179,831
- Fund Balance as at 31 December 2020:	US\$ 170,084
- Fund Balance as at 31 December 2021:	US\$ 189,963

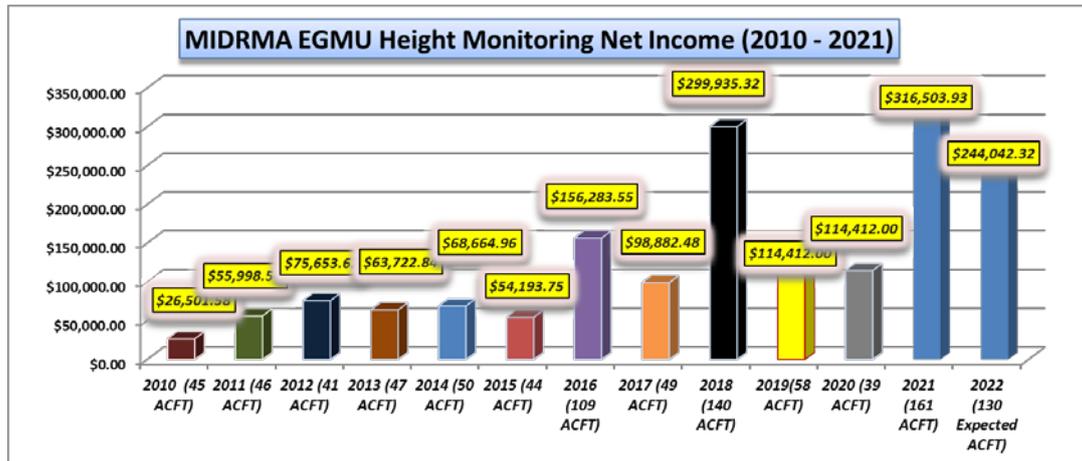
3.7 The meeting recalled that in accordance with MIDRMA Board/16 Decision 16/2, the MIDRMA Board Chairman certified two requests for the transfer of the amount of US\$ 200,000 each, on 15 June 2020 and 15 June 2021, respectively from the MIDRMA account managed by ICAO Headquarters to the MIDRMA account in Bahrain.

3.8 The meeting reviewed and approved the financial statements related to the MIDRMA expenditures for years 2020 and 2021 as of 31 December 2020 and 31 December 2021 as at **Appendices 3D** and **3E**, respectively. The supporting documents (associated bills) are also available for review by the MIDRMA Board Members, and will also be available for review during the next board meeting.

3.9 According to the latest Bank statement dated 31 December 2021, the fund balance of the MIDRMA Bank account in Bahrain is: USD 677,874.59.

3.10 The meeting was apprised of the MIDRMA expected expenditures and income for years 2022 and 2023.

3.11 The meeting noted with appreciation that since year 2010, the MIDRMA has been conducting GMU height monitoring missions and managed to generate income from successful checking of **829** aircraft, as reflected in **Graph 01**. The total amount credited to the MIDRMA account from conducting the monitoring missions is **USD 1,445,164.57**; which had been used in the development of tools for the MIDRMA activities and to cover some of the operational expenses. In accordance with the 2022 Plan for GMU monitoring activity, the expected income from GMU missions would be approximately **USD 244,042.32**.



Graph 01

3.12 The meeting urged States to comply with the instructions for payment contained in the invoices sent by ICAO HQ (Project code, fund number, invoice number, Bank information, etc.) and underlined that the non-compliance with these instructions causes problems and delays in locating the transferred amounts.

REPORT ON AGENDA ITEM 4: RVSM MONITORING AND RELATED TECHNICAL ISSUES***MID Risk Analysis Software (MIDRAS) Upgrade Project***

- 4.1 The subject was addressed in WP4, presented by the MIDRMA.
- 4.2 The meeting recalled that the MIDRMA Board/11 (Cairo, 27 -29 September 2011) approved the development/purchase of the MID Risk Analysis Software (MIDRAS) which is currently used by the MIDRMA to develop the annual MID RVSM Safety Monitoring Reports (SMRs).
- 4.3 The meeting noted that the current software features require further improvements to facilitate the calculation of all RVSM risk parameters, and to help MIDRMA Member States to overcome problems and errors frequently found in the submitted Traffic Data Samples (TDS), and to avoid excessive time consuming and efforts by the MIDRMA to ensure the correctness of thousands of traffic data records.
- 4.4 Furthermore, the meeting noted the areas of improvement of the MIDRAS Software gathered by the MIDRMA Team through the extensive work on the software during the last 10 years.
- 4.5 The meeting noted and reviewed the offer received by the MIDRAS developer Dr. Sameer Alam and his team to address the areas of improvement, at **Appendix 4A**.
- 4.6 The meeting noted that the total amount of the MIDRAS upgrade project offer is USD 100,700.00; to be paid from the MIDRMA available budget. The meeting recalled that, through the MIDRMA Board Draft Conclusion 16/6, the MIDRMA Board Chairman was requested to communicate to the Board Members the cost-benefit analysis associated with the development/upgrade of the Software to seek their thoughts and formal approval on the allocation of required funds. Therefore, it was decided that a business case / cost-benefit analysis related to the necessary upgrade to the MIDRAS software be developed by the MIDRMA for presentation to the MIDANPIRG/19 meeting for a final decision. Accordingly, the meeting agreed to the following Decision:

MIDRMA BOARD DECISION 17/2: BUSINESS CASE / COST-BENEFIT ANALYSIS FOR THE MIDRAS SOFTWARE UPGRADE

That, the MIDRMA develop a business case / cost-benefit analysis related to the upgrade of the MIDRAS, to be presented to the MIDANPIRG/19 meeting, to support the decision-making process on the subject.

Assessment of NON-RVSM Approved Aircraft

- 4.7 The subject was addressed in WP/5, presented by the MIDRMA.
- 4.8 The meeting recalled the MIDRMA task to carry out systematic checks of the operators' compliance with State approval requirements within the MID Region, on periodical basis.
- 4.9 The meeting noted that the source of data used by the MIDRMA is either the RVSM State Approval Database, or the TDS provided by the States on annual basis. The meeting noted with appreciation the TDS reports that are continuously provided on monthly basis by Bahrain, Iraq and UAE.
- 4.10 The meeting noted the MIDRMA process to validate the RVSM approvals for the Aircraft operating within the MID Region RVSM Airspace against the global RVSM approval database, and the communication with the appropriate Civil Aviation Authorities and the related RMAs to clarify

the discrepancy found, and the request of corrective actions to resolve the issue. In this respect, it was noted that most of the nonconformities were due to the late submission of the RVSM certificates to the RMAs.

4.11 The meeting noted the notification bulletin issued by the MIDRMA on monthly basis and shared with the MIDRMA Focal points, at **Appendix 4B**, to warn the relevant Air Traffic Control Units about the NON-RVSM approved aircraft operating in the MID RVSM Airspace.

4.12 The meeting urged States to review **Appendix 4B** and take the necessary measures.

MID RVSM SMR 2021

4.13 The subject was addressed in WP/6, presented by the MIDRMA.

4.14 The meeting recalled MIDANPIRG Conclusion 18/7 related to the development of the SMR 2021:

CONCLUSION 18/7: MID RVSM SAFETY MONITORING REPORT (SMR) 2021

That,

- a) the FPL/traffic data for the period 1 – 31 July 2021 and LHD Reports for the period 1 January 2021 to 31 December 2021 be used for the development of the MID RVSM Safety Monitoring Report (SMR 2021);*
- b) only the appropriate Traffic Data as per MIDRMA requirements shall be submitted; any corrupted traffic data will be rejected;*
- c) the traffic data must be submitted to the MIDRMA before 31 August 2021; and*
- d) the final version of the MID RVSM SMR 2021 be ready for presentation to and endorsement by the MIDANPIRG/19 meeting.*

4.15 The meeting reviewed the SMR 2021 at **Appendix 4C**, and agreed to the following Draft Conclusion:

DRAFT CONCLUSION 17/1: MID RVSM SMR 2021

*That, the MID RVSM Safety Monitoring Report (SMR) 2021 at **Appendix 4C**, be presented to the MIDANPIRG/19 meeting for endorsement.*

4.16 The meeting urged Member States to continue reporting the LHDs categories A, B, C, D, H, J, K and L through the LHD online reporting system, and urged Member States to investigate the related LHDs and reply back with their findings/corrective actions by using the reply feature in the LHD online reporting system.

4.17 The meeting noted the long standing RVSM Safety Protocol opened at Muscat/Mumbai FIR Boundaries and urged the concerned States to address it in coordination with the relevant Regional Offices and RMAs.

4.18 The meeting noted with concern the increased number of LHD reports submitted by Sana'a ACC, and urged the concerned States to address it and to resolve the issue; in coordination with the relevant Regional Offices and RMAs.

4.19 The meeting noted with concern that Libya has not submitted the TDS for long period, and urged the Libyan CAA to provide the data to include Tripoli FIR in the upcoming SMRs.

Development of the MID RVSM Safety Monitoring Report (SMR) 2022

4.20 The subject was addressed in WP/7, presented by the MIDRMA.

4.21 The meeting noted that the reporting cycle for the development of the MID RVSM SMR 2022 will be from 01st January until 31st December 2022, the Traffic Data Sample (TDS) must be submitted in the right format using the excel sheet designed for the MIDRMA Risk Analysis Software (MIDRAS) available on the MIDRMA website (www.midrma.com). This sheet has been prepared and made available to States in order to collect all necessary TDS data of traffic operating between FL 290 and FL 410 inclusive.

4.22 The meeting noted that for the Year 2022, the highest volumes of traffic will be observed, in addition to the Hajj season, during the FWC 2022 event, organized by Qatar (November and December 2022). Accordingly, the meeting agreed that it will be very beneficial to measure the RVSM TLS during the FWC 2022 event.

4.23 Based on the above, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 17/2: MID RVSM SMR 2022

That,

- a) *States are required to provide the FPL/traffic data for the period 1st June until 30th June 2022 and LHD data for the period 1 January to 31 December 2022 to the MIDRMA before 1 August 2022, for the development of the MID RVSM Safety Monitoring Report (SMR 2022);*
- b) *Bahrain, Iran, Iraq, Kuwait, Oman, Saudi Arabia and UAE, are urged to provide the FPL/traffic data for the period 1 – 30 November and 1 – 31 December 2022 to the MIDRMA before 31 January 2023 for measuring the ICAO RVSM TLS (Technical and Overall) during the FWC 2022 event; the remaining States are strongly encouraged to provide the FPL/traffic to the MIDRMA for the same period (months of November and December 2022).*
- c) *only the appropriate Flight Data form, available on the MIDRMA website (www.midrma.com), should be used for the provision of FPL/traffic data to the MIDRMA; and*
- d) *the final version of the MID RVSM SMR 2022 be ready for presentation to and endorsement by the MIDANPIRG/20 meeting.*

RVSM Height Monitoring Activities

4.24 The subject was addressed in WP/8, presented by the MIDRMA.

4.25 The meeting was apprised of the MIDRMA activities during 2020 and 2021.

4.26 The meeting noted that, due to the COVID-19 pandemic, and in coordination with the MIDRMA Chairman, the GMU activities were ceased mid-February 2020, for the safety of the MIDRMA team until the situation improved and the team received the vaccination in August 2021.

4.27 The meeting noted with appreciation the conduct of 200 GMU monitoring for 200 aircraft registered in the MID States and even other States from other Regions, in 18 months period. The meeting noted that the MIDRMA objective is to reach 95% of the targeted monitoring missions during 2022.

4.28 The meeting noted with appreciation the efforts made by the focal points of Iran, Iraq, Libya, Sudan and Yemen to support the MIDRMA team in the GMU monitoring missions.

4.29 The meeting noted that the current US Treasury OFAC license, which was granted for two years validity to inspect Iran CAO RVSM Approved Aircraft, is valid until 31st January 2023, and the MIDRMA submitted an official request to renew the license.

4.30 Furthermore, the meeting noted that the MIDRMA submitted the request of US Treasury OFAC license for the use of GMU to monitor the Syrian RVSM Approved Aircraft.

4.31 The meeting noted with concern the high percentage of Libyan registered aircraft with unknown height monitoring results for a long period, which is a clear violation of the ICAO provisions that has a negative impact on the ICAO TLS results for technical risk in the Region.

4.32 The meeting urged the Libyan CAA to coordinate with the MIDRMA and ICAO MID Office to overcome the difficulties of conducting the GMU monitoring of the relevant Libyan registered aircraft (in other States).

4.33 The meeting noted with concerns the difficulties faced by the MIDRMA team with the Customs of some MID States, related to the carriage of the GMU equipment, and urged the MIDRMA Focal points to undertake necessary internal coordination with appropriate authorities prior to the arrival of the MIDRMA team for the facilitation of their mission.

4.34 The meeting noted with concerns that three of Yemen registered RVSM approved aircraft are not compliant with the RVSM height monitoring requirements for a very long period, and the remaining other three aircraft are about to expire in less than two weeks which will leave all Yemen RVSM approved aircraft not compliant with the RVSM requirements.

4.35 The meeting thanked all Member States' focal points for their continuous follow-up to comply with the RVSM height monitoring, as per ICAO Annex 6 requirements, and the MIDRMA team for their continuous efforts.

REPORT ON AGENDA ITEM 5: FUTURE WORK PROGRAMME

5.1 The meeting recalled that the MIDRMA Board meetings should be hosted by the MIDRMA Member States on rotation basis.

5.2 The meeting noted that Qatar agreed in principle to host the MIDRMA Board/18 meeting, in Doha (10 – 11 October 2022), subject to further formal confirmation.

5.3 The meeting agreed that the ICAO MID Regional Office coordinate with the MIDRMA Board Chairperson, MIDRMA and concerned States the venue/hosting of the MIDRMA Board/19 meeting during the third Quarter of 2023.

REPORT ON AGENDA ITEM 6: ANY OTHER BUSINESS

6.1 The meeting reviewed and updated the list of MIDRMA Board Members, Alternates and Focal Points (ATC and Airworthiness/Flight Operations) as at **Appendix 6A**.

APPENDICES

FOLLOW-UP ACTION PLAN ON MIDRMA/16 CONCLUSIONS AND DECISIONS

CONCLUSIONS AND DECISIONS	FOLLOW-UP	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	REMARKS
<p>MIDRMA CONCLUSION 16/1: PAYMENT OF ARREARS TO THE MIDRMA PROJECT</p> <p><i>That, States, that have not yet done so, pay their contributions to the MIDRMA Project prior to 30 March 2020, based on the invoices issued by ICAO TCB.</i></p>	<p>Necessary follow-up actions taken</p>	<p>ICAO MID</p> <p>States</p>	<p>Issue SL to States Ref AN 6/5.10.15A – 20/125 dated 31 May 2020</p> <p>Pay their contribution</p>		<p>(TO BE CLOSED)</p>
<p>MIDRMA DECISION 16/2: REQUEST FOR THE TRANSFER OF USD 400,000 TO THE MIDRMA ACCOUNT IN BAHRAIN</p> <p><i>That, the MIDRMA Board Chairperson is delegated the authority to request the transfer of the amount of US\$ 400,000 from the MIDRMA account managed by ICAO HQ to the MIDRMA Bank account in Bahrain as follows:</i></p> <p>a) US\$ 200,000 by 1 June 2020; and</p> <p>b) US\$ 200,000 by 1 June 2021.</p>	<p>Necessary follow-up actions taken</p>				<p>COMPLETED</p>

FOLLOW-UP ACTION PLAN ON MIDANPIRG/18 CONCLUSIONS & DECISIONS

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 18/ 1	MID RVSM SAFETY PROTOCOL PROCEDURE That, the MID RVSM Safety Protocol Procedure at Appendix 3.3A , is endorsed.	To address opened safety protocols	Procedure	MIDRMA	2021	Completed
C. 18/2	PROCEDURE FOR TEMPORARY RVSM APPROVAL That, the procedure for granting Temporary RVSM Approvals at Appendix 3.3B , is endorsed.	Initial process of granting RVSM approval for new aircraft type	Procedure	States	2021	Completed
C.18/3	PERFORMANCE BASED COMMUNICATION AND SURVEILLANCE (PBCS) That, a) States provide the MIDRMA on monthly basis with the information related to the list of registered aircraft (fleet) granted approvals to operate in PBCS airspaces where compliance with specific RCP/RSP are required; b) the MIDRMA is authorized to coordinate and share information with other RMAs with respect to PBCS compliant aircraft and follow-up with MID States, as required; c) the MIDRMA functions and responsibilities be amended accordingly; and d) the implementation of PBCS be addressed by the RASG-MID, ATM SG and CNS SG for appropriate action.	Monitor and share communication and surveillance specification compliance with the set-out airspace requirements	Provide the granted approvals of registered ACFT Coordinate and shre the information with other RMAs	States MIDRMA	2021	Completed
C. 18/4	MID RVSM SAFETY MONITORING REPORT (SMR) 2019 That, the MID RVSM Safety Monitoring Report (SMR) 2019 at Appendix 3.3C , is endorsed.	to develop the MID SMR 2019	SMR 2019	MIDRMA	2019	Completed

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 18/5	<p>MID RVSM SAFETY MONITORING REPORT (SMR) 2020 That, the MID RVSM Safety Monitoring Report (SMR) 2020 at Appendix 3.3D, is endorsed.</p>	To develop the MID SMR 2020	SMR 2020	MIDRMA	2019	Completed
C. 18/6	<p>PREVENTING NON-RVSM APPROVED AIRCRAFT FROM OPERATING WITHIN MID RVSM AIRSPACE That, in order to prevent the Non-RVSM approved aircraft from operating within the MID RVSM airspace:</p> <p>a) the MIDRMA:</p> <p>i. develop a search engine of updated “Global RVSM Approval Database” under the MIDRMA website, which can help MID ATCUs to check the RVSM approval status of any aircraft entering their area of responsibility; and</p> <p>ii. in order to increase the awareness on the subject, the MIDRMA issue a Bulletin which includes the list of the non-RVSM approved aircraft observed operating within the RVSM airspace and circulate it to all MIDRMA Member States on monthly basis; and</p> <p>b) the MID States/ATCUs:</p> <p>i. ensure that the non-RVSM approved aircraft listed in the MIDRMA Bulletin are not allowed to operate within the RVSM airspace; and</p> <p>ii. report to MIDRMA any case of violation, including the cases of aircraft transferred from adjacent Regions/FIRs.</p>	To prevent non-RVSM approved aircraft from operating within the MID RVSM Airspace	<p>Develop online search engine</p> <p>Develop bulletin to States</p> <p>Ensure NON-RVSM Aircraft are not allowed to operate within the RVSM Airspace</p> <p>Report to MIDRMA cases of violation</p>	<p>MIDRMA</p> <p>MIDRMA</p> <p>States</p> <p>States</p>	2021	Completed

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 18/7	<p>MID RVSM SAFETY MONITORING REPORT (SMR) 2021</p> <p>That,</p> <p>a) the FPL/traffic data for the period 1 – 31 July 2021 and LHD Reports for the period 1 January 2021 to 31 December 2021 be used for the development of the MID RVSM Safety Monitoring Report (SMR 2021);</p> <p>b) only the appropriate Traffic Data as per MIDRMA requirements shall be submitted; any corrupted traffic data will be rejected;</p> <p>c) the traffic data must be submitted to the MIDRMA before 31 August 2021; and</p> <p>d) the final version of the MID RVSM SMR 2021 be ready for presentation to and endorsement by MIDANPIRG/19.</p>	Develop SMR 2021	<p>State Letter</p> <p>Provide TDS and LHDs</p> <p>SMR 2021</p>	<p>ICAO</p> <p>States</p> <p>MIDRMA</p>	2022	<p>Actioned</p> <p>ICAO MID SL AN 6/5.10.15A – 21/090 dated 15 June 2021</p> <p>Will be presented to MIDANPIRG/19 for endorsement</p>
C. 18/30	<p>MID REGION RVSM AIRSPACE SAFETY ASSESSMENT RELATED TO THE FWC 2022</p> <p>That, the MIDRMA conduct a MID Region RVSM airspace safety assessment, to ensure that the overall risk is meeting the ICAO TLS; and identify the peak periods, hotspots, bottlenecks, etc., based on a worst case scenario, using the forecasted traffic during the FWC 2022 period and all historical LHD reports available within the MIDRMA database.</p>	Develop RVSM Airspace assessment related to FWC 2022 forecasted traffic movements.	<p>Provide forecasted traffic data</p> <p>Develop the assessment using the current Airspace structure</p> <p>Share the results to the concerned States</p>	<p>Qatar</p> <p>MIDRMA</p> <p>ICAO MID</p>	2021	<p>Actioned</p> <p>Qatar provided the forecasted traffic data April 2021</p> <p>MIDRMA developed the analysis and presented the TF:</p> <p>https://www.icao.int/MID/Documents/2021/ATFM%20TF5/WP5.pdf</p> <p>Assessment results circulated to MID States</p>

Status of States' Contributions to the MIDRMA Project
(As of 31 December 2021)

Note. Currency in US Dollars

State	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bahrain	Paid 30,000	Paid 20,000	Paid 30,000	Paid 30,000	Paid 30,000	Paid 29,978 27 Oct 11	Paid 30,000 29 Aug 12	Paid 30,000 15 Apr 13	Paid 29,975 6 May 15	Paid 29,975 13 May 15	Paid 30,000 18 Feb 16	Paid 30,000 16 May 17	Paid 29,975 12 Mar 18	Paid 29,975 13 Jan 2020	Received 30,000 2 July 2020	Received 30,000 9 Sep 2021
Egypt	Paid 30,000	Paid 20,000	Paid 30,000	Paid 30,000	Paid 30,000	Paid 29,960 9 Sep 10	Paid 29,960 17 Jan 12	Paid 29,983 30 Jan 13	Paid 29,940 8 Apr 14	Paid 29,940 24 Feb 15	Paid 29,935 24 Dec 15	Paid 29,935 2 Jun 17	Paid 29,935 16 Jan 18	Paid 29,965	Received 29,965 18 Feb 2020	Received 30,000 11 Aug 2021
Iran	Paid 30,000	Paid 20,000	Paid 30,000	Paid 30,000	Paid 30,000	Paid 29,946 27 Jul 13	Paid 29,935 27 Jul 13	Paid 89,965 4 Apr 16			Paid 29,960 12 May 16	Paid* 29,960 10 Mar 17 not received	Not Paid 30,000	Not Paid 30,000	Not Paid 30,000	Not Paid 30,000
Iraq	N/A	N/A	N/A	N/A	N/A	Paid 10,000 on 16 Sep 11	Paid 10,000 on 5 Jul 12	Paid 10,000 5 Sep 13	Paid 10,000 22 Sep 14	Paid 10,000 23 Apr 15	Paid 10,000 1 Sep 16	Paid 10,000 20 Jun 17	Paid 10,000 20 Aug 18	Not Paid 10,000	Received 10,000 07 Dec 2020	Not Paid 10,000
Jordan	Paid 30,000	N/A	Paid 1,250	Paid 10,000	Paid 10,000	Paid 10,000 on 10 Aug 10	Paid 10,000 on 28 Nov 11	Paid 10,000 04 Dec 12	Paid 9,924 4 Aug 14	Paid 9,924 3 Feb 15	Paid 9,924 11 Dec 15	Paid 10,000 19 May 17	Paid 9,921 16 Mar 18	Paid 9,984.93 6 Dec 2019	Received 9,984.93 4 June 2020	Received 9,984.93 12 Nov 2021
Kuwait	Paid 30,000	N/A	Paid 1,250	Paid 10,000	Paid 10,000	Paid 10,000 on 27 Sep 10	Paid 9,849 on 21 Feb 12	Paid 10,000 20 Mar 13	Paid 10,000 5 May 14	Paid 10,000 12 Mar 15	Not Paid 10,000	Paid 10,000 28 Jul 17	Paid 10,000 14 Feb 18	Not Paid 10,000	Not Paid 10,000	Received 10,000 27 Sep 2021
Lebanon	Paid 30,000	N/A	Paid 1,250	Paid 10,000	Paid 10,000	Paid 10,000 on 4 Feb 11	Paid 9,960 18 Dec 12	Paid 9,960 10 May 13	Paid 10,000 25 Jul 14	Paid 9,970 15 Dec 15	Paid 9,970 18 Oct 16	Paid 9,915 30 Jul 18	Not Paid 10,000	Not Paid 10,000	Received 10,000 29 Dec 2020	Received 10,000 1 Apr 2021
Libya	Libya didn't sign the MIDRMA MOA yet.															
Oman	Paid 30,000	Paid 20,000	Paid 30,000	Paid 30,000	Paid 30,000	Paid 30,000 13 Sep 11	Paid 30,000 11 Jan 12	Paid 30,000 28 Feb 13	Paid 30,000 14 Mar 14	Paid 30,000 16 Dec 15	Paid 30,000 9 Mar 16	Paid 30,000 27 Apr 17	Paid 30,000 12 Feb 18	Paid 30,000 16 Dec 2019	Received 30,000 24 June 2020	Received 30,000 29 July 2021
Qatar	Qatar joined the MIDRMA on 28 April 2015										Paid 9,978 19 Nov 15	Paid 9,970 10 Apr 17	Paid 9,978 20 Feb 18	Paid 10,000 7 Oct 2019	Received 10,000 14 Apr 2020	Received 9,978.00 18 Oct 2021
Saudi Arabia	Paid 30,000	Paid 20,000	Paid 30,000	Paid 30,000	Paid 30,000	Paid 30,000 4 Mar 11	Paid 30,000 12 Jan 12	Paid 30,000 13 Mar 13	Paid 30,000 21 May 14	Paid 30,000 21 May 15	Paid 30,000 13 Apr 16	Paid 30,000 16 June 17	Not Paid 30,000	Paid 30,000 27 Nov 2019	Not Paid 30,000	Received 30,000 13 Aug 2021
Sudan	Sudan joined the MIDRMA on 26 May 2014									Paid 9,607 17 Feb 15	Paid 9,278 10 Nov 15	Paid 10,000 16 May 17	Paid 9,863 2 Mar 18	Received 9,974.73 20 Nov 2019	Received 10,133.86 11 June 2020	Not Paid 10,000
Syria^(*)	Paid 30,000	N/A	Paid 1,250	Paid (US\$ 1,250 + 42,789 + 11,862 + 10,374 + 7,778 + 9,970) = 84,023								Not Paid 10,000	Not Paid 10,000	Not Paid 10,000	Not Paid 10,000	Not Paid 10,000
UAE	Exempted from payment up-to end of 2015										Paid 29,933 26 Apr 16	Paid 29,933 26 Apr 17	Paid 29,931 26 Feb 18	Paid 29,931 9 Oct 2019	Received 30,000 16 July 2020	Received 30,000 9 July 2021
Yemen	Paid 30,000	N/A	Paid 1,250	Paid 10,000	Paid 10,000	Paid 10,000 on 17 Aug 10	Paid 9,975 on 17 Apr 12	Paid 19,973 for 2 years 26 Mar 15		Paid 9,987 26 Mar 15	Not Paid 10,000	Not Paid 10,000	Not Paid 10,000	Not Paid 10,000	Not Paid 10,000	Not Paid 10,000

Project Agreement

MIDDLE EAST RISK ASSESSMENT SOFTWARE SYSTEM UPGRADE

PARTIES	
MIDRMA	Middle East Regional Monitoring Agency of the ICAO
Dr Sameer ALAM	Consultant

Project Details	
Project Name	MIDDLE EAST RISK ASSESSMENT SOFTWARE SYSTEM UPGRADE
Project Plan	As Attached (Statement of Work and Project Proposal)
Key Personnel	Dr Sameer ALAM

Project Deliverables	
Software	MIDRAS Updated Software
Technical Report	Hot-Spot Analysis Report
Source Code	N/A

Key Dates	
Project Start Date	15 th Jan 2022
Project Completion Date	15 th July 2022

Contact Details/Address for notices/invoice	
MIDRMA	Mr Fareed Abdulla Al-Alawi, P.O Box 50468, Kingdom of Bahrain
Consultant	Dr Sameer ALAM, 05-04, 33B Nanyang Av, Singapore 639805

Payment	
Payment Invoice Date	Upon Signatures
Total Consultancy Fee Payable (incl. GST)	<u>100,700.00 USD</u>

Account Details	
Account Name	Sameer Alam
Account Number	537462392001
Bank Name	Oversea-Chinese Banking Corporation Limited Singapore
Bank Address	OCBC CENTRE, FLOOR 9, 65 CHULIA STREET. ZIP Code: 049513
Intermediary Bank	JP Morgan Chase Bank, New York, USA
SWIFT BIC code:	CHASUS33

General Terms & Conditions

1. Confidentiality

The Consultant and the MIDRMA may during the course of this Agreement and in connection with the Services obtain information relating to the other party which is not made available generally by that other party (“Confidential Information”). The receiving party shall:

- i. keep all Confidential Information confidential and not disclose it to any person (save as required by law); and
- ii. use the Confidential Information only for the purpose for which it was provided and for no other purpose.

2. Data Protection

- i. Both parties will comply with all applicable requirements of the Data Protection Legislation. This is in addition to, and does not relieve, remove or replace, a party’s obligations under the Data Protection Legislation.
- ii. The parties acknowledge that for the purposes of the Data Protection Legislation, the MIDRMA is the data controller and the Consultant is the data processor (where “Data Controller” and “Data Processor” have the meanings as defined in the Data Protection Legislation).
- iii. The Consultant will ensure that it has all necessary appropriate consents and notices in place to enable lawful transfer of the personal data to the MIDRMA for the duration and purposes of this agreement.

3. Payment

- i. The Consultant shall invoice the MIDRMA within 30 days of signing of the contract.
- ii. The MIDRMA shall pay the invoice no later than 30 days after the invoice has been received.
- iii. If the MIDRMA does not pay the invoice by the due date for payment the Consultant may suspend provision of the Services until payment in full is received.
- iv. The MIDRMA shall pay the invoice in full without any set-off or deduction.

4. Termination

- i. This agreement commences on the date the last party signs this agreement and expires three (3) months after the Project Completion Date unless terminated earlier.
- ii. This agreement terminates if the parties agree to terminate the agreement in writing at any time.
- iii. The MIDRMA must pay for any work undertaken in relation to the Project up to the effective date of termination which will not exceed an amount equivalent to the payment



Project Agreement
**MIDDLE EAST RISK ASSESSMENT SOFTWARE SYSTEM
UPGRADE**

MIDRMA acknowledges that Sameer Alam is engaged in this contact in his sole private capacity and that the Nanyang Technological University Singapore has neither involvement nor interest in the work and accepts no liability whatsoever.

Neither party shall have any liability for any failure to perform or delay in performing any of its obligations under this Agreement if and to the extent that such failure or delay is caused by reasons, circumstances or events beyond the reasonable control of that party.

This agreement constitutes the entire agreement between the parties in relation to its subject matter and supersedes any previous agreement of the parties, or any other communication or representation made, in relation to its subject matter.

Attachment 1: Project Proposal

Attachment 2: Statement of Works



Signed Sameer ALAM (Consultant)
Date 30/12/2021
Singapore

Signed on Behalf of MIDRMA
Date _____
Bahrain

Mr Fareed Al-Alawi
Middle East Regional Monitoring Agency
Email: midrma@midrma.com
P.O. Box 50468, Kingdom of Bahrain

Project Consultant: Dr Sameer Alam
Dated: 20th Dec 2021

PROJECT PROPOSAL: MIDDLE EAST RISK ASSESSMENT SOFTWARE SYSTEM UPGRADE **MIDRAS AI**

ABSTRACT

MIDRAS is a Collision Risk Assessment software system with interactive features for collision risk analysis and visualization for Middle East airspace region. The MIDRAS software integrates the ICAO standard models for collision risk calculations and provides an interactive interface for Collision Risk analysis, scenario planning, Hot-Spot analysis and fast-time air traffic simulation. With the changing dynamics of Middle-East air traffic flow, airspace reconfiguration, new aircraft and increased congestion, the MIDRAS software needs significant upgrades in terms of new Hot-Spot modeling, congestion analysis as well as several other features that are required to serve the emerging needs of airspace users and ANSPs in the Middle East region. This project proposal outlines the required upgrades and development of new features in MIDRAS software incorporating Artificial Intelligence (MIDRAS AI). These new features and upgrades will enable MIDRMA in making effective analysis of collision risk in the region and gain new insights into emerging traffic dynamics to better manage airspace congestion.

1 INTRODUCTION

Given the continued growth in air transportation, one of the key challenges faced by Air Navigation Service Providers (ANSPs) and airlines is: how to increase airspace capacity without compromising on safety? New air traffic management (ATM) paradigms by ICAO aim for doubling the airspace capacity (2x) while increasing the safety by a factor of 10 by 2030. To achieve such ambitious targets, development of new operational concepts, safety measures and safety performance indicators in the air traffic system are not only expected but also necessary. Reduced Vertical Separation Minimum (RVSM) airspace which ranging vertically from 29,000 feet (FL290) to 41,000feet (FL410), reduces the vertical separation from 2000 feet to 1000 feet, adding 6 extra flight levels. To maintain the safety and integrity of airspace stringent procedures by ICAO are in place.

To achieve these measures, MIDRMA has developed MIDRAS software for collision risk assessment of Middle East airspace. This software system uses ICAO RGCSP Vertical Collision Risk Model for collision risk computation. The ICAO model is based on knowledge of the traffic flows along a given route structure. The software computes Collision Risk equation parameters and process flight data for each member state and computes Collision Risk. The MIDRAS software also provide an interactive interface for collision risk visualization, simulation, modelling of scenarios and Hot-Spot analysis.

2 BACKGROUND

Collision Risk analysis requires an in-depth understanding of not only the nature of air traffic and key parameters which contributes to the overall collision risk but also how the collision risk emerges over time. This understanding will not only aid in the design/re-design of airspace/sectors, but may also assist ATCs in identifying traffic flow management strategies that might lead to increased collision risk under various traffic and sector characteristics.

Such capabilities require a high fidelity air traffic simulation environment that can perform a variety of complex computations and collision risk analysis while presenting the results. It is also desirable that such capability transform into a visual decision making tool that can illustrate how the collision risk builds up in a given airspace. MIDRAS software requires new features, upgrades and correction for comprehensive analysis, detailed insights and data analytic for achieving such capabilities. The new features and upgrades will enable MIDRMA in making effective analysis of collision risk and gain new insights into emerging traffic dynamics in the region. Such features requires Artificial Intelligence capabilities in MIDRAS software (MIDRAS AI) as rigid business rules cannot deal with large possibilities in collision risk modelling with large amount of traffic data for multiple ANSPs.

3 SCOPE OF WORK AND WORK PACKAGES

The MIDRAS AI software will be divided into three Work Packages (WP) as follows. The details of work items covered in each work package is in attached **Annex (Project Work Details MIDRAS)**.

- **WP1: New Features in MIDRAS** - This work package will develop new features in MIDRAS software using Artificial Intelligence. This will include new Hot-Spot Detection and Visualization model, Top of Decent analysis, Airway Occupancy statistics and analysis, new metrics for Congestion analysis. This work package will also develop Target Level of Safety Collision Risk Graph generation and display capabilities along with video recorder inbuilt into MIDRAS AI software. These new features will allow MIDRAS AI software to use more comprehensively for airspace risk assessment and proactive safety planning in the face of traffic growth in the region. These features will give new insights and understanding of the collision risk and its co-relation to airspace congestion at strategic level for better airspace design.
- **WP2: Upgrades to MIDRAS** - This work package will upgrade some existing capabilities in MIDRAS software. Such upgrades will include automated Flight input data correction, automated speed/distance errors fixes, features to extend interactive features in terms of Zoom and Pan. The upgrades will also include MIDRAS air traffic simulation timing control which can help user to choose the simulation speed. Such upgrades will allow MIDRAS users to speed up the data processing, and reduce the need for manual intervention for data entry errors, which prevents some flights plan data to be processed using AI algorithms. The enhancement to interactive flight features will allow for better traffic flow analysis and greater understanding of collision risk at crossing points.
- **WP3: Correction to MIDRAS** - This work package will modify exiting features due to changes in the business rules for dealing with RVSM flights entering and exiting at non-RVSM levels. The correction will also include revising data inputs files such as BADA, used in MIDRAS which are outdated and requires corrections. There are some features in MIDRAS which are not required, such as procedural airspace and waypoint due to changes in Middle East airspace redesign/reconfiguration, and need to be removed from the software for better design and process flow. Moreover, there is a need for error messages to be more detailed so that exact issue with the data processing errors can be identified and dealt with. The work-package will address above issues using Artificial Intelligence algorithms.

4 TIMELINE AND MILESTONES

The Work-packages will start concurrently depending upon the architecture of the software and related activities in respective work packages. There can be significant overlaps in the work packages given the nature of project which may requires the output of one work-package as input to others. Each work package is not envisioned in a silo but as interacting and influencing components.

	M1	M2	M3	M4	M5	M6
WP1: New Features in MIDRAS	X			X	X	X
WP2: Upgrades to MIDRAS			X	X		X
WP3: Correction to MIDRAS	X	X	X		X	

5 BUDGET AND COSTING

The total estimated consulting cost for this project is **USD 100,700.00 (One Hundred Thousand and Seven Hundred US Dollars)**. This cost does not include travel cost associated with project (training/software installation). The travel cost associated with the project will be covered by MIDRMA. This cost does not include third party software licenses. The cost includes HW/SW requirements for project.

Work Package	Man Hours Required	Consulting Cost (USD per hour)	Consulting Cost per WP USD
WP1	90 Hours	530	47,700
WP2	40 Hours	530	21,200
WP3	60 Hours	530	31,800
Total Hours/Cost	190 Hours		100,700

6 PROJECT TIMELINE

The expected duration of the project is Six Months. The expected start date of the Project is **15th January 2022** and the expected completion date of the project is **15th July 2022..**

7 PROJECT DELIVERABLE

Following are the key deliverable for the project (details as per Annex):

1. MIDRAS Software with New Hot-Spot identification and traffic congestion visualization model.
2. MIDRAS Software with updated Input/Output files, Graph display and Error handling capabilities.
3. MIDRAS Software with new business rules for flight plan processing and data analytic features.

8 PAYMENT TERMS AND DELIVERY DATES

The Consultant shall invoice the MIDRMA within 30 days of signing of the contract. The MIDRMA shall pay the invoice no later than 30 days after the invoice has been received. Total cost is inclusive of GST. Any transaction fees such as bank charges, exchange fees etc. will be borne by MIDRMA. The software (MIDRAS AI) will be delivered six months from the start date of the contract. The

software delivery will also include training on the new features of MIDRAS ver 3.0 as well as user manual detailing the features and software functionality.

MIDRAS AI : Project Work Details

Description:

MIDRMA requesting new features/upgrades/correction within MIDRAS software. Requirements for each module are listed separately.

#Module 1. MIDRAS

#	Item	Comments
MIDRAS Input\Supp Data		
1	BADA Database <ul style="list-style-type: none"> Update BADA Future update option by MIDRMA 	Outdated, last updated in 2016. Fareed is using BADA mapping for missing ACFT types which is not accurate
2	ASE Mapping <ul style="list-style-type: none"> Update in every 2 year from Eurocontrol 	Responsibility of MIDRMA to obtain the update from Eurocontrol
3	Aircraft Dimensions.CSV <ul style="list-style-type: none"> Update Aircraft Dimension file 	Outdated. Need reference of source to update
4	AAD Samples.CSV	Need more information about this file. Purpose, how to update?
5	Procedural Waypoints.CSV <ul style="list-style-type: none"> Remove 	Procedural separation is no longer required within Middle east region.
6	Waypoint Map.CSV <ul style="list-style-type: none"> Remove 	No longer required

MIDRAS Input\Flight Data – Processing		
1	State name update <ul style="list-style-type: none"> Saudi change to “KSA” 	File name “Saudi” should be “KSA”
2	Accept and process flight records with FLs crossing RVSM layer – Entry and Exit levels Currently MIDRAS consider these records as errors.	<p><i>MIDRAS is not accepting flight record with FLs outside RVSM airspace</i></p> <p><i>Examples:</i></p> <ol style="list-style-type: none"> Entry at FL 270 & Exit at FL 430 Entry at FL 430 & Exit at FL 250 Entry at FL 430 & Exit at FL 310 Entry at FL 310 & Exit at FL 430

3	<p>Autocorrect following errors</p> <ul style="list-style-type: none"> List each error with “checkbox” Adjust each traffic data record in error summary based on selected checkbox <p>Errors:</p> <ol style="list-style-type: none"> Distance of leg is longer than total distance – Exit time Distance of leg is too short – Exit time Flight flying at an unrealistic slow speed – exit time Flight flying at an unrealistic high speed – exit time Flight flying at an unrealistic high speed in levelled cruise – Exit time Time of leg is longer than total Time-Exit time Time of leg is too short – exit time 	<p>Fareed is manually correcting all errors and correction related to these errors can be automated.</p> <p>If the flight is landing, discard the waiting time since it is not in RVSM</p>
Sessions : MIDRAS yyyy-mm-dd_time\Logs		
1	<p>Flight data with error in .CSV format</p> <ul style="list-style-type: none"> Complete flight data Add new columns “Error Code and Error Description” 	<p>This report will be shared with authorities if required.</p>
2	<p>Error Summary.CSV Correction : Traffic data record line number</p>	<p>Now the line number has a difference of 2</p>

Sessions : Result		
1	<p>Hotspot within airways Center of Risk, hotspot should be within the airways.</p>	<p>Now the marking is showing where there are no airways.</p>
2	<p>More info needed in Help pdf file</p> <ul style="list-style-type: none"> Display items labels Hotspot Manual and explanations 	<p>PDF file needs to be edited, File location required</p>
3	<p>Session file</p> <ul style="list-style-type: none"> How to load previous sessions into MIDRAS 	
4	<p>TLS Graph Graphical representation of :</p> <ul style="list-style-type: none"> Calculated technical risk along with ICAO TLS 	

	<ul style="list-style-type: none"> Calculated overall risk along with ICAO TLS 	
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#Module 2. Traffic Visualization

#	Item	Comments
1	Speed controller <ul style="list-style-type: none"> Need better speed scaling option 	Example : Flightradar24.com
2	Zoom pan controller <ul style="list-style-type: none"> Zoom and drag options 	Hand panning needed. Currently drag option is with right-click, not user friendly.
3	Display Options <ul style="list-style-type: none"> What are Convex Hull, Cluster no scaling, the display option checkboxes 	Need explanation and change labels to Operational terms
4	Plot risk with congestion	Risk congestion needs to displayed within the simulation display
5	CRM fast simulation Real flight simulation with Safety parameters	This needs to be developed
6	Record video Record and save video of simulation	New feature, needs to be developed
7	Risk plotting <ul style="list-style-type: none"> Color options needed 	Only green color is showing now, need more colorful presentation
8	Help Manual for visualization Need how to use with details	
9	Time format Change time representation to UTC time format – 24 hour format	
10	Plot TOD points	
11	Airway occupancy Statistics plotting	

#Module 3. Hotspot viewer

#	Item	Comments
1	Opposite crossing Needs to improve	Example: Bahrain-SMR19. Wrong location where no flights permitted
2	Boundary of risk Needs to improve presentation	Better presentation required. Current shapes in green are hard to understand
3	Number within shapes are not clear. Label 'NP' is not showing always while zoom. What is NP with -12 exponent	Need explanation (What is the purpose of these points)
4	Center of Risk, Should be within airways.	Hotspot area is displaying outside airways, needs to be corrected.

5	Representation is not presentable Boundary should represent where traffic flowing	Example : ALSER – point not in boundary-SMR19, although the co-ordinates are checked and those are correct.
6	No Help document	Detailed user guide required

#Current problems

#	Item	Comment
1	MIDRAS unexpected crash	Option 1. Need log/ error why it crashed. Option 2. Debug option is preferred

NON-RVSM Approved Aircraft – Responsibility of MIDRMA Member states

#	Observed Operating RVSM in	Registrations of Violating ACFT	ICAO Type	First Observed on	Responsible State
1	Baghdad	152252	AN72	1/14/2020	IRAN
2	Baghdad	152253	AN74	10/5/2020	IRAN
3	Baghdad	152256	AN72	1/3/2020	IRAN
4	Baghdad	152257	AN72	10/9/2020	IRAN
5	Baghdad	152282	IL76	1/6/2020	IRAN
6	Baghdad	EPCPQ	B703	1/18/2020	IRAN
7	Baghdad	EPCQA	B742	1/4/2020	IRAN
8	Baghdad	YKATA	IL76	1/1/2020	SYRIA
9	Baghdad	YKATB	IL76	1/2/2020	SYRIA
10	EURRMA	EPIBO	A310	29/07/2020	IRAN
11	EURRMA	5AFLI	G300	10/7/2020	LIBYA
12	EURRMA	5APOL	IL76	26/09/2020	LIBYA
13	EURRMA	STPRB	AN74	18/08/2020	SUDAN
14	EURRMA, Emirates	STPSA	F900	20/09/2020	SUDAN
15	EURRMA	STPRM	AN72	8/2/2021	SUDAN
16	Emirates	ZAYED17	A332	5/1/2020	UAE

NON-RVSM Approved Aircraft – Responsibility of other RMAs

#	Observed in FIRs	ACFT Reg.	ICAO Type	First Observed on	Responsible RMA
1	Bahrain, Emirates	40001A	C17	25/01/2020	AAMA
2	Emirates	60208A	C17	30/03/2020	AAMA
3	Sana'a	5HTCG	B788	7/4/2020	AFIRMA
4	Bahrain, Emirates	5NATA	CL60	30/01/2020	AFIRMA
5	Bahrain, Emirates, Tehran	5YCIS	E145	30/04/2020	AFIRMA
6	Cairo	5YFAN	CRJ2	7/15/2020	AFIRMA
7	Khartoum	5YFDW	C56X	7/15/2020	AFIRMA
8	Muscat, Sana'a	5YIRE	B722	7/2/2020	AFIRMA
9	Sana'a	5YKOB	B733	7/15/2020	AFIRMA
10	Emirates	5YKQB	B733	9/1/2020	AFIRMA
11	Khartoum	5YWBH	C56X	7/14/2020	AFIRMA
12	Cairo	ETATF	B350	7/8/2020	AFIRMA
13	Sana'a	ZSCQP	CRJ9	7/7/2020	AFIRMA
14	Bahrain, Emirates	PRTQB	A320	2/9/2021	CARSAMA
15	Cairo	UR11316	AN12	7/22/2020	EURRMA
16	Bahrain, Emirates, Baghdad	URCTO	IL76	8/8/2021	EURRMA
17	Bahrain, Emirates	URCTU	IL76	3/8/2021	EURRMA
18	Bahrain, Emirates, Baghdad	URFSA	IL76	5/9/2021	EURRMA
19	Bahrain, Baghdad	URFSC	IL76	9/28/2021	EURRMA
20	Bahrain, Emirates	URFSD	IL76	9/29/2021	EURRMA
21	Cairo	80002A	C17	7/23/2020	MAAR
22	Cairo, Muscat	CB8001	C17	7/29/2020	MAAR
23	Cairo, Muscat, Emirates	CB8004	C17	7/24/2020	MAAR
24	Bahrain	IN307	IL38	12/3/2020	MAAR
25	Muscat	K3604	E35L	7/17/2020	MAAR
26	Emirates	KJ3452	IL76	8/3/2020	MAAR
27	Emirates	KJ3454	IL76	16/03/2020	MAAR
28	Cairo	N1112B	B350	7/16/2020	NAARMO
29	Bahrain, Emirates	N131DS	GLF6	28/09/2021	NAARMO
30	Emirates	N131GA	GLF5	14/03/2020	NAARMO
31	Emirates	N181CK	GLEX	17/12/2020	NAARMO
32	Bahrain, Emirates, Baghdad	N298RB	GLF4	14/05/2021	NAARMO
33	Emirates	N302PJ	H25B	7/1/2021	NAARMO
34	BAHRAIN, UAE	N44UA	CL60	6/7/2020	NAARMO
35	Emirates	N5062	SF50	14/01/2020	NAARMO
36	Bahrain, Baghdad	N527EF	GLF4	4/11/2020	NAARMO
37	Emirates	N542TP	F2TH	1/5/2021	NAARMO
38	Bahrain, Emirates, Baghdad	N685MF	GLF4	12/8/2021	NAARMO
39	Bahrain, Baghdad	N920SA	F2TH	18/02/2021	NAARMO
40	Bahrain, Emirates	N958BG	F2TH	18/10/2021	NAARMO

MID RVSM SMR 2021



MID RVSM SAFETY MONITORING REPORT 2021 (SMR 2021)

Prepared by the Middle East Regional Monitoring Agency (MIDRMA)

SUMMARY

The aim of the MID RVSM Safety Monitoring Report 2021 is to provide airspace safety review of the MID RVSM airspace and to highlight by means of arguments and supporting evidence that the implementation of RVSM in the ICAO Middle East Region is acceptably safe.

1. INTRODUCTION:

1.1 Executive Summary

The MID RVSM Safety Monitoring Report is issued by the Middle East Regional Monitoring Agency (MIDRMA) for endorsement by the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG).

The report presents evidence that according to the data and methods used, all safety objectives set out in the MID RVSM Safety Policy in accordance with ICAO Doc 9574 (2nd Edition) continue to be met in operational services within the Middle East RVSM airspace with some reservation for Safety Objective 3 which is under continuous monitoring by MIDRMA.

To conclude on the current safety of RVSM operations, the three key safety objectives endorsed by MIDANPIRG have to be met:

Objective 1 The risk of collision in MID RVSM airspace due solely to technical height-keeping performance meets the ICAO target level of safety (TLS) of 2.5×10^{-9} fatal accidents per flight hour.

The value computed for technical height risk is estimated 3.509×10^{-12} this meets RVSM Safety Objective 1.

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 the MID RVSM airspace meets the ICAO overall TLS of 5×10^{-9} fatal accidents per flight hour.

The value computed for the overall risk is estimated 4.073×10^{-10} this meets RVSM Safety Objective 2.

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.

Middle East RVSM Airspace Estimated Annual Flying Hours = (1,421,352) Average Aircraft Speed = 444.35 kts			
Risk Type	Risk Estimation	ICAO TLS	Remarks
Technical Risk	3.509×10^{-12}	2.5×10^{-9}	Below ICAO TLS
Overall Risk	4.073×10^{-10}	5×10^{-9}	Below ICAO TLS

Conclusions:

- (i) The estimated risk of collision associated with aircraft height-keeping performance is 3.509×10^{-12} and meets the ICAO TLS of 2.5×10^{-9} fatal accidents per flight hour (RVSM Safety Objective 1).
- (ii) The estimated overall risk of collision due to all causes which includes the technical risk and all risk due to operational errors and in-flight contingencies is 4.073×10^{-10} meets the ICAO overall TLS of 5×10^{-9} fatal accidents per flight hour (RVSM Safety Objective 2)
- (iii) Based on currently-available information (Except for Tripoli FIR), there is no evidence available to MIDRMA that the continued operations of RVSM adversely affects the overall vertical risk of collision other than the violation of Non-RVSM approved aircraft to the MID RVSM airspace which is under continuous monitoring and review by MIDRMA. (More details in 2.5)

1.2 Considerations on the Safety Objectives for MID RVSM SMRs

When considering the three safety objectives for RVSM, the following considerations should be borne in mind:

1. The assessment of risk against the TLS, both for technical and overall risk estimates, relies on height-keeping performance data to assess the risk in the vertical plane and studies of traffic density to calculate the risk in the horizontal plane. There are numbers of assumptions that must be verified to satisfy the reliability of the risk assessment, the verification of these assumptions deals primarily with monitoring of aircraft performance issues.
2. The Aircraft performance is assessed by individual airframe and by monitoring group. A monitoring group consists of aircraft that are nominally of the same type with identical performance characteristics that are made technically RVSM compliant using a common compliance method. Monitoring group analysis is necessary to verify that the Minimum Aviation System Performance Standards (MASPS) for that group is valid. Aircraft that are made RVSM compliant on an individual basis are termed non-group.
3. RVSM Safety Objective 2, dealing with overall risk, takes into account the technical risk together with the risk from all other causes. In practice, this relates to the human influence and assessment of this parameter relies on adequate reporting of Large Height Deviation (LHD) Reports, and the correct interpretation of events for input to the CRM.
4. RVSM Safety Objective 3 requires the RMA to monitor long-term trends and to identify potential future safety issues, this compares the level of risk-bearing incidents for the current reporting period. It also highlights if there are issues that should be carried forward as recommendations to be adopted for future reports.

2.0 Discussion

Scope:

The geographic scope of the MID RVSM Safety Monitoring Report covers the MID RVSM airspace, which comprises the following FIRs/UIRs:

Amman	Bahrain	Beirut	Baghdad	Cairo	Damascus	Emirates
Jeddah	Kuwait	Khartoum	Muscat	Sana'a	Tehran	Tripoli*

T-1: FIRs/UIRs of the Middle East RVSM Airspace

***Note: Tripoli FIR excluded from the RVSM safety analysis due to lack of data.**

The Data Sampling periods covered by SMR 2020 are as displayed in the below table

Report Elements	Time Period
Traffic Data Sample	01/07/2021 - 31/07/2021
Operational & Technical Errors	01/01/2021 - 31/12/2021

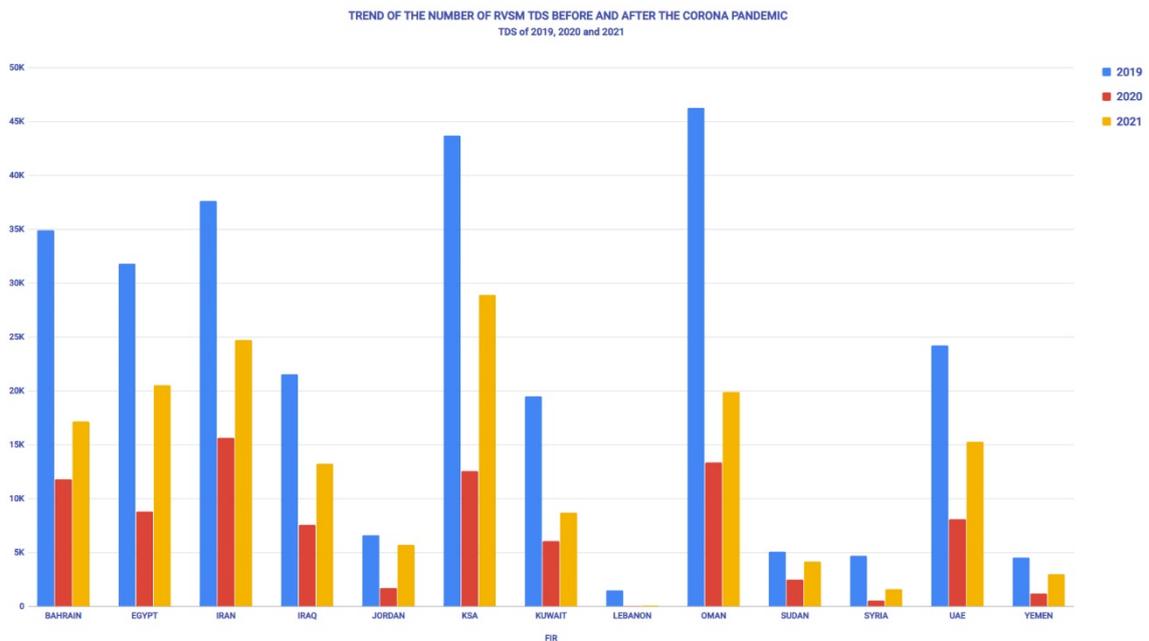
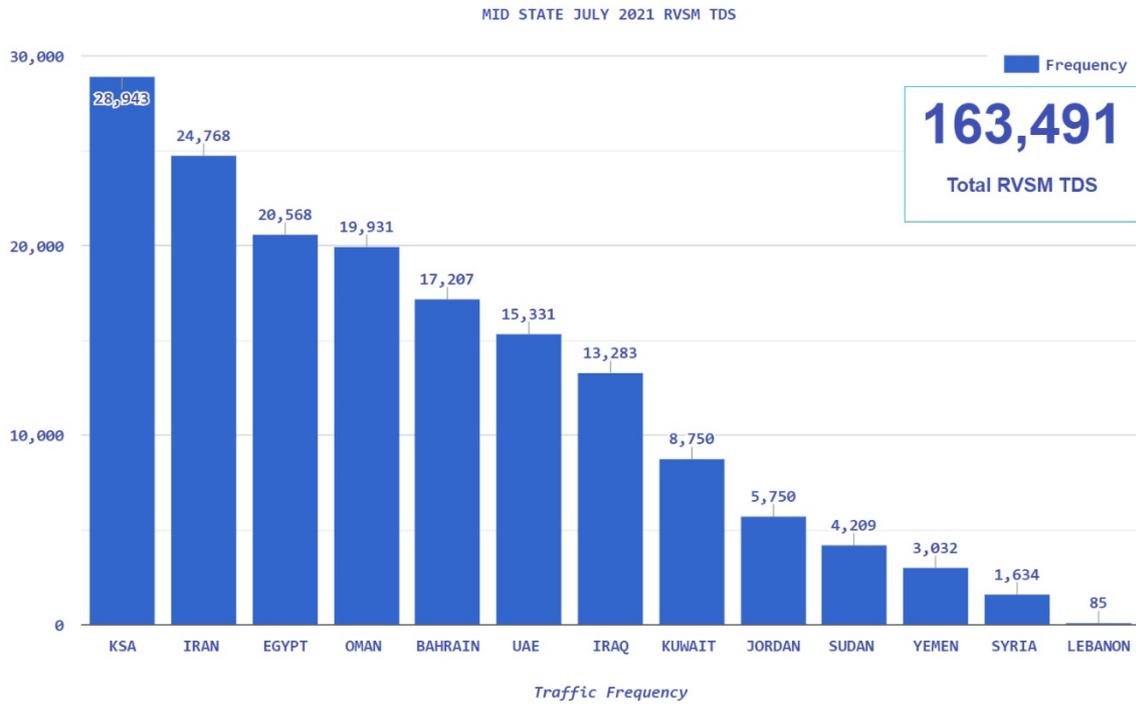
2.1 The descriptions of the traffic data collected from each MIDRMA Member State are depicted in table below:

MID States	No. of Flights	Received Dates	Status
Bahrain FIR	17207	12/08/2021	Accepted
Cairo FIR	20568	26/08/2021	Accepted
Amman FIR	5750	28/08/2021	Accepted
Muscat FIR	19931	17/08/2021	Accepted
Tehran FIR	24768	12/09/2021	Accepted
Khartoum FIR	4209	30/08/2021	Accepted
Emirates FIR	15331	22/08/2021	Accepted
Damascus FIR	1634	12/09/2021	Accepted
Sana'a FIR	3032	23/08/2021	Accepted
Baghdad FIR	13283	25/08/2021	Accepted
Kuwait FIR	8750	01/08/2021	Accepted
Jeddah FIR	28943	19/08/2021	Accepted
Beirut FIR	85	04/09/2021	Accepted
Tripoli FIR	-	-	No Data Submitted
Total	163491		

Table 1: Details of the MID States RVSM Traffic Data Sample (TDS) for July 2021.

Note: MIDRMA still faces number of errors/mistakes in the delivered TDS data from many States.

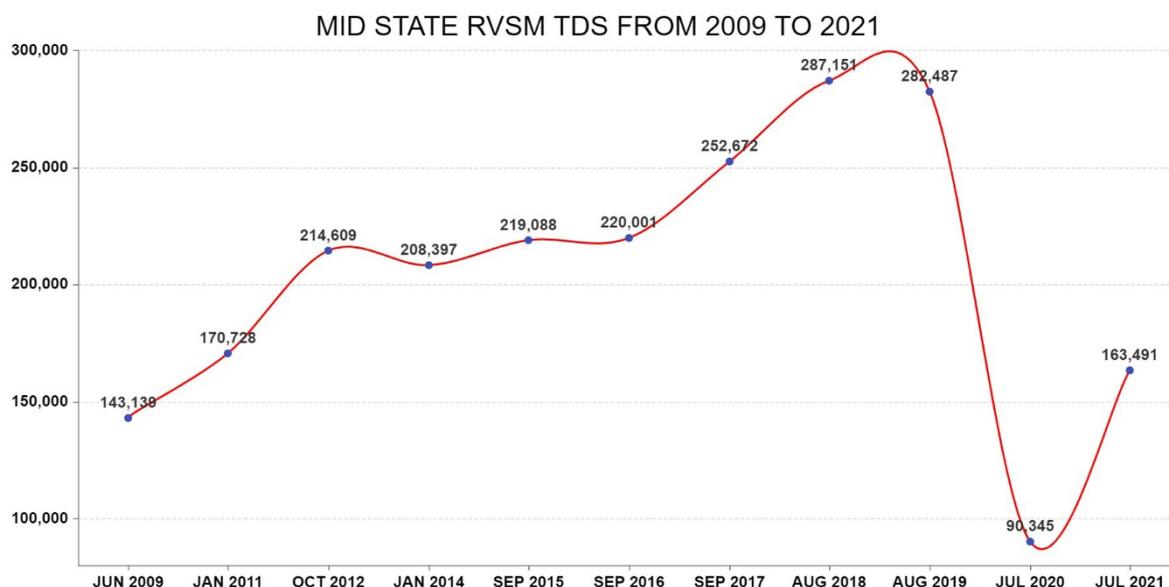
2.2 The description of the traffic data processed for each MIDRMA member state by the MID Risk Analysis Software (MIDRAS) is depicted in the graph below, a total of **163,491** flights were processed for the 13 FIRs, these flights were evaluated and processed very carefully to ensure accurate results according to the data submitted.



2.3 The COVID-19 pandemic has had a major impact on the airline industry across the world due to travel restrictions and reduced demand among travelers. The significant decrease in passenger demand is starting to improve compared to 2020 while this SMR TDS has reached 58% of what was recorded for TDS 2019 (before the pandemic).

#	MID FIRs	No of TDS July 2020	No of TDS July 2021	TDS Difference 2020 vs 2021	% of TDS Difference 2020 vs 2021
1	Bahrain FIR	11844	17207	5363	↑ 45.28 %
2	Cairo FIR	8838	20568	11730	↑ 132.72 %
3	Amman FIR	1752	5750	3998	↑ 228.2 %
4	Muscat FIR	13404	19931	6527	↑ 48.69 %
5	Tehran FIR	15689	24768	9079	↑ 57.87 %
6	Khartoum FIR	2526	4209	1683	↑ 66.63 %
7	Emirates FIR	8137	15331	7194	↑ 88.41 %
8	Damascus FIR	582	1634	1052	↑ 180.76 %
9	Sana'a FIR	1233	3032	1799	↑ 145.9 %
10	Jeddah FIR	12605	28943	16338	↑ 129.62 %
11	Beirut FIR	28	85	57	↑ 203.57 %
12	Baghdad FIR	7602	13283	5681	↑ 74.73 %
13	Kuwait FIR	6105	8750	2645	↑ 43.33 %
14	Tripoli FIR	NO TDS	NO TDS	-	-
	Total	90,345	163,491	73,146	↑ 80.96%

Comparison Table of MIDRMA Member States TDS for Years 2020 and 2021



2.4 Compiling and correcting the traffic data and then analysing it require a lot of efforts and follow up with the focal points to ensure the highest quality results obtained are reliable to study the impact of RVSM implementation within the ICAO Middle East Region, the MIDRMA decided to arrange for an upgrade to the MIDRAS to overcome problems with the errors in the received TDS

from some member states, the upgrade will include other necessary features which will facilitate calculating all RVSM risk parameters and shall save a lot of time to avoid rejecting the TDS due to a lot of errors which usually delay the production of the SMR.

#	Reporting Points	FIRs	Frequency
1	TASMI	BAGHDAD / KUWAIT	4951
2	RATVO	BAGHDAD / ANKARA	4857
3	SIDAD	BAGHDAD / KUWAIT	4823
4	DAVUS	BAHRAIN / KUWAIT	4500
5	NINVA	BAGHDAD / ANKARA	4133
6	ULINA	CAIRO / AMMAN	4041
7	KITOT	CAIRO / JEDDAH	3634
8	ULADA	BAHRAIN / JEDDAH	3541
9	LONOS	BAHRAIN / KUWAIT	3156
10	DEESA	AMMAN / JEDDAH	3004
11	RASKI	MUSCAT / MUMBAI	2848
12	GABKO	TEHRAN / EMIRATES	2661
13	ALPOB	BAHRAIN / EMIRATES	2542
14	RASDA	CAIRO / NICOSIA	2477
15	NUBAR	CAIRO / KHARTOUM	2363
16	TUMAK	BAHRAIN / EMIRATES	2339
17	DAROR	BAHRAIN / JEDDAH	2305
18	NARMI	BAHRAIN / JEDDAH	2290
19	PASAM	CAIRO / JEDDAH	2249
20	BONAM	TEHRAN / ANAKRA	2221

TDS 2021 Top 20 Busiest FIR Entry / Exit Points in the ICAO MID RVSM Airspace

2.5 For the Seventh consecutive Safety Monitoring Reports, Tripoli FIR excluded temporary from the RVSM safety analysis due to lack of TDS and LHD reports, taking into consideration the MIDRMA never done any risk analysis for Tripoli FIR RVSM airspace since Libya joint the MIDRMA, this issue require the MIDRMA board and MIDANPIRG to decide what action should be taken if RVSM operations resume within the Tripoli FIR in the future

2.6 The Collision Risk Model (CRM)

2.6.4 The risk of collision to be modelled is that due to the loss of vertical separation between aircraft flying between FL290 and FL410 in a given portion of an airspace. One collision between two aircraft is counted as the occurrence of two accidents. The risk of collision depends both on the total number and types of aircraft flying in the system and the system characteristics.

2.6.2 The CRM provides an estimate of the number of accidents within an airspace system that might occur per aircraft flight hour due to aircraft collisions resulting from the loss of vertical separation in an RVSM environment analysis, is expressed in terms of quantifiable parameters. In the vertical dimension the CRM can be broken down in order to separately model a single route on which aircraft are flying in the same or opposite directions at adjacent flight levels, pairs of crossing routes

and combinations of individual and intersecting routes, this model is applied equivalently to vertical, lateral and longitudinal separation.

2.6.3 Three parameters used within the CRM:

- a. The Vertical Overlap Probability, denoted as $P_z(1\ 000)$.
- b. The Lateral Overlap Probability, denoted as $P_y(0)$.
- c. The aircraft Passing Frequency are the most important quantities in determining the vertical collision risk. Of these, the vertical overlap probability is also an important parameter to calculate.

2.7 Technical Height Keeping Performance Risk Assessment

RVSM Safety Objective 1

The risk of collision in MID RVSM airspace due solely to technical height-keeping performance meets the ICAO target level of safety (TLS) of 2.5×10^{-9} fatal accidents per flight hour.

Direct evidence of compliance with TLS for Technical Height-Keeping Error

The result shows the risk of collision due to technical height-keeping performance is estimated to be 3.509×10^{-12} fatal accidents per flight hour, which is less than the ICAO TLS 2.5×10^{-9} .

MID RVSM SMRs Technical Risk Values				
Year 2006	Year 2008	Year 2010	Year 2011	Year 2012/13
2.17×10^{-14}	1.93×10^{-13}	3.96×10^{-15}	5.08×10^{-14}	6.37×10^{-12}
Year 2014	Year 2015	Year 2016	Year 2017	Year 2018
3.18×10^{-12}	3.056×10^{-10}	6.347×10^{-11}	4.966×10^{-11}	1.562×10^{-11}
Year 2019	Year 2020	Year 2021		
2.012×10^{-13}	9.185×10^{-13}	3.509×10^{-12}		

According to the technical risk values as shown in the above table the TLS values still, meet the ICAO TLS.

2.7.1 Supporting evidence of compliance with TLS for technical height-keeping performance

To demonstrate that the result is reliable, it is necessary to demonstrate that the following assumptions are true:

- a. The estimated value of the frequency of horizontal overlap, used in the computations of vertical-collision risk, is valid;

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- b. $P_z(1000)$ – the probability of vertical overlap due to technical height-keeping performance, between aircraft flying 1000 ft. separation in MID RVSM airspace is estimated 5.207×10^{-10} valid and is less than the ICAO requirement of 1.7×10^{-8} .
- c. The monitoring target for the MID RVSM height-monitoring programme is an on-going process.
- d. The input data used by the CRM is valid.
- e. An adequate process is in place to investigate and correct problems in aircraft technical height-keeping performance.

2.7.2 Calculating the Probability of Lateral Overlap ($P_y(0)$)

The probability of lateral overlap $P_y(0)$ is the probability of two aircraft being in lateral overlap which are nominally flying on (adjacent flight levels of) the same route. The calculation of the $P_y(0)$ for the SMR 2021 has the following to consider:

- a. The MIDRMA continued to calculate the probability of lateral overlap $P_y(0)$ for all the MID RVSM airspace as per the ICAO methodology developed for this purpose and derived by the MID Risk Analysis Software (MIDRAS).
- b. The MIDRMA calculated the probability of lateral overlap $P_y(0)$ for each MIDRMA Member State and found all the results are valid :
 - 1- Bahrain FIR:
Passing Frequency (n_equiv): 6.43304E-003
Probability of Lateral Overlap ($P_y(0)$): 0.16441.
 - 2- Cairo FIR:
Passing Frequency (n_equiv): 2.38668E-001
Probability of Lateral Overlap ($P_y(0)$): 0.15226.
 - 3- Baghdad FIR
Passing Frequency (n_equiv): 2.95343E-002
Probability of Lateral Overlap ($P_y(0)$): 0.1658.
 - 4- Tehran FIR
Passing Frequency (n_equiv): 4.18680E-002
Probability of Lateral Overlap ($P_y(0)$): 0.14065.
 - 5- Amman FIR
Passing Frequency (n_equiv): 4.13924E-002
Probability of Lateral Overlap ($P_y(0)$): 0.13698
 - 6- Kuwait FIR
Passing Frequency (n_equiv): 3.87258E-003
Probability of Lateral Overlap ($P_y(0)$): 0.1716
 - 7- Beirut FIR
Passing Frequency (n_equiv): Not enough traffic to measure
Probability of Lateral Overlap ($P_y(0)$): 0.097463
 - 8- Muscat FIR
Passing Frequency (n_equiv): 1.93820E-001

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Probability of Lateral Overlap (Py(0)): 0.16611

9- Jeddah FIR

Passing Frequency (n_equiv): 2.13603E-002

Probability of Lateral Overlap (Py(0)): 0.14626

10- Khartoum FIR

Passing Frequency (n_equiv): 5.63241E-002

Probability of Lateral Overlap (Py(0)): 0.17548

11- Damascus FIR

Passing Frequency (n_equiv): 2.82413E-001

Probability of Lateral Overlap (Py(0)): 0.12441

12- Emirates FIR

Passing Frequency (n_equiv): 3.61452E-003

Probability of Lateral Overlap (Py(0)): 0.16116

13- Sana'a FIR

Passing Frequency (n_equiv): 2.39246E-001

Probability of Lateral Overlap (Py(0)): 0.17121

- c. Overall, the results are considered to be valid.

2.7.3 Pz(1000) Compliance

The Pz(1000) is the probability that two aircraft at adjacent RVSM flight levels will lose vertical separation due to technical height keeping errors. The value of the probability of vertical overlap Pz(1000), based on the actual observed ASE and typical AAD data is estimated to be of **5.207 x 10⁻¹⁰**

This value meets the Global System Performance Specification that the probability that two aircraft will lose procedural vertical separation of 1000ft should be no greater than **1.7x10⁻⁸**.

The MIDRMA continues to issue the minimum monitoring requirements (MMRs) through the automated MMR software which is programmed to address the MIDRMA member states with their updated requirements according to the latest RVSM approvals received, the MMR table valid for December 2021 is available in **Appendix B**.

Note: All member states are required to check and comply with their MMR through the MIDRMA website (www.midrma.com).

2.7.1 Conclusions on Technical Vertical Collision Risk:

- a. The current computed vertical-collision risk due to technical height-keeping performance meets the ICAO TLS.
- b. The probability of vertical-overlap estimate, Pz(1000), satisfies the global system performance specification.
- c. Most monitoring groups are complying with ICAO TVE component requirements (also known as technical height-keeping group requirements).

2.7.2 Recommendations for Safety Objective 1:

- a. The MIDRMA shall continue to review the content and structure of its aircraft monitoring groups (on going task).

- b. The MIDRMA will continue to keep the methods of calculating the technical CRM parameters and the risk due to technical height keeping errors under review and explore more options to enhance the MID Risk Analysis Software (MIDRAS),

Note: new project has started to include more features in the MIDRAS (will be presented to the MIDRMA Board meeting for approval.

- c. The MIDRMA shall carry out continuous height monitoring survey and investigation concerning aircraft flying within the MID RVSM airspace by collecting the TDS from member states offered to submit their RVSM TDS on a monthly basis.
- d. More MIDRMA Member states other than Bahrain, Iraq and UAE are encouraged to send their monthly RVSM traffic data to explore more possible violations to the MID RVSM airspace.

2.8 Assessment of overall risk due to all causes against the TLS of 5×10^{-9} fatal accidents per flight hour

RVSM 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 the MID RVSM airspace meets the ICAO overall TLS of 5×10^{-9} fatal accidents per flight hour.

The value computed for the overall risk is estimated 4.073×10^{-10} this meets RVSM Safety Objective 2.

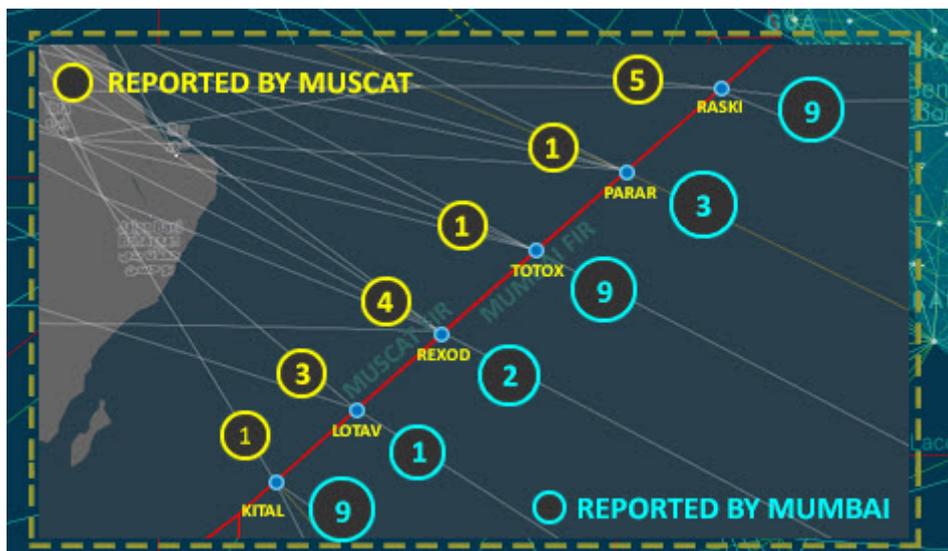
Overall Risk Values				
Year 2006	Year 2008	Year 2010	Year 2011	Year 2012/13
Not calculated	4.19×10^{-13}	6.92×10^{-12}	1.04×10^{-11}	3.63×10^{-11}
Year 2014	Year 2015	Year 2016	Year 2017	Year 2018
4.91×10^{-11}	7.351×10^{-10}	5.691×10^{-10}	4.518×10^{-11}	9.845×10^{-11}
Year 2019	Year 2020	Year 2021		
8.345×10^{-10}	5.206×10^{-10}	4.73×10^{-10}		

2.8.1 The vertical risk estimation due to atypical errors has been demonstrated to be the major contributor in the overall vertical-risk estimation for the MID RVSM airspace, In the previous SMRs the processed data were severely influenced by either NIL reporting of Large Height Deviations (LHDs) and very few reports of categories A, B, C, D, J and K as without enough data (especially from FIRs with high volume of traffic) will not reflect confidence with the final results.

2.8.2 The MIDRMA continues to monitor the LHD reports at the eastern FIR boundary of Muscat FIR filed by Mumbai, the MIDRMA indicated in SMR 2017 the level of LHD reports filed by Muscat and Mumbai ATCUs related to each other at their transfer of control points reached to a dangerous level and started to effect the ICAO TLS of RVSM implementation in the MID and APAC regions, therefore the MIDRMA requested from MIDRMA Board/15 meeting (Muscat – Oman 29 – 31 January 2018) to open a Safety Protocol for the purpose of resolving this issue as soon as possible.

2.8.3 Although, the traffic level reduced at the common FIR boundary points for Muscat and Mumbai, the MIDRMA can't see much improvement for SMR 2021 as the safety concern still exist and more works required from both ATCUs to close this safety protocol such as the implementation of OLDI/AIDC which is still ambiguous at this stage and required follow up from MIDANPIRG.

Note: A Safety Protocol is a critical safety issue effecting the implementation of RVSM operations which require the concerned authority an immediate action to rectify/resolve the problem in a certain period of time under the supervision of MIDRMA and ICAO MID Office.

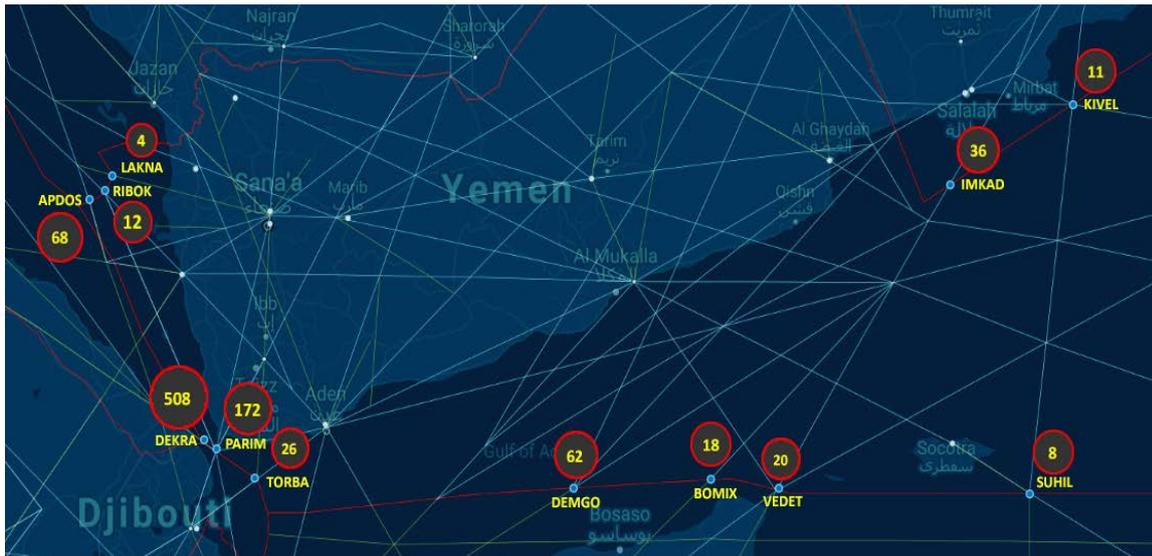


2.8.4 The Safety Protocol is under continuous review by MIDRMA and MAAR and the LHD reports filed by all concerned ATC Units are investigated and evaluated through the MIDRMA online LHD system and further update will be addressed to the next MIDRMA Board meeting.

2.8.5 The problem of the increased number of LHD reports submitted by Sana'a ACC related to some its neighboring ATCUs began to appear more than three years ago and did not improve even with the decrease in the number of air traffic in 2020 and 2021 due to the outbreak of the Corona pandemic, the MIDRMA is addressing this issue to the MIDRMA Board/17 to take all necessary measures to resolve this problem.

2.8.6 Through the evaluation review for the LHD reports valid for SMRs 2017, 2018, 2019 and 2020 the MIDRMA noticed very few Member States are investigating the reported LHDs related to their FIRs and reply with their outcomes/corrective actions. The meeting may wish to note that the Online LHD System has the feature to allow all Member States to forward their reports directly to the concerned focal points responsible to receive the LHD reports and allow them to reply with their outcomes in the same report which will be archived for future analysis.

2.8.7 The MIDRMA pointed out during the last Board meeting the issue of lack of response to the received LHD reports using the feature of direct response to the reporting unit to ensure that all responses are archived and referenced when needed. Unfortunately, the extreme majority of the Member States are not using this feature and don't bother to investigate and reply to the received LHD reports.



2.8.8 The Table below presents a summary of operational risk associated with Large Height Deviation (LHD) reports by LHD categories, these reports used to calculate the overall vertical collision risk for the MID RVSM airspace.

LHD Cat. Code	Large Height Deviation (LHD) Category	No. of LHDs	LHD Duration (Sec.)
A	Flight crew fails to climb or descend the aircraft as cleared	6	95
B	Flight crew climbing or descending without ATC clearance	-	-
C	Incorrect operation or interpretation of airborne equipment	-	-
D	ATC system loop error	-	-
E	ATC transfer of control coordination errors due to human factors	42	990
F	ATC transfer of control coordination errors due to technical issues	1	15
G	Aircraft contingency leading to sudden inability to maintain level	-	-
H	Airborne equip. failure and unintentional or undetected FL change	2	25
I	Turbulence or other weather related cause		
J	TCAS resolution advisory and flight crew correctly responds	1	5
K	TCAS resolution advisory and flight crew incorrectly responds	-	-
L	An aircraft being provided with RVSM separation is not RVSM approved	1	20
M	Other	-	-
	Total	53	1150

Summary of Operational Risk associated with Large Height Deviation Reports

MID RVSM SMR 2021

2.8.9 The picture below reflects the locations of the top 20 reported LHDs category E in the ICAO Middle East Region.

MID RVSM SMR 2021

2.8.10 Effects of Future Traffic Growth

For the second year, the Coronavirus outbreak and the relevant precautionary measures to limit its spreading are having clear impacts on human mobility at global scale. This provoked a reduction of domestic and international volumes of air passenger traffic worldwide, such effects are currently being observed in the Middle East region. This has clear implications for the aviation industry as well as indirect consequences to several sectors (e.g. tourism) and the economy at large as well as the society.

The MIDRMA continuously monitoring the traffic growth from the RVSM traffic data received on a monthly basis from Bahrain, Iraq and UAE and found the traffic growth compared with July 2020 has increased by 25% - 30% . These range from a quick and complete recovery to less optimistic scenarios of a slower or even incomplete recovery, and will depend on the duration and severity of the lockdown and the spread of this virus in the MIDRMA member states.

The effect of future traffic growth on the vertical collision risk can be evaluated on the assumption of a linear relationship between traffic growth and frequency of horizontal overlap, which will directly affect the two components of the risk: the risk due to technical height-keeping performance and due to atypical operational errors.

With the current uncertainty over traffic growth this issue will be revisited when the Middle East economic conditions return to more normal growth.

2.8.11 Conclusions on the overall vertical risk:

- a. 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 the MID RVSM airspace, estimated from the operational and technical vertical risks calculated with LHD reports from most of the member states, the computed result for this SMR is considered to be representative for the MID RVSM airspace.
- b. The effect of future traffic growth on the vertical collision risk can be evaluated on the assumption of a linear relationship between traffic growth and frequency of horizontal overlap, which will directly affect the two components of the risk: the risk due to technical height-keeping performance and due to atypical operational errors. It is very clear the MID region is suffering sever reduction in the traffic growth which is keeping the estimation of overall risk in safe side.

2.8.12 Recommendations Applicable to Safety Objective 2:

- a. The MIDRMA shall continue to encourage States to provide Large Height Deviation Reports (LHD) of all categories and not only related to handover issues.
- b. Due to the failure of replying related LHD reports by some member states, the MIDRMA will upgrade the LHD online reporting system to alert states who failed to respond with the need to investigate and report their outcomes in the system itself as soon as possible.
- c. The MIDRMA, in coordination with concerned States, assure that incidents and violations which have direct impact on the implementation of RVSM within the MID Region are reported in continuous basis through the MIDRMA LHD online reporting system in due time for operational safety assessment analysis.

2.9 ASSESSMENT OF SAFETY-RELATED ISSUES RAISED IN THIS REPORT

RVSM 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

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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.

- a. The MIDRMA improved its monitoring capabilities by conducting trial ADSB Height Keeping Performance for some RVSM approved aircraft registered by MIDRMA member states.
- b. The MIDRMA started to build its database for the RVSM approved aircraft registered by MIDRMA member states which are capable of ADSB out to conduct height monitoring using AHMS (ADSB Height Monitoring System)
- c. The MIDRMA started to address Performance-Based Communication and Surveillance (PBCS) approvals request from member states issuing PBCS approvals and forward reports received from other regions related none compliant of PBCS requirements.
- d. The MIDRMA will address the Hot Spots of each MID FIR generated by the (MIDRAS) Software (for information only).
- e. Current risk-bearing situations have been identified by using the MIDRAS and the MID Visualization and Simulation of Air Traffic and action will be taken to ensure resolving all violations to RVSM airspace by non-approved aircraft.
- f. The MIDRMA continued to carry out scrutiny checks for aircraft filling W in their flight plans for all aircraft flying within the ICAO Middle East RVSM airspace and address all violating aircraft to the concerned authorities.
- g. The MIDRMA arranged for an upgrade project to enhance the MIDRAS which will improve and facilitate the calculation of all RVSM risk parameters.

-It is concluded that this Safety Objective is currently met.

Appendix A

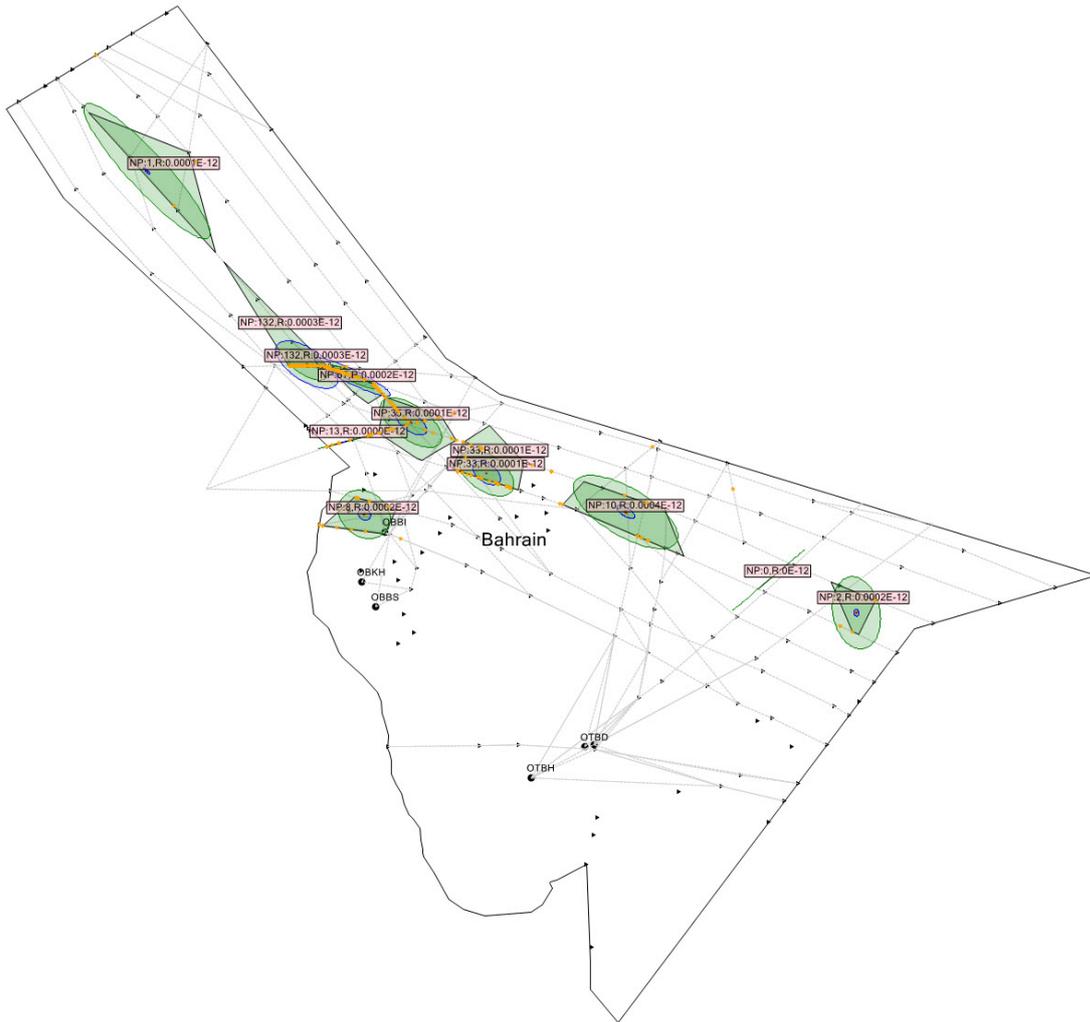
MID STATES RVSM AIRCRAFT MINIMUM MONITORING REQUIREMENTS

Valid as of 31st December 2021

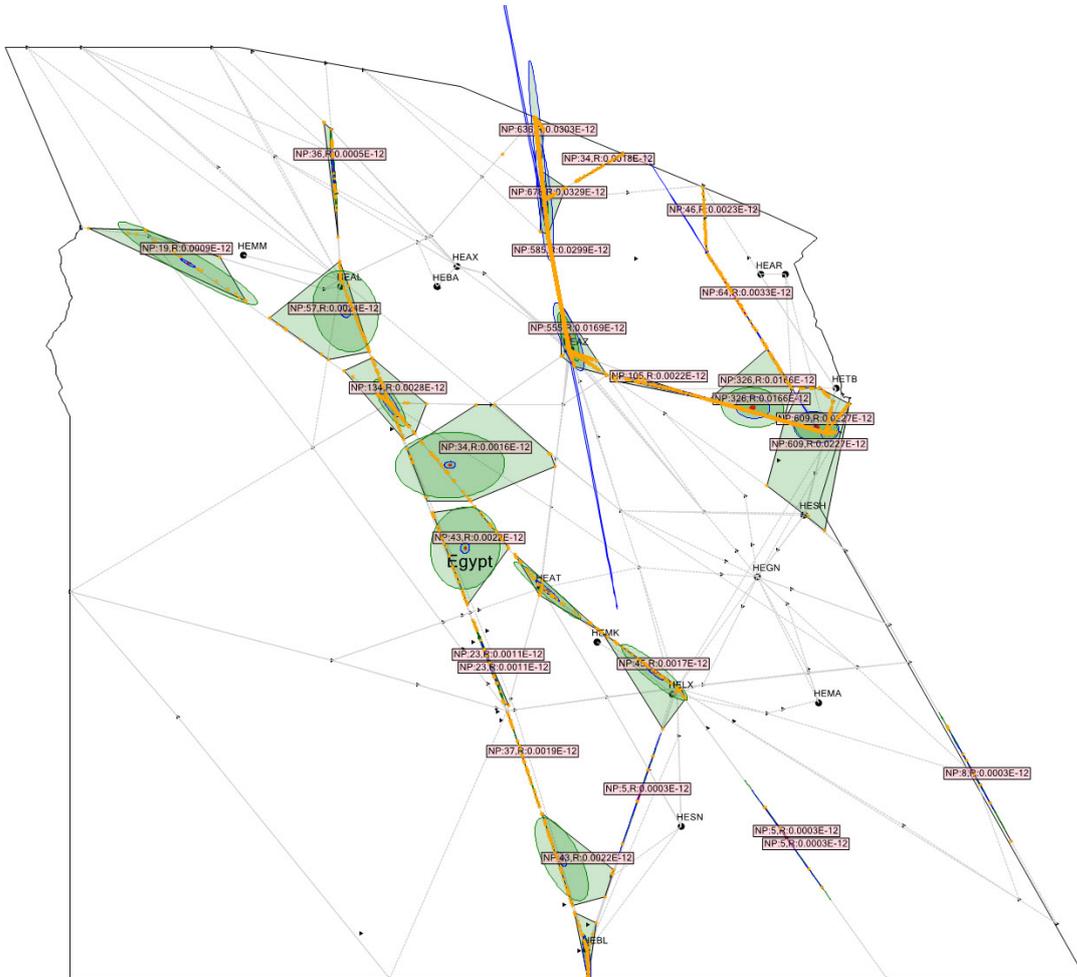
MID STATES	RVSM APPROVED A/C	HAVE RESULTS OR COVERED	NOT COVERED	NOT COVERED IN %	A/C MMR
Bahrain	60	60	0	0%	0
Egypt	156	113	43	28%	27
Iran	249	138	111	45%	36
Iraq	43	43	0	0%	0
Jordan	44	40	4	9%	4
KSA	259	257	2	0.8%	2
Kuwait	70	64	6	9%	5
Lebanon	32	32	0	0%	0
Libya	31	9	22	71%	15
Oman	72	63	9	13%	3
Qatar	276	276	0	0%	0
Sudan	10	10	0	0%	0
Syria	15	0	15	100%	9
UAE	584	529	55	9%	24
Yemen	5	0	5	100%	5
TOTAL	1906	1635	271	14.22%	130

Appendix B

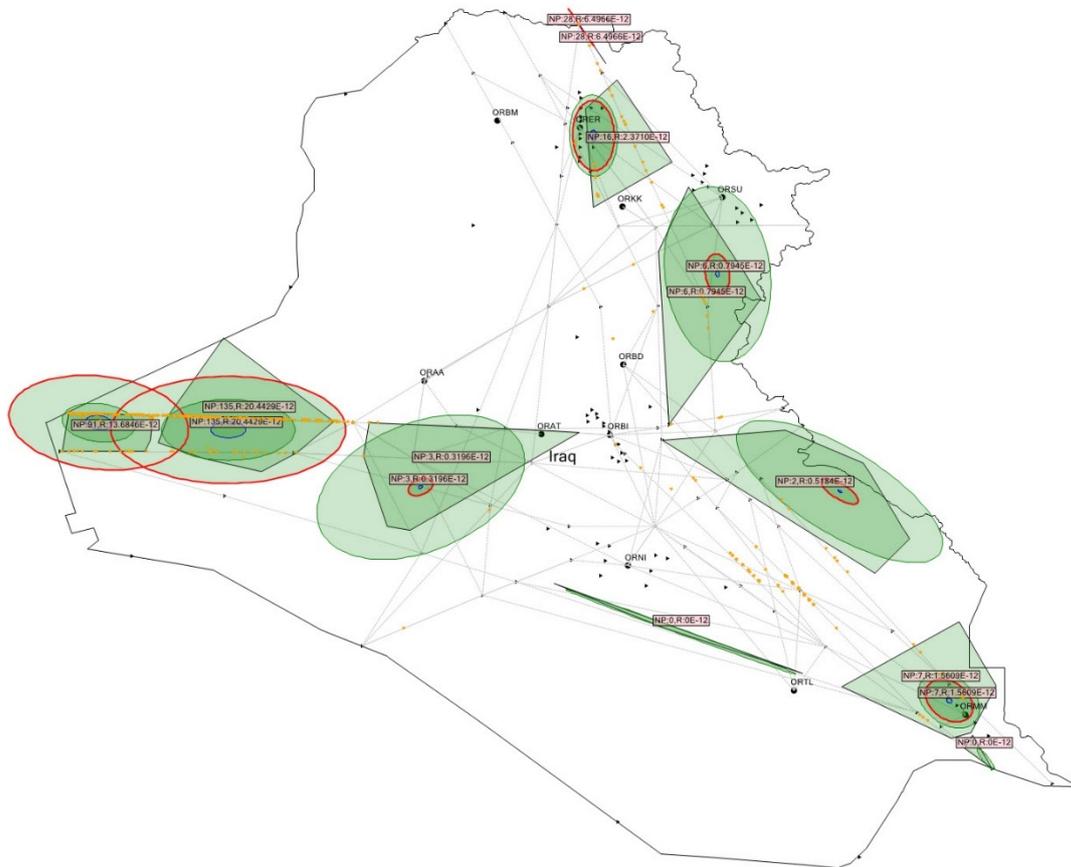
**MIDRMA Member States Hot Spots Generated from July 2021 TDS
(For information ONLY)**



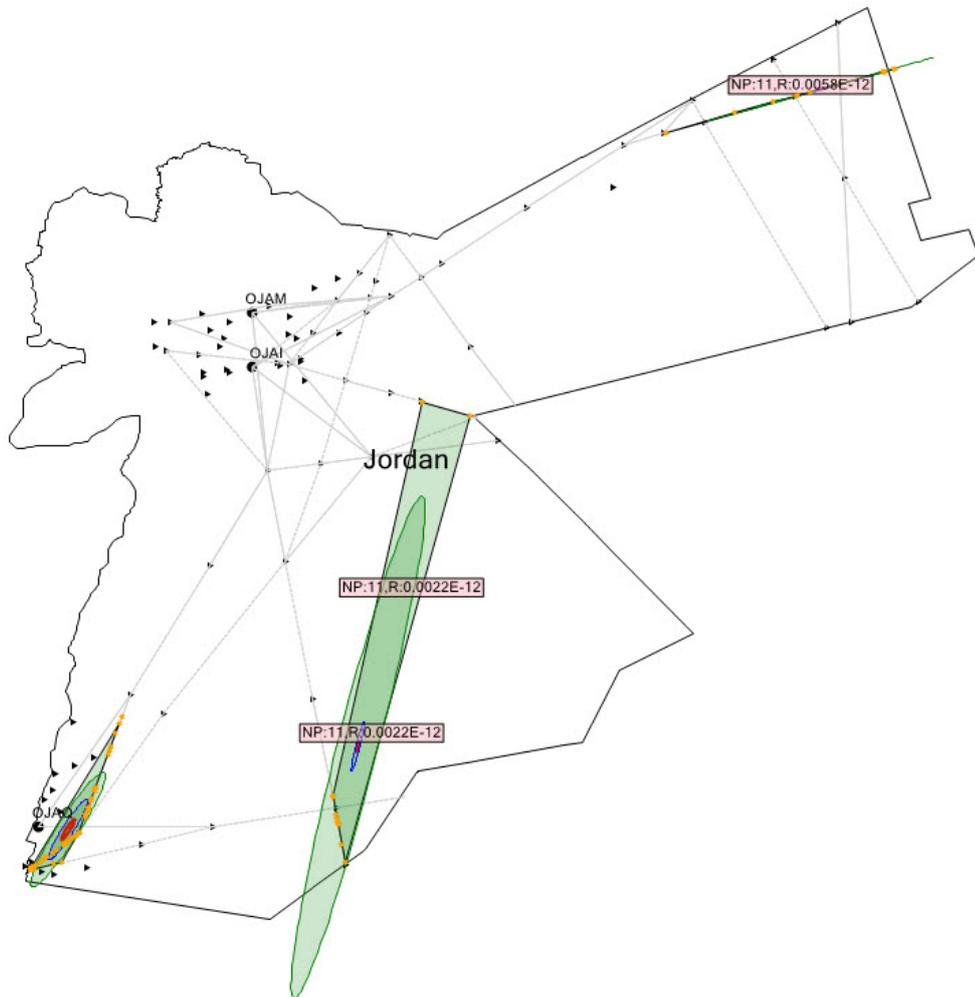
Bahrain FIR



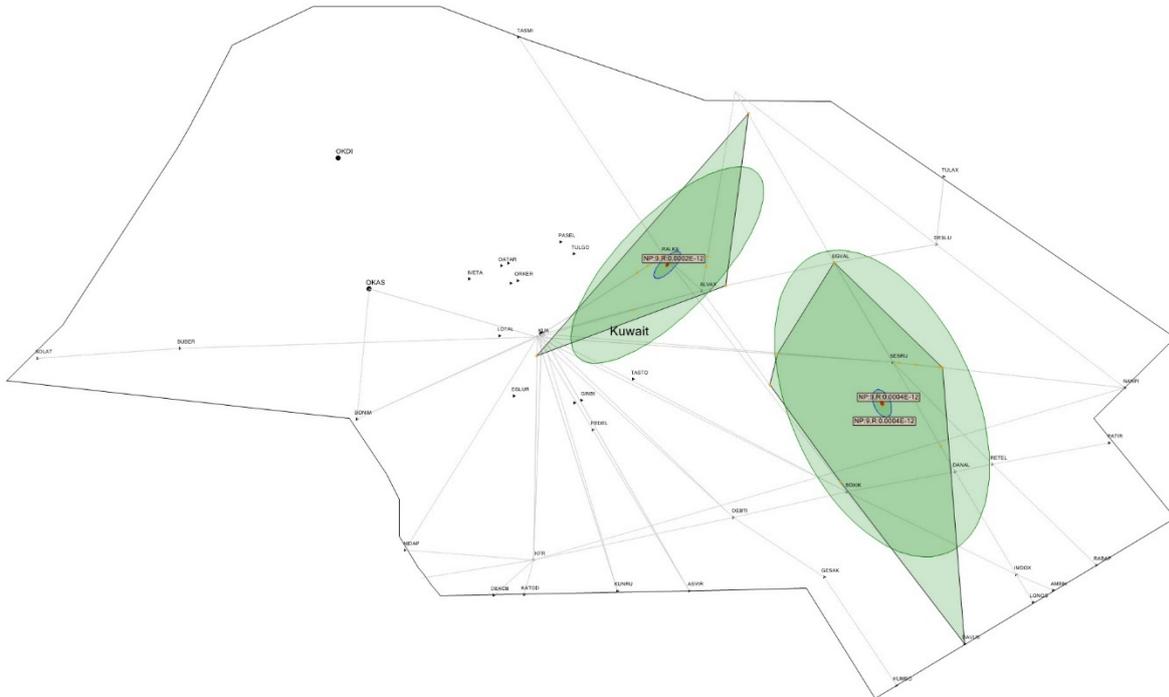
Cairo FIR



BAGHDAD FIR



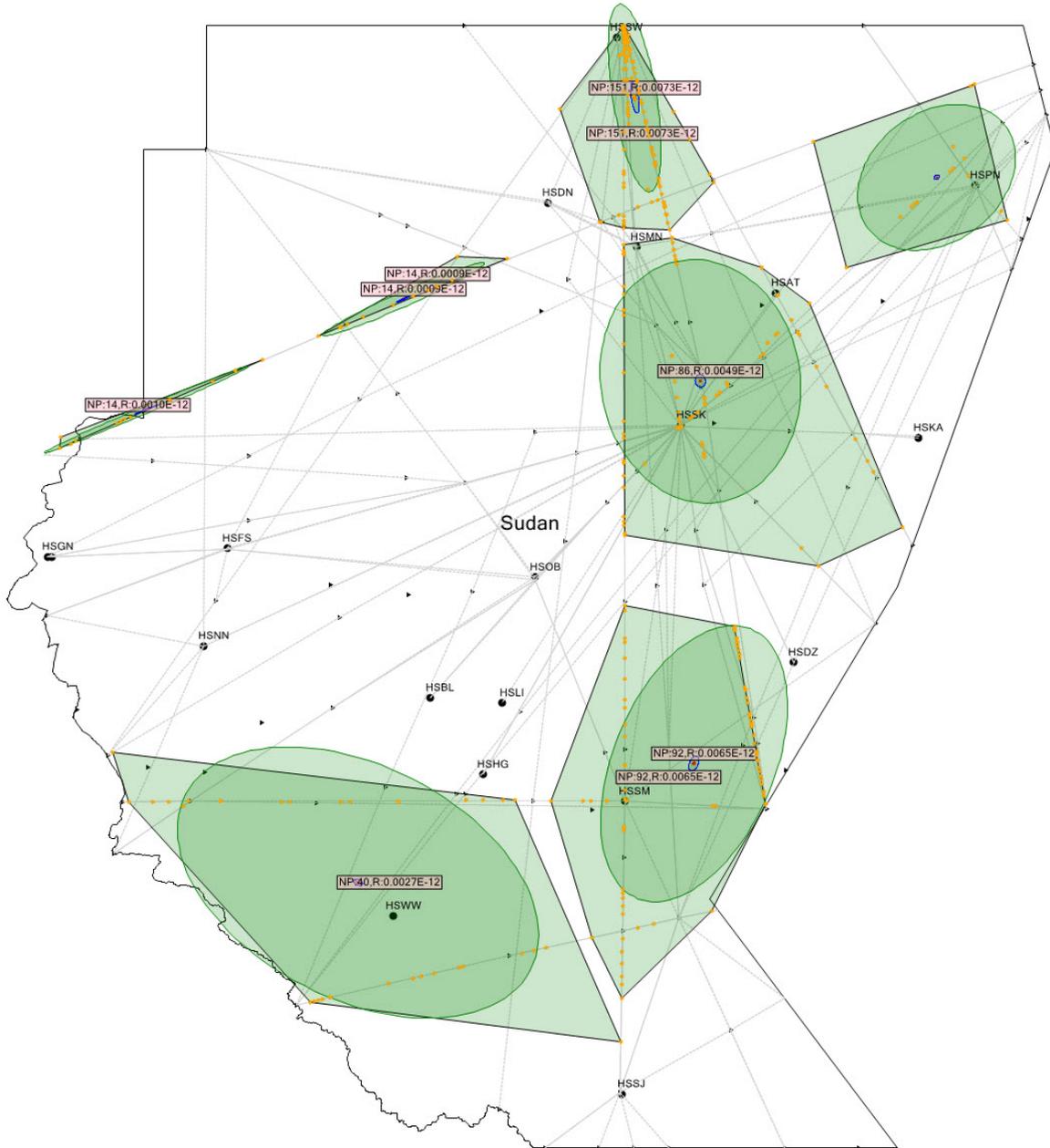
AMMAN FIR



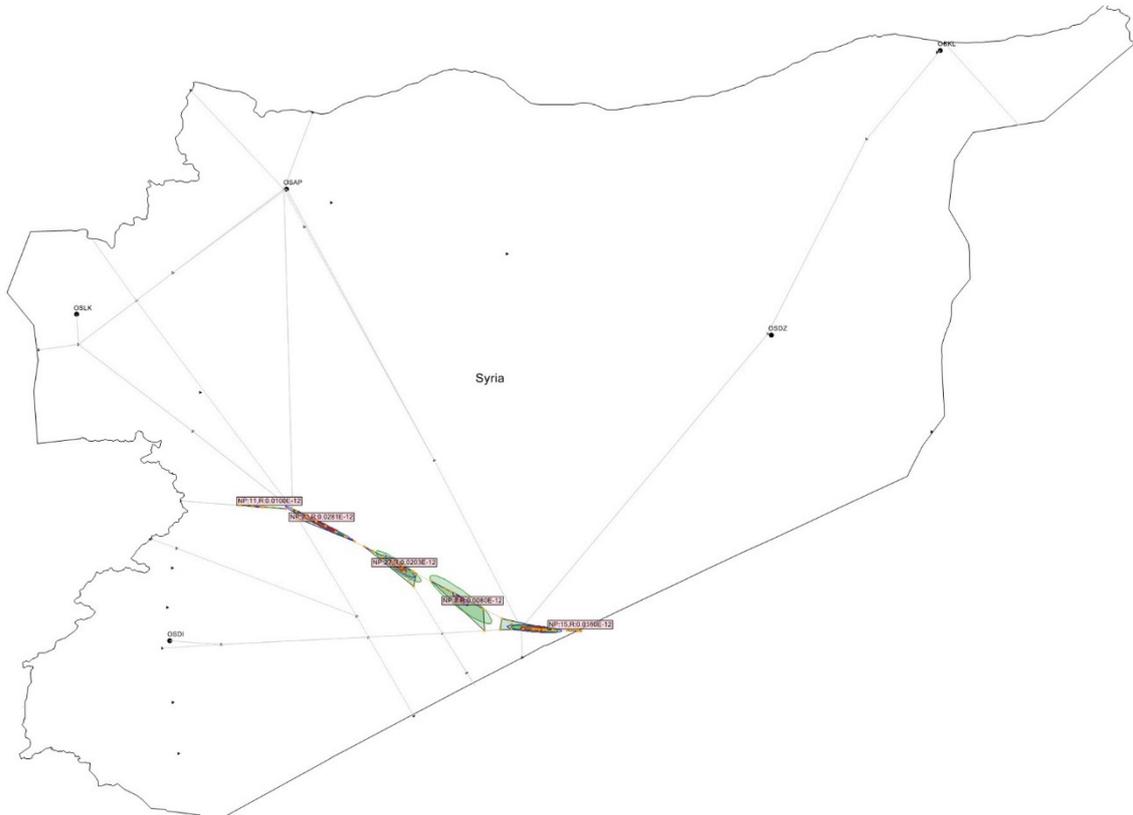
KUWAIT FIR



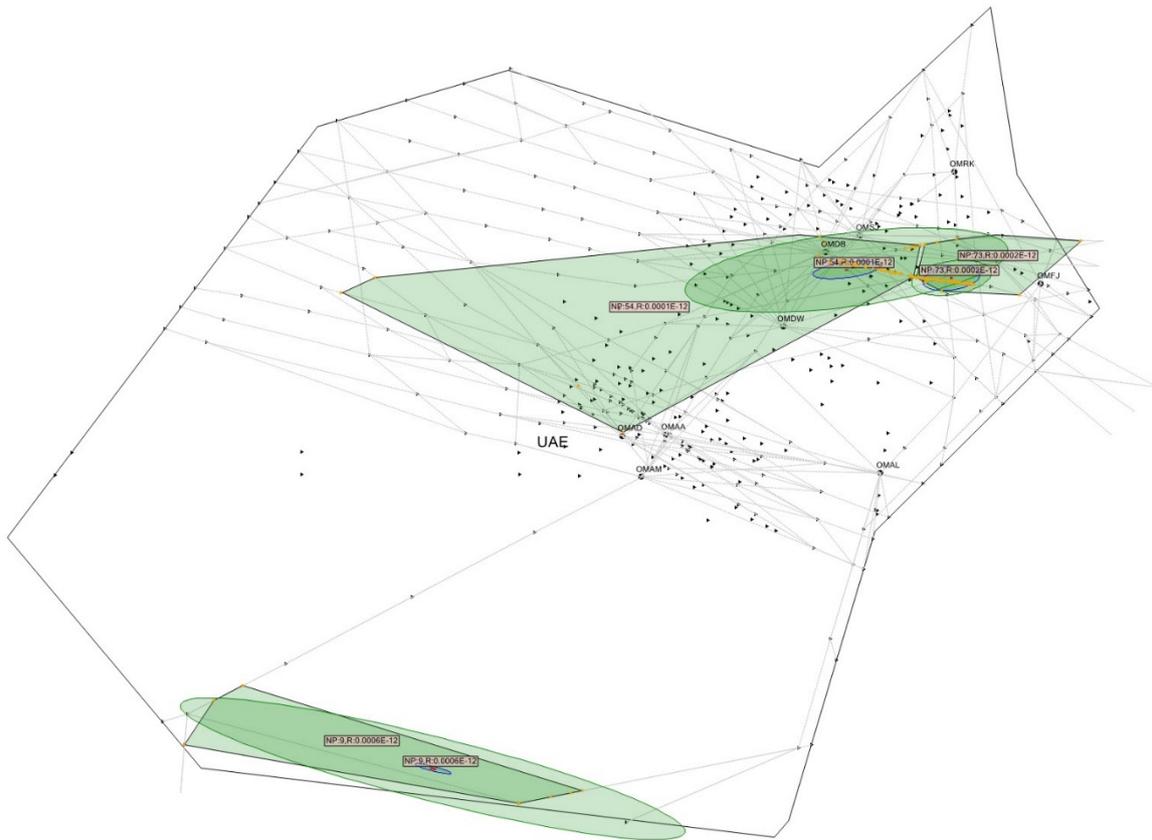
MUSCAT FIR



KHARTOUM FIR



DAMASCUS FIR



EMIRATES FIR

LIST OF MIDRMA BOARD MEMBERS/ALTERNATES AND FOCAL PONTS

Chairman: Mr. Mohamed Zainal (Bahrain)

STATE	MIDRMA BOARD MEMBER	ALTERNATE	ATC FOCAL POINT	AIRWORTHINESS/FLIGHT OPERATIONS FOCAL POINT
BAHRAIN	<p>Mr. Ahmed Mohammed Bucheery Chief Air Traffic Management Civil Aviation Affairs P.O. Box 586 BAHRAIN</p> <p>Fax: +973 17 329977 Tel: +973 17 321117 Mobile: +973 39522696 E-mail: a.ali@mtt.gov.bh</p>	<p>Mr. Isa Al-Khamiri Safety Manager Civil Aviation Affairs P.O. Box 586 – BAHRAIN</p> <p>Fax: +973 17 329977 Tel: +973 17 321118 Mobile: +973 3644768 E-mail: ialkhamiri@mtt.gov.bh</p>	<p>Same as MEMBER</p>	<p>Eng. Abdulrazzqaq Abdulwahid Aircraft Registration Specialist Civil Aviation Affairs P.O. Box 586 BAHRAIN Tel: +973 17 32 9031 E-mail: a.mohammed@mtt.gov.bh</p>
EGYPT	<p>Mr. Tayseer Mohamed Abdelkareem General Manager of ATS Egyptian Civil Aviation Authority (ECAA) General Manager of ATS Cairo - Egypt</p> <p>Fax: +202 2268 7849 Tel: +202 2267 8883 Mobile: +20100 522 8675 E-mail: tayseerkasem73@gmail.com tayseer.mohamed@civilaviation.gov.eg</p>	<p>Mr. Mario Riad Mahrous Airworthiness Senior Inspector Egyptian Civil Aviation Authority Cairo Airport Road Cairo - EGYPT</p> <p>Mobile: +201227197389 Email: mario.riad@gmail.com</p>	<p>Mr. Amr Mohamed Amin Safety Manager National Air Navigation Services Company (NANSC) Cairo Airport Road Cairo - EGYPT</p> <p>Mobile: +20106 156 9762 Email: amro_1962@yahoo.com</p>	<p>Same as ALTERNATE</p>

STATE	MIDRMA BOARD MEMBER	ALTERNATE	ATC FOCAL POINT	AIRWORTHINESS/FLIGHT OPERATIONS FOCAL POINT
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STATE	MIDRMA BOARD MEMBER	ALTERNATE	ATC FOCAL POINT	AIRWORTHINESS/FLIGHT OPERATIONS FOCAL POINT
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JORDAN	<p>Mr. Marwan Hani Ibrahim Al-Masri Air Traffic Control Officer ATCO/QA&IA Civil Aviation Regulatory Commission Queen Alia Airport</p> <p>Tel: +962-6 445 1672 Mobile: +962 795 990 890 Fax: +962-6 445 1667 Email: marwan.al-masri@carc.gov.jo</p>	<p style="text-align: center;">Same as MEMBER</p>	<p style="text-align: center;">-</p>	<p>Eng. Majed Saltan Dmour Airworthiness Inspector Civil Aviation Regulatory Commission P.O. Box 7547/11110 Amman - JORDAN</p> <p>Fax: (962-6) 487 4710 Tel: (962-6) 489 2282 Ext 3733 Mobile: (962) 77 7413 263 E-mail: majeddmour@carc.gov.jo</p>

STATE	MIDRMA BOARD MEMBER	ALTERNATE	ATC FOCAL POINT	AIRWORTHINESS/FLIGHT OPERATIONS FOCAL POINT
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LEBANON	<p>Mr. Kamal Nassereddine Chief Air Navigation Department Directorate General of Civil Aviation Beirut Airport Beirut – LEBANON</p> <p>Fax: +961-1 629 023 Tel: +961-1 628 178 Mobile: +961 3 331974 +961 71 309409 E-mail: atm@beirutairport.gov.lb</p>	<p>Mr. Tarek Mrad Head Division ACC Directorate General of Civil Aviation (DGCA) Raffic Harriri Int'l Airport Beirut – LEBANON</p> <p>Tel: +961 11 629026 Mobile: +961 3824719 E-mail: intorganisations@beirutairport.gov.lb</p>	<p>Same as ALTERNATE</p>	<p>Dr. Omar Kaddouha Chief of Safety Department Directorate General of Civil Aviation (DGCA) Raffic Harriri Int'l Airport Beirut – LEBANON</p> <p>Tel: +961 1 628185 Mobile: +961 1 629106 Email: okaddouha@beirutairport.gov.lb</p>
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STATE	MIDRMA BOARD MEMBER	ALTERNATE	ATC FOCAL POINT	AIRWORTHINESS/FLIGHT OPERATIONS FOCAL POINT
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STATE	MIDRMA BOARD MEMBER	ALTERNATE	ATC FOCAL POINT	AIRWORTHINESS/FLIGHT OPERATIONS FOCAL POINT
QATAR	<p>Mr. Dhiraj Ramdoyal Head ANS Inspectorate/ SSP Administrator Qatar Civil Aviation Authority</p> <p>Tel: +974445571563 Mob: +97433932711 Email: dhiraj.ramdoyal@caa.gov.qa</p>	<p>Mr. Ramy Saad ANS Inspector Qatar Civil Aviation Authority</p> <p>Tel: +97444571560 Mob: +97430060955 Email: ramy.saad@caa.gov.qa</p>	<p>Mr. Ahmed Al Eshaq Director Air Navigation Civil Aviation Authority P.O. Box 73 - Doha, QATAR</p> <p>Fax: +974-4 4465 6554 Tel: +974-4 4462 2300 Mobile: +974-55 550 440 E-mail: ahmed@caa.gov.qa</p>	<p>AIRWORTHINESS FOCAL POINT: Mr. Majed Al Atawi Director Air Safety Department Qatar Civil Aviation Authority</p> <p>Tel: +97444557252 Mob: +97455558487 Email: majed.alatawi@caa.gov.qa</p> <p>-----</p> <p>FLIGHT OPERATIONS FOCAL POINT: Captain Christos Kalogirou Acting Head of Flight Operations Air Safety Department Civil Aviation Authority P.O. Box 73 - Doha, QATAR</p> <p>Tel: +974-4 4557425 Mobile: +974-33941716 E-mail: christos.kalogirou@caa.gov.qa</p>
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STATE	MIDRMA BOARD MEMBER	ALTERNATE	ATC FOCAL POINT	AIRWORTHINESS/FLIGHT OPERATIONS FOCAL POINT
SUDAN	<p>Mr. Yasir Rabih Hassan Director of ATM Air Navigation Service Sudan Civil Aviation Authority P.O. Box 137 Code 11112 Khartoum - SUDAN</p> <p>Mob: +249 123288253 Tel: +249 912375269 E-mail: yasirrabih20@gmail.com Yasirrabih20@yahoo.com</p>	<p>Mr. Shakir Salah Eldin Mohamed Saeid Air Navigation Service Sudan Civil Aviation Authority P.O. Box 137 Code 11112 Khartoum - SUDAN</p> <p>Mob: +249 123402755 Tel: +249 12320103 E-mail : shakir.caa@gmail.com</p>	<p style="text-align: center;">Same as Alternate</p>	<p>Mr. Mohamed Abduelmaniam Mohamed Yousif Airworthiness Inspector ASD Directorate Sudan Civil Aviation Authority P.O. Box: 165 code 11112 Khartoum - SUDAN</p> <p>Mob: +249 123277974 E-mail: m.a.elmonim@gmail.com m.a.elmonim@scaa.gov.sd mcaasudan@gmail.com</p> <p style="text-align: center;">-----</p> <p>FLIGHT OPERATIONS FOCAL POINT:</p> <p>Mr. Mohiedin Abaker Obeidallah Mohamed Senior Flight Ops. Inspector / Head of AOC Section Sudan Civil aviation Authority , Flight Ops.Directorate. P.O.Box -165</p> <p>Tel: 00249913328034 ,00249123499422 Email: mohielsuki65@gmail.com</p>

STATE	MIDRMA BOARD MEMBER	ALTERNATE	ATC FOCAL POINT	AIRWORTHINESS/FLIGHT OPERATIONS FOCAL POINT
SYRIA	<p>Mr. Ammar Tawil ATCO Damascus Airport P.O. Box 5409 Damascus - SYRIA</p> <p>Fax: +963-11 5400312 Tel: +963-11 5400 312 Mobile: +963-944462249 E-mail: a.tawil@hotmail.com</p>	<p>Mr. Fissal Dayoub ATC SCAA Damascus International Airport</p> <p>Fax: +963-11 5400540 Tel: +963-11 5400312 Mobile: +963 3693807 E-mail: fdayoub@mail.sy</p>	<p style="text-align: center;">Same as MEMBER</p>	<p style="text-align: center;">-</p> <p>Eng. Muhannad Rekab E-mail : muhannadrekab@gmail.com Tel: 00963-994082763 Fax : 00963-5400151</p>
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STATE	MIDRMA BOARD MEMBER	ALTERNATE	ATC FOCAL POINT	AIRWORTHINESS/FLIGHT OPERATIONS FOCAL POINT
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ATTACHMENT A

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	Mr. Mohammed Zainal	Director Aviation Safety and Security & MIDRMA Board Chairman
	Mr. Yaseen Hasan Al Sayed	Director, Air Navigation Systems
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	Mr. Ehab Raslan Mohamed	G.M of R&D
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State	Name	Title
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SUDAN	Mr. Shakir S. M. Algamal	Air Traffic Controller
	Mr. Yasir Rabih Hassan	Director of Air Traffic Management
SYRIA	Mr. Muhammad Salamah	Deputy Director of Air Traffic Management
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	Mr. Faisal Al Khaja	Assistant Manager ANS Safety
	Mrs. Habeeba Ali Al Towaiti	Analyst – Flight Data Quality and Reporting
	Mr. Hamad Mohamed ALMarzooqi	Communication Supervisor
	Mr. Muayyed Al Teneiji	Director Air Traffic Management
YEMEN	Mr. Abdulla Mohammed Othman Alghuzi	Manager of ACC

State	Name	Title
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	Mr. Hussein Hussein Al-Abed	Manager of Air Navigation Operations
	Mr. Ibrahim Mohammed Jaber	ANS Statistics Manager

Org.	Name	Title
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IATA	Mr. Jehad Faqir	Assistant Director Safety & Flight Operations
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	Mr. Fathi Al-thawadi	MIDRMA Officer
	Mr. Amal Jo Antony	Data Analyst
ICAO MID	Mr. Mohamed Smaoui	Acting Regional Director (ARD)
	Mrs. Muna Alnadaf	Regional Officer, Communication, Navigation and Surveillance (RO/CNS)
	Mr. Radhouan Aissaoui	Regional Officer, Information Management (RO/IM)
	Mr. Ahmad Amireh	Regional Officer, Air Traffic Management and Search and Rescue (RO/ATM/SAR)
	Mr. Ahmad Kavehfirouz	Regional Officer, Air Traffic Management (RO/ATM)
	Ms. Dina El Karimy	Technical Assistant (ATM/SAR & ASF)
	Mr. Mohamed Hamed	Marketing Assistant
	Mr. Ayman Ramadan	ICT Assistant