



International Civil Aviation Organization

MIDANPIRG/20 and RASG-MID/10 Meetings

(Muscat, Oman, 14-17 May 2023)

Agenda Item 4.2: RVSM Monitoring and Related Technical Issues

**RVSM AIRSPACE SAFETY ASSESSMENT RESULTS
DURING THE FIFA WORLD CUP 2022 EVENT**

(Prepared by the MIDRMA)

SUMMARY

This information paper presents a safety assessment related to RVSM operations and the traffic growth during the FWC 2022 event.

Action by the meeting is at paragraph 3.

REFERENCES

- ATM SG/8 Report (Amman, Jordan; 7 – 10 November 2022)
- MIDRMA Board/18 meeting Report (Doha, Qatar; 19 – 20 September 2022)
- MID RVSM SMR 2022

1. INTRODUCTION

1.1 The Middle East Regional Monitoring Agency (MIDRMA) is responsible for conducting RVSM risk analysis in the Middle East region, which includes Qatar FIR, the hosting country of the FWC 2022 event. The aim of this report is to present the results of the RVSM risk analysis carried out for the affected FIRs by the traffic growth during the FIFA World Cup (FWC) 2022, held in Doha, Qatar, from 20 November to 18 December 2022.

2. DISCUSSION

2.1 The RVSM risk analysis was conducted using the MIDRMA RVSM Risk Analysis Software (MIDRAS AI Version). The software uses a quantitative approach to calculate the technical values associated with RVSM operations, as well as an overall risk assessment that considers other factors such as operational errors. The analysis covered the affected FIRs in the Middle East region listed in 2.2 for the month November and December 2022.

2.2 The meeting may wish to recall the MIDANPIRG Conclusion 19/2:

MIDANPIRG CONCLUSION 19/2: MID RVSM SMR 2022

That,

- a) States are required to provide the FPL/traffic data for the period 1 June until 30 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.

2.2.1 Reference to b) above only, Bahrain, Iraq, KSA, Oman, UAE and Yemen submitted their RVSM traffic data during the required period while no data received from Kuwait and Iran.

2.3 Results

2.3.1 The results of the RVSM risk analysis for the affected FIRs during the FWC 2022 were overall satisfactory. The technical risk values, which are 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, did not show a significant increase during the event. In addition, 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 calculated values did not reflect a huge increment. This is despite the fact that the traffic growth during the FWC 2022 was well over the estimated levels, which could have potentially increased the risk of RVSM operations.

2.3.2 Th MIDRMA calculated all risk parameters for each individual FIR participated in this study and calculated the hotspots for each FIR with a study of the airway's occupancy.

Note: The MIDRMA is ready to provide high-resolution maps generated by the MIDRAS AI to any member state that is interested in exploring their controlled airspace with more detailed information.

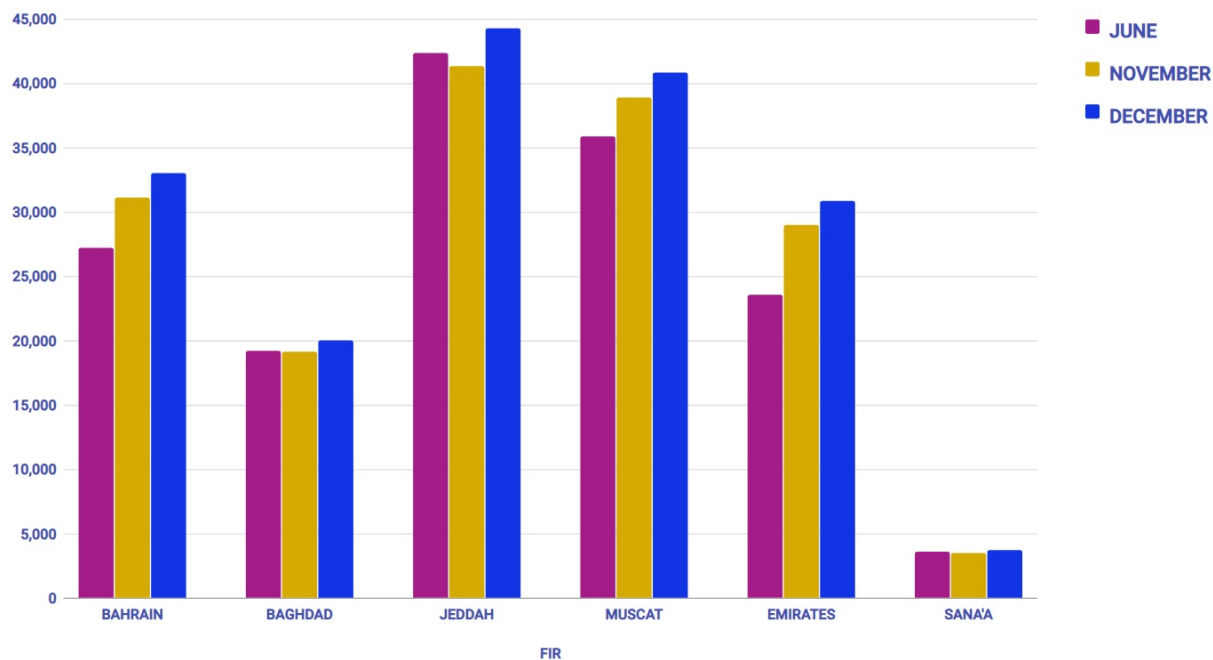
2.3.3 The tables and the graphs below show a comparison of June RVSM TDS which was used for SMR 2022 and the TDS during Nov. and Dec. 2022 for each FIR in 2.2.1.

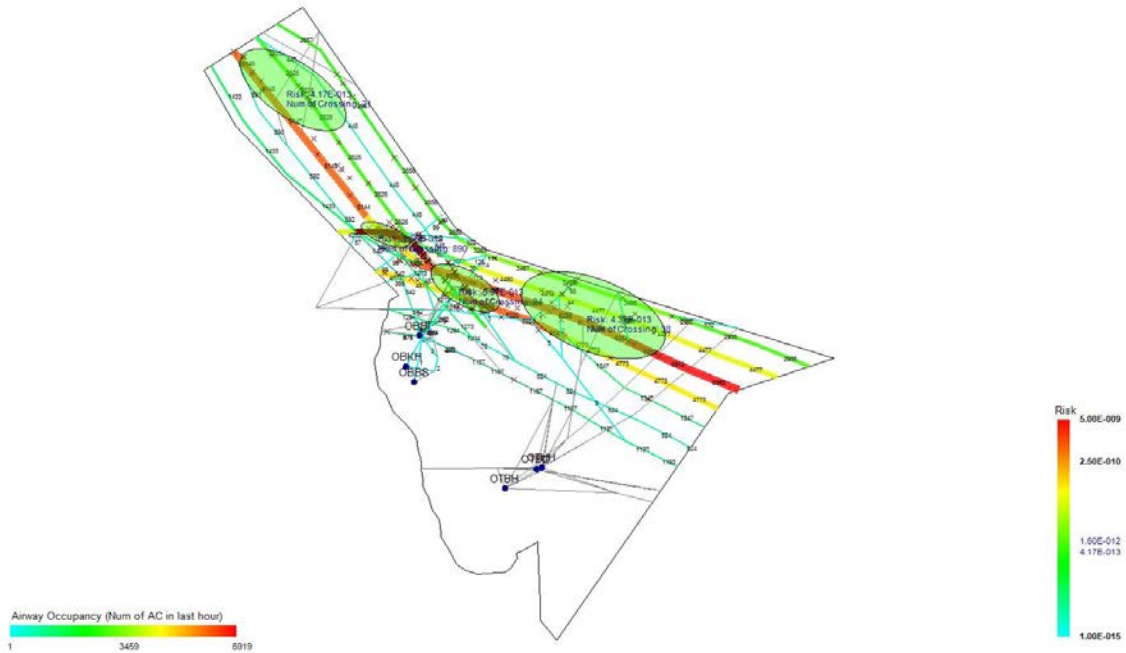
- 3 -

FIR	SMR June 2022 RVSM TDS	Nov 2022 RVSM TDS	Difference in %
Bahrain	27297	31190 ↑	+ 14.3 %
Baghdad	19279	19213 ↓	- 0.4 %
Jeddah	42433	41420 ↓	- 2.4 %
Muscat	35947	38972 ↑	+ 8.4 %
Emirates	23645	29069 ↑	+ 22.9 %
Sana'a	3666	3578 ↓	- 2.4 %

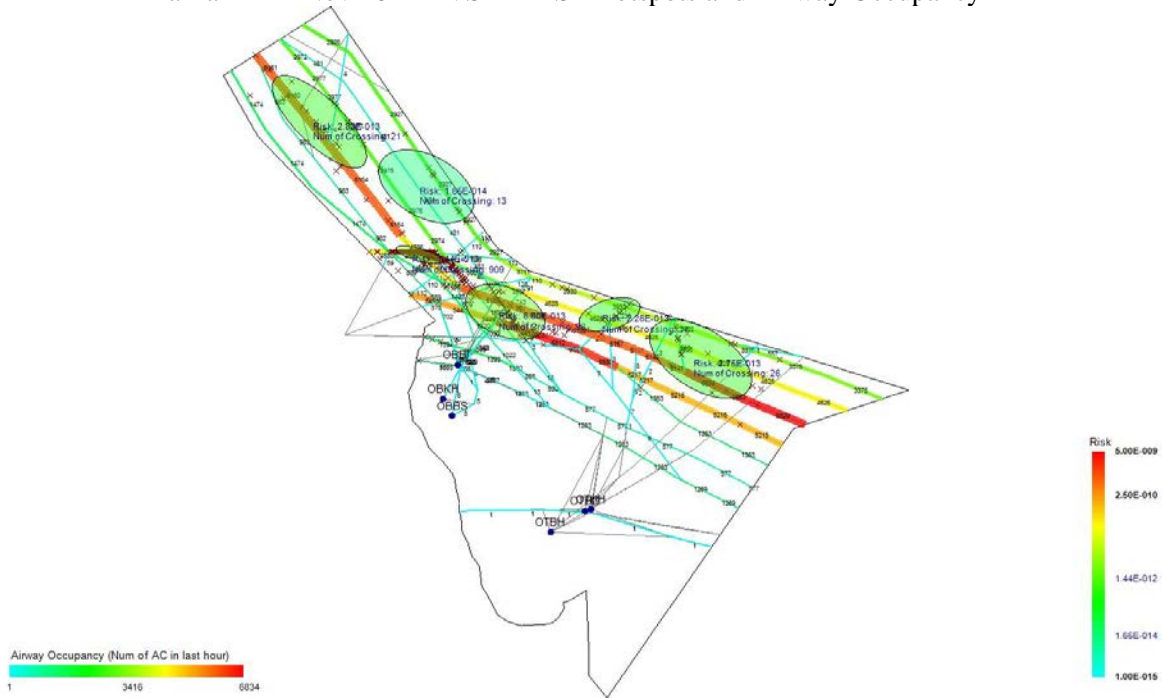
FIR	SMR June 2022 RVSM TDS	Dec 2022 RVSM TDS	Difference in %
Bahrain	27297	33104 ↑	+ 21.3 %
Baghdad	19279	20091 ↑	+ 4.2 %
Jeddah	42433	44351 ↑	+ 4.5 %
Muscat	35947	40914 ↑	+ 13.8 %
Emirates	23645	30939 ↑	+ 30.8 %
Sana'a	3666	3794 ↑	+ 3.5 %

TREND OF THE NUMBER OF RVSM TDS OF JUNE, NOVEMBER AND DECEMBER 2022



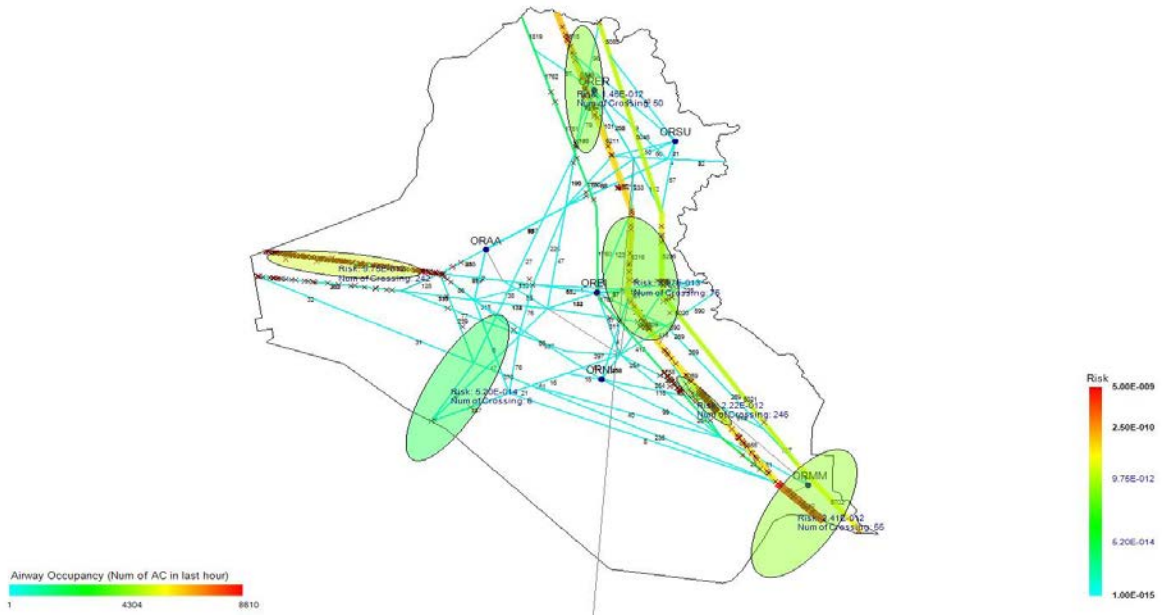


Bahrain FIR Nov 2022 RVSM TDS– Hotspots and Airway Occupancy

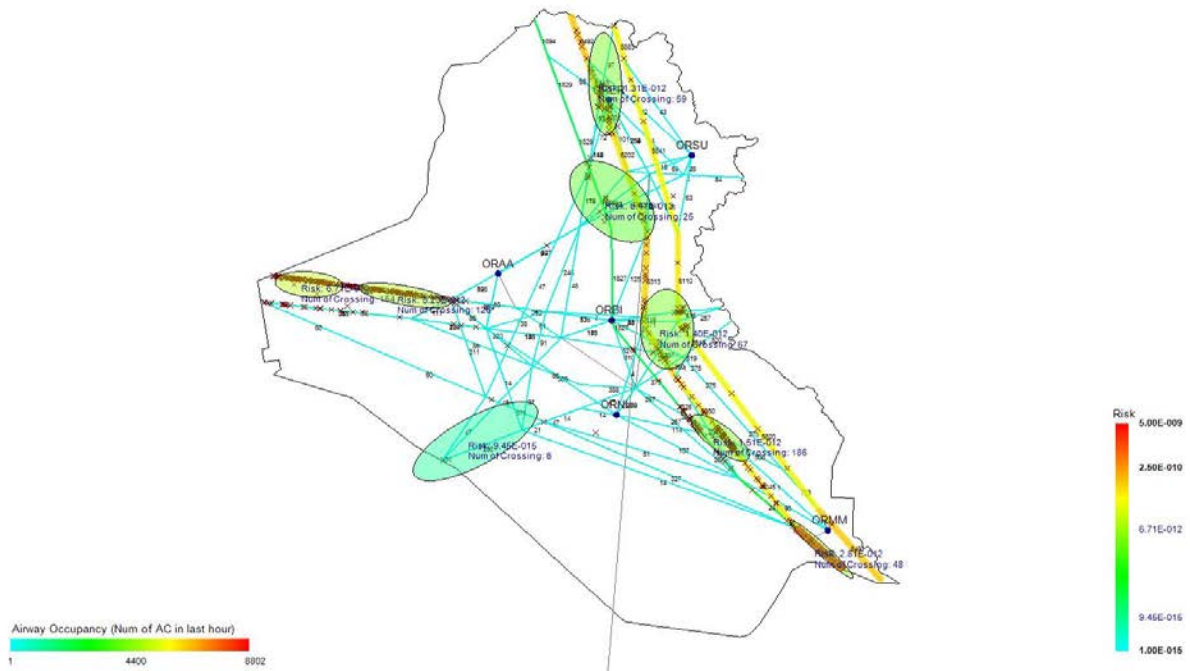


Bahrain FIR Dec 2022 RVSM TDS– Hotspots and Airway Occupancy

Risk Type	Risk Estimation	ICAO/TLS	Remarks
Technical Risk	<p>3.052 x 10⁻¹² (Nov 2022)</p> <p>2.906 x 10⁻¹² (Dec 2022)</p> <p>* The overall risk value is the same value for the technical risk due to No LHD reported for both months</p>	2.5 x 10⁻⁹	Both Values are below ICAO TLS

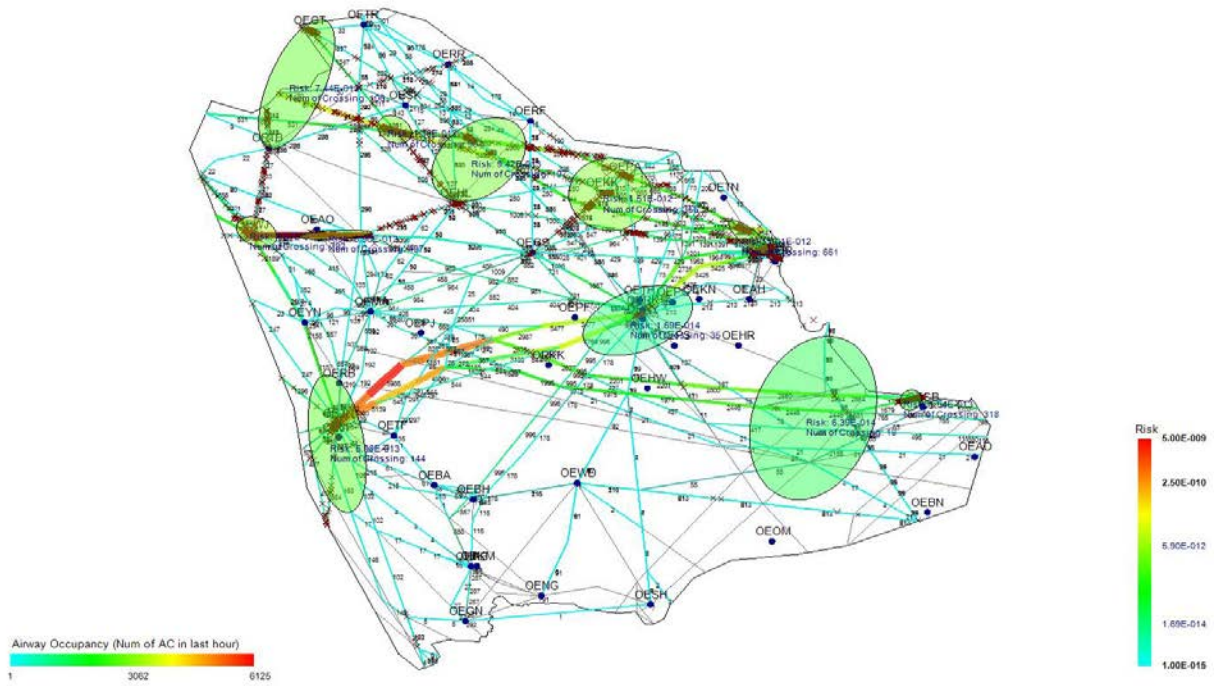


Baghdad FIR Nov 2022 RVSM TDS– Hotspots and Airway Occupancy

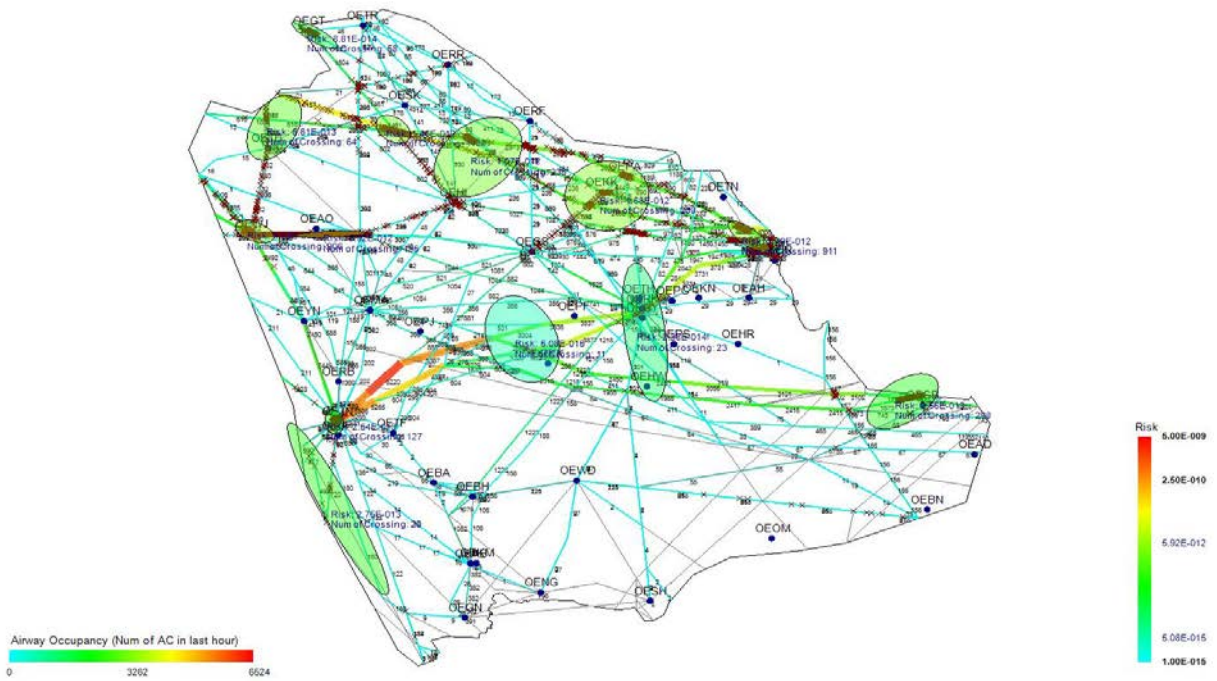


Baghdad FIR Dec 2022 RVSM TDS– Hotspots and Airway Occupancy

Risk Type	Risk Estimation	ICAO/TLS	Remarks
Technical Risk	<p>1.685 x 10⁻¹¹ (Nov 2022)</p> <p>1.962 x 10⁻¹¹ (Dec 2022)</p> <p>* The overall risk value is the same value for the technical risk due to No LHD reported for both months</p>	2.5 x 10⁻⁹	Both Values are below ICAO TLS

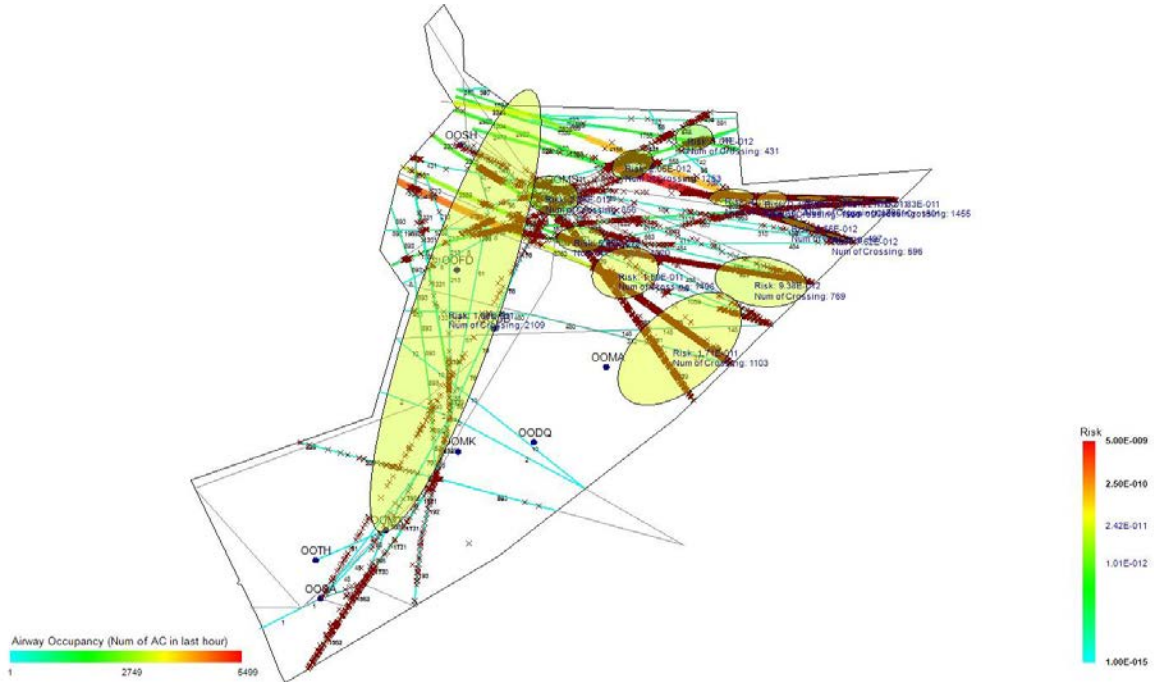


Jeddah FIR Nov 2022 RVSM TDS – Hotspots and Airway Occupancy

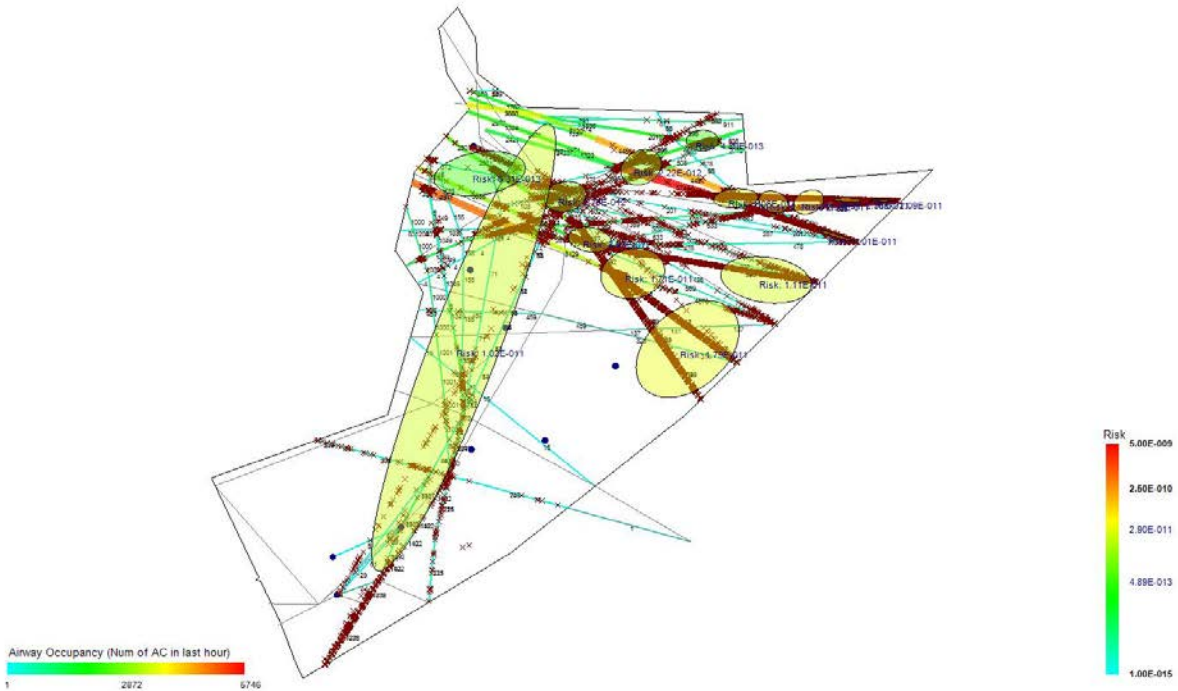


Jeddah FIR Dec 2022 RVSM TDS– Hotspots and Airway Occupancy

Risk Type	Risk Estimation	ICAO/TLS	Remarks
Technical Risk	<p>1.691 x 10⁻¹¹ (Nov 2022)</p> <p>1.772 x 10⁻¹¹ (Dec 2022)</p> <p>* The overall risk value is the same value for the technical risk due to No LHD reported for both months</p>	2.5 x 10⁻⁹	Both Values are below ICAO TLS

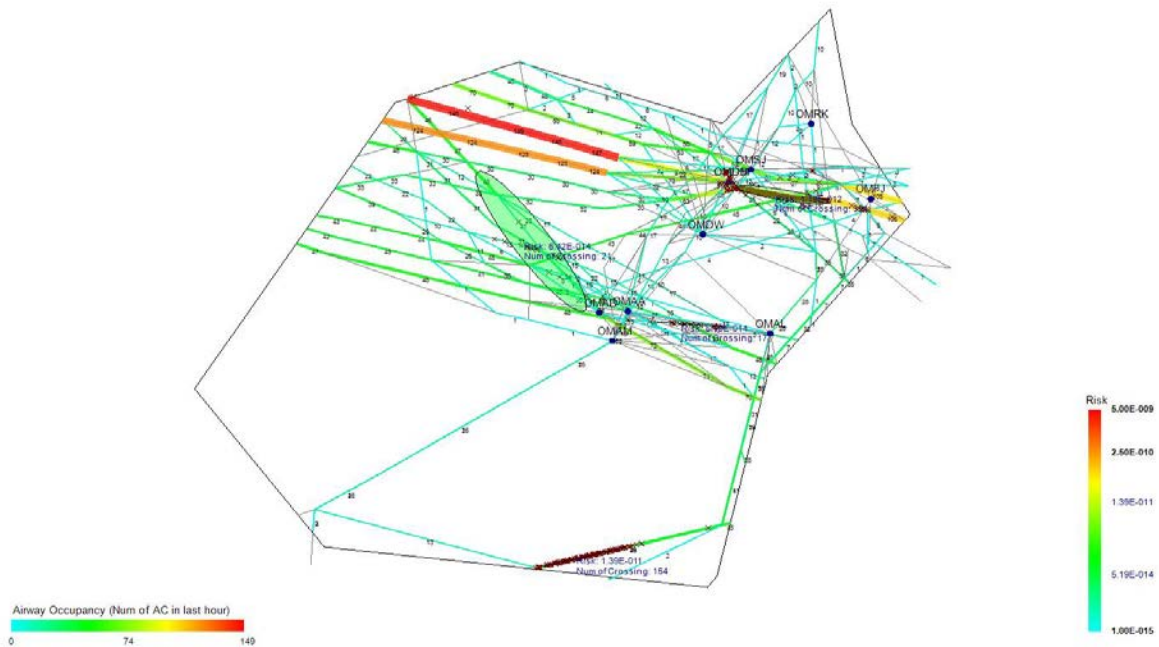


Muscat FIR Nov 2022 RVSM TDS – Hotspots and Airway Occupancy

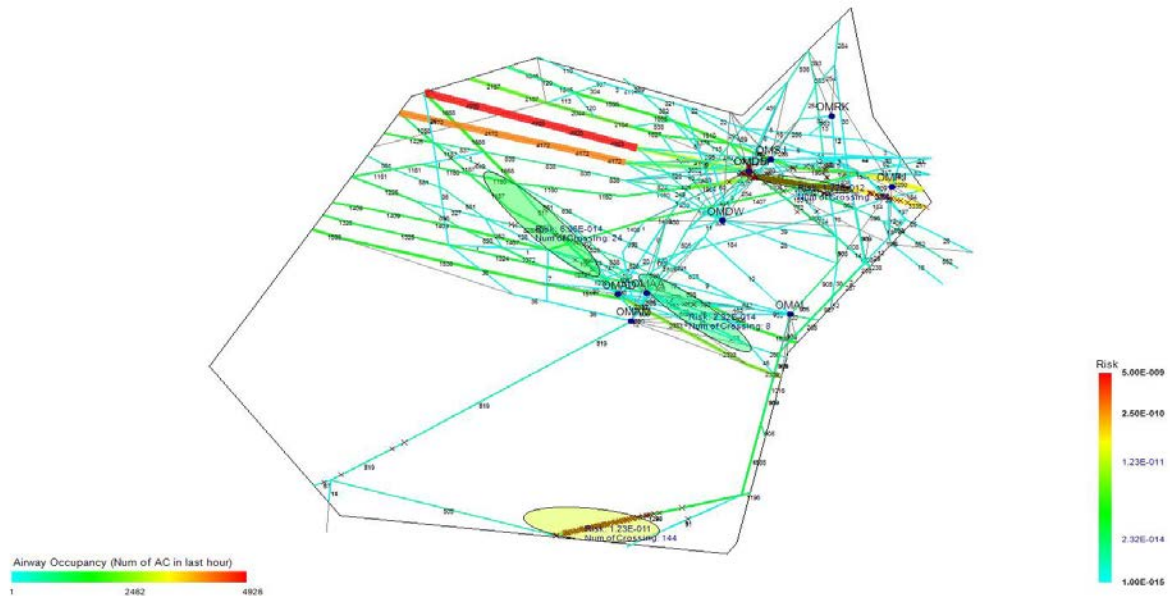


Muscat FIR Dec 2022 RVSM TDS– Hotspots and Airway Occupancy

Risk Type	Risk Estimation	ICAO/TLS	Remarks
Technical Risk	<p>1.766 x 10⁻¹⁰ (Nov 2022)</p> <p>1.877 x 10⁻¹⁰ (Dec 2022)</p> <p>*The overall risk value is the same for the technical risk due to no LHD having a direct impact in the RVSM airspace for both months.</p>	2.5 x 10⁻⁹	Both Values are below ICAO TLS

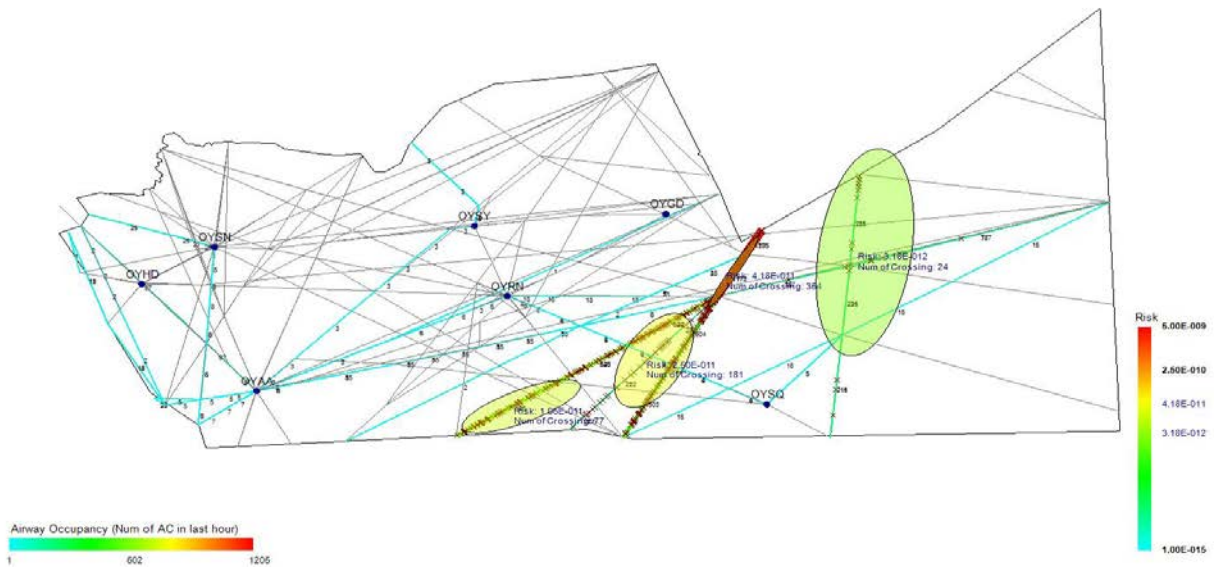


Emirates FIR Nov 2022 RVSM TDS– Hotspots and Airway Occupancy

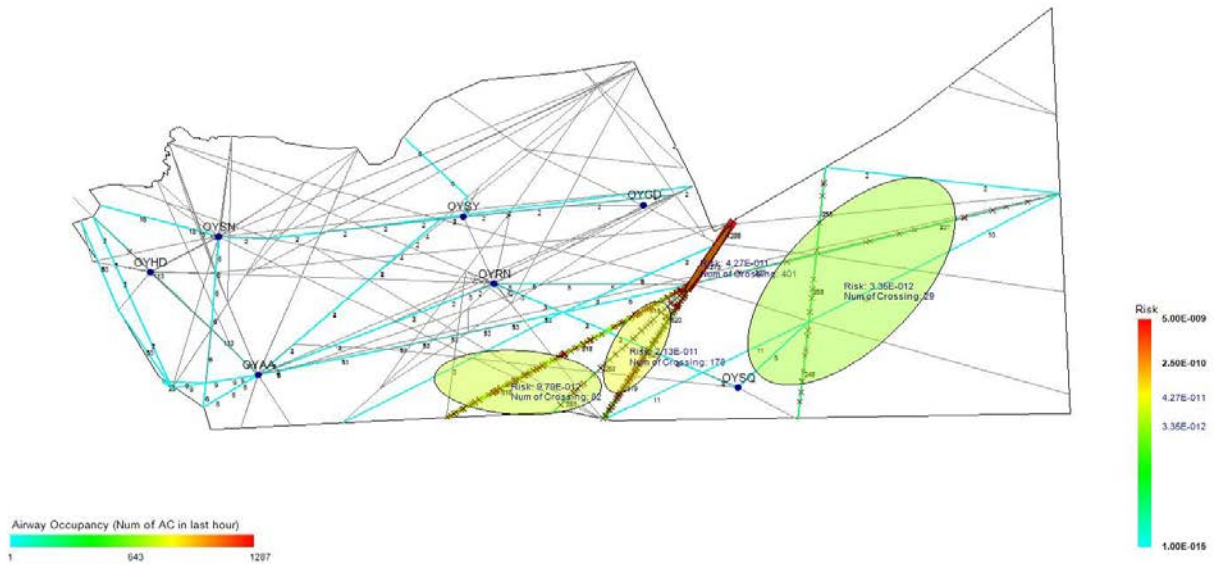


Emirates FIR Dec 2022 RVSM TDS – Hotspots and Airway Occupancy

Risk Type	Risk Estimation	ICAO/TLS	Remarks
Technical Risk	<p>1.525 x 10⁻¹¹ (Nov 2022)</p> <p>1.368 x 10⁻¹¹ (Dec 2022)</p> <p>*The overall risk value is the same for the technical risk due to no LHD having a direct impact in the RVSM airspace for both months.</p>	2.5 x 10⁻⁹	Both Values are below ICAO TLS



Sana'a FIR Nov 2022 RVSM TDS – Hotspots and Airway Occupancy



Sana'a FIR Dec 2022 RVSM TDS– Hotspots and Airway Occupancy

Risk Type	Risk Estimation		ICAO/TLS	Remarks
Technical Risk	8.039 x 10⁻¹¹ (Nov 2022)	7.718 x 10⁻¹¹ (Dec 2022)	2.5 x 10⁻⁹	Both Values are below ICAO TLS
Overall Risk	3.206 x 10⁻¹⁰ (Nov 2022)	3.366 x 10⁻¹⁰ (Dec 2022)	5 x 10⁻⁹	

2.4 Conclusion

2.4.1 The RVSM risk analysis carried out by the MIDRMA for the affected FIRs during the FWC 2022 event, showed satisfactory results. Despite the traffic growth well overestimated, the technical and overall risk values did not reflect a significant increase during the event. This can be attributed to the comprehensive preparations by the affected FIRs and the advanced technologies and equipment used by the involved ATC Units. The results of this analysis provide valuable insights into the safe and efficient operations of RVSM airspace during large-scale events, which can be useful for future planning and risk assessment.

2.4.1 Although there was traffic growth during the event, it was not as much as expected. The MIDRMA believes that there is a significant reason why air traffic during the FWC 2022 event did not match the estimated figures from the study made before the event when compared with the June RVSM TDS. This is primarily due to the large number of aircraft carrying pilgrims to the Kingdom of Saudi Arabia, which occurs in the Middle East region during June 2022 which is a very busy period.

Note 1: The MIDRMA is not aware of the traffic movements below the RVSM airspace, and the calculated results were based on the TDS submitted by each member state in 2.2.1.

Note 2: The absence of TDS from Tehran FIR affects this safety assessment, making it difficult to obtain a clear and complete picture of the risk analysis of the northern part of Doha FIR.

3. ACTION BY THE MEETING

3.1 The meeting is invited to review and to note the results of this assessment.