International Civil Aviation Organization

MIDANPIRG Air Traffic Management Sub-Group

Ninth Meeting (ATM SG/9)
(Sharm El Sheikh, Egypt, 14 – 16 November 2023)

Agenda Item 4: Planning and Implementation issues related to ATM/SAR

RVSM IMPLEMENTATION AND MONITORING

(Presented by the Secretariat)

SUMMARY

This working paper details the preliminary results of the MID RVSM Safety Monitoring Report 2023 and demonstrates, according to the data used, that so far the key safety objectives of the SMR in accordance with ICAO Doc 9574 were met in operational service.

The calculated technical risk of en-route mid-air collision in RVSM airspace is estimated to be **1.019 x 10^{-10}** fatal accidents per flight hour which satisfies the Target Level of Safety and Safety Objective 1. The overall risk of en-route mid-air collision in RVSM airspace is estimated to be **8.408 x 10^{-10}** fatal accidents per flight hour which satisfies the Target Level of Safety and Safety Objective 2. So far, the final conclusions of the data processed have been severely limited by the continued NIL reporting of Large Height Deviations (LHDs) from some member states which does not support a high confidence in this result.

Action by the meeting is in paragraph 3.

REFERENCES

- MIDRMA Board/18 meeting (Doha, Qatar, 19 – 20 September 2022) Report
- MIDRMA Board/19 meeting (Manama, Bahrain, 10 – 11 October 2023) report
- MIDANPIRG/20 & RASG-MID/10 (Muscat, Oman, 14 – 17 May 2023) Report

1. INTRODUCTION

1.1 The Middle East Regional Monitoring Agency (MIDRMA) issues the MID RVSM Safety Monitoring Report (SMR) on an annual basis for endorsement by the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG). This report is expected to provide evidence that, based on the data and methods employed, all safety objectives outlined in the MID RVSM Safety Policy, in accordance with ICAO Doc 9574, continue to be satisfied within operational services. However, for the SMR 2023 edition, MIDRMA is still facing challenges in receiving Traffic Data Samples (TDS) from some Member States. Some of the data was found to be unsuitable for conducting risk analysis and did not conform to the required traffic data format.

1.2 The calculations conducted thus far to assess both ICAO TLS (Technical and Overall) have led MIDRMA to the conclusion that the MID-RVSM airspace so far meets both ICAO TLS for the technical and the overall risk.

2. DISCUSSION

2.1 Preliminary Results of the MID RVSM SMR 2023 (First Draft Version)

2.1.1 Implementation of RVSM should be based on a safety assessment that demonstrates the continued fulfillment of all RVSM safety objectives outlined in the MID-RVSM Safety Policy, in accordance with ICAO Doc 9574, within the operational services of the Middle East RVSM airspace.

2.1.2 The results calculated for the MID RVSM SMR 2023 provide evidence that, based on the data and methods employed, the three safety objectives have been met thus far. However, it is worth noting that the level of reporting of LHD by some member states is unsatisfactory, particularly those with high volumes of traffic. Therefore, the results do not support a high level of confidence, and we shall await further data until the end of this year in 2023, which marks the completion of the SMR reporting cycle.

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 **1.019×10^{-10}** 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 **8.408×10^{-10}** this is below the ICAO overall TLS.

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 Average Aircraft Speed = **440.3 kts**			
Risk Type	**Risk Estimation**	**ICAO TLS**	**Remarks**
Technical Risk	**1.019×10^{-10}**	**2.5×10^{-9}**	**Below ICAO TLS**
Overall Risk	**8.408×10^{-10}**	**5×10^{-9}**	**Below ICAO TLS**

Conclusions:

(i) The estimated risk of collision associated with aircraft height- keeping performance is **1.019 x 10^{-10}** and meets the ICAO TLS of **2.5 x 10^{-9}** fatal accidents per flight hour (RVSM Safety Objective1).

(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 **8.408 x 10^{-10}**this value is below the ICAO overall TLS of 5**x10^{-9}** fatal accidents per flight hour (RVSM Safety Objective 2)

(iii) based on currently available information (Except for Tripoli, Khartoum, and Beirut FIRs), there is no evidence available to MIDRMA that the continued operations of RVSM adversely affects the overall vertical risk of collision in the first nine months of the SMR reporting cycle.

(iv) 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, The final conclusions of the data processed so far have been severely limited by the continued NIL reporting of Large Height Deviations (LHDs) from some members which does not support a high confidence in the result, the MIDRMA is reiterating the importance of submitting such reports especially from FIRs with high volume of traffic.

2.1.3 The MIDRMA continuously stressed the importance of all MIDRMA member states to submit the required data to adequately assess and calculate all relevant safety parameters and factors, however the MIDRMA still suffers problems with some member States due to the late submission of the traffic data and due to the corrupted data, which caused excessive delay for calculating the SMR safety parameters.

2.1.4 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*
			Doha			

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

***Note: Beirut and Khartoum FIRs excluded from the RVSM safety analysis due to lack of TDS, while Tripoli FIR excluded due to lack of their routing options.**

2.1.5 The details of the preliminary results of SMR2023 are at **Appendix A**.

2.1.6 The meeting may wish to note the new function of the MIDRAS software has been delivered, particularly, the Airway occupancy rate; the analysis of the MID Region FIR started to be delivered and will be presented to ATM SG meeting along with the annual SMR results, sample of the Airway occupancy is at **Appendix B**.

2.1.7 The meeting may wish to note the results of the study conducted by the MIDRMA for the implementation of ADS-B for height monitoring (a detailed paper was presented to the MIDRMA Board/19 meeting), and accordingly, the plan proposed to the MIDRMA Board/19 meeting, the Board meeting agreed to the following Draft Decision:

DRAFT DECISION 19/X: MID ADS-B HEIGHT MONITORING SYSTEM (MID AHMS)

That,

a) States implementing ADS-B to share the archived data with the MIDRMA for evaluation and analysis;

b) MIDRMA to coordinate with MAAR for:

i. sharing their experience in evaluating and analyzing samples of the received ADS-B data; and

ii. providing required training related to AHMS implementation for MIDRMA Staff.

c) MIDRMA to develop a mechanism and tools for submitting the ADS-B data by States;

d) MIDRMA provides the required training for CNS engineers from member states responsible for extracting ADS-B data from their systems and submitting it to MIDRMA at regular, mutually agreed intervals;

e) MIDRMA to develop and document all required processes and procedures to be reflected in the training Manuals for the AHMS implementation, to be incorporated in the MIDRMA Tasks and responsibilities;

f) MIDRMA shall continue to provide GMU monitoring service until the AHMS is fully operational, and for the Aircraft not included in the MID-AHMS; and

g) the funding mechanism (including services charges) might be revised accordingly (based on cost -recovery basis). In accordance with ICAO Policies on charges for Airports and Air Navigation Services (Doc 9082), in coordination with IATA.

2.2 The meeting may wish to note that the MIDRMA Sustainability Action Group (MSAG) has conducted 5 virtual meetings. to develop a Strategic Plan for the MIDRMA to ensure business continuity and Sustainability. The MSAG developed a document, including the anticipated technical and managerial issues for the coming 6 years (period from 2024 to 2030).

2.3 The MIDRMA Board/19 meeting reviewed the documents and agreed to the following:

a) There is a need to further enhancement to the MIDRMA Training Plan to ensure succession of knowledge and expertise of the Staff, by covering all the assigned task and responsibilities to the MIDRMA including ICT requirements.

b) The need to include the newly introduced technologies related to implementation of ADS-B Height Monitoring System (AHMS), including the current capabilities and required additional resources; subject to the discussion of WP/11 of this meeting.

2.4 The MIDRMA Board/19 meeting appreciated the progress made in the development of the initial version of the document and agreed on the need for further development of the plan. Including in the criteria the following: Duties and responsibilities: best practices. And the establishment and enhancement of the training manual.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) review and discuss the preliminary results of the MID RVSM SMR 2023;

b) request Oman to provide and update on the coordination with Mumbai ACC and to outline the actions taken (including progress made in connecting OLDI/AIDC) to close the RVSM safety protocol;

c) discuss the progress of closing the RVSM Safety Protocol in Sanaa FIR;

d) encourage Member States, apart from those already doing so, to submit their RVSM Traffic Data Samples (TDS) on a monthly basis. This submission will facilitate the assessment of non-RVSM approved aircraft operating within the MID RVSM airspace; and include States did not submit the RVSM TDS submitted in the Mid-Air Navigation Deficiency Database (MANDD);

e) encourage States to share their archived ADS-B data with the MIDRMA for RVSM height monitoring (AHMS); and

f) note the progress related to the MIDRMA Sustainability Action Group; encourage States to provide support to the activities of the Action Group.

Preliminary Results of the MID RVSM SMR 2023 (First Draft Version)

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1.2 The results calculated for the MID RVSM SMR 2023 provide evidence that, based on the data and methods employed, the three safety objectives have been met thus far. However, it is worth noting that the level of reporting of LHD by some member states is unsatisfactory, particularly those with high volumes of traffic. Therefore, the results do not support a high level of confidence, and we shall await further data until the end of this year in 2023, which marks the completion of the SMR reporting cycle.

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

***Note: Beirut and Khartoum FIRs excluded from the RVSM safety analysis due to lack of TDS, while Tripoli FIR excluded due to lack of their routing options.**

1.5 The Data Sampling periods covered by SMR 2023 are as displayed in the below table

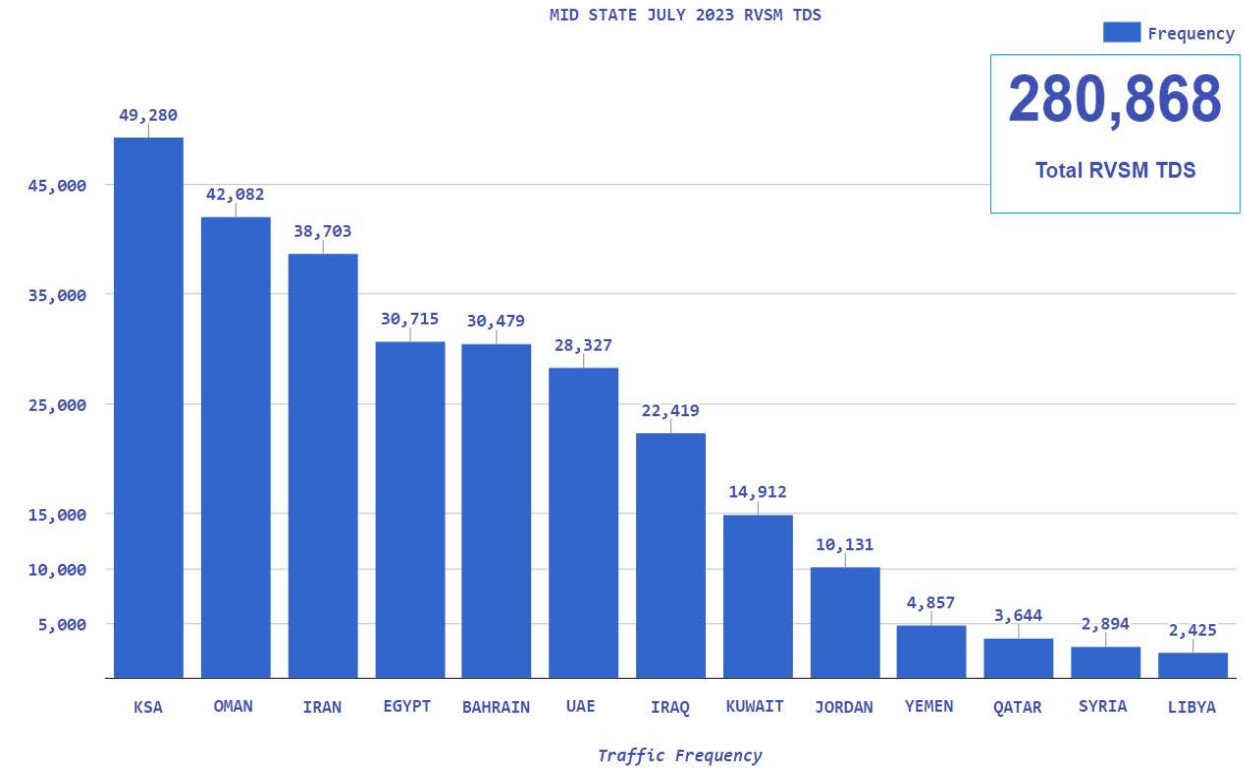
Report Elements	Time Period

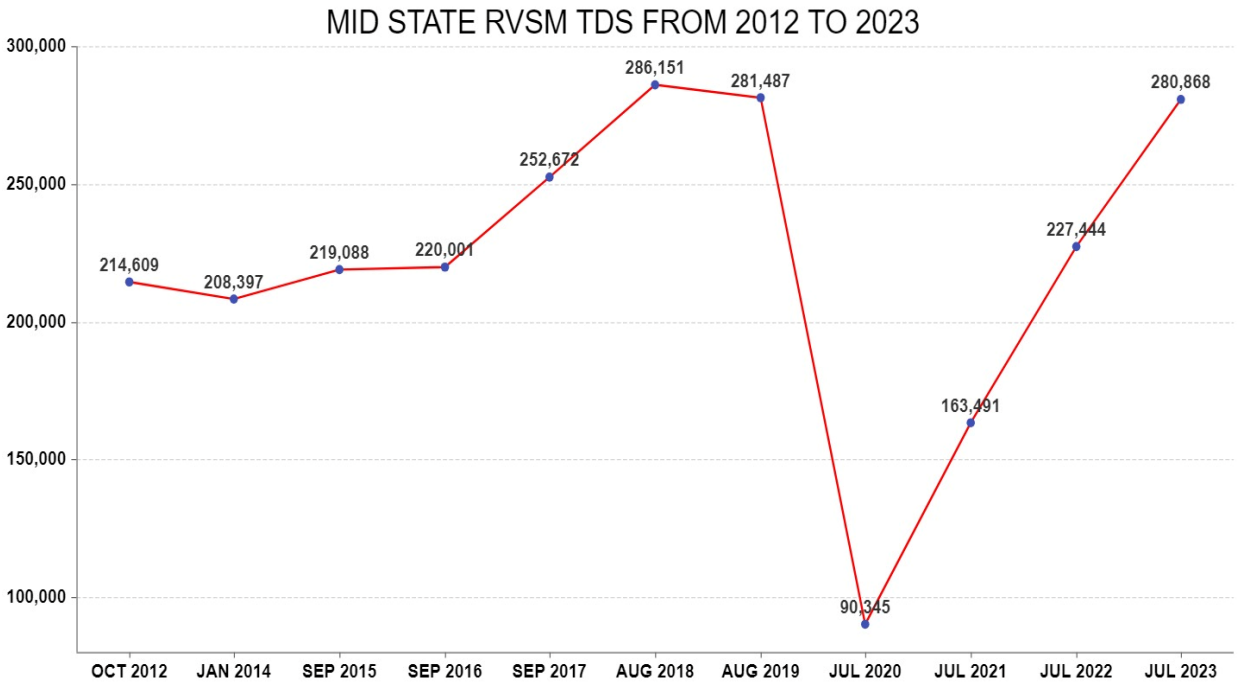
Traffic Data Sample	01/06/2023 - 30/06/2023
Operational & Technical Errors	01/01/2023 - 30/09/2023

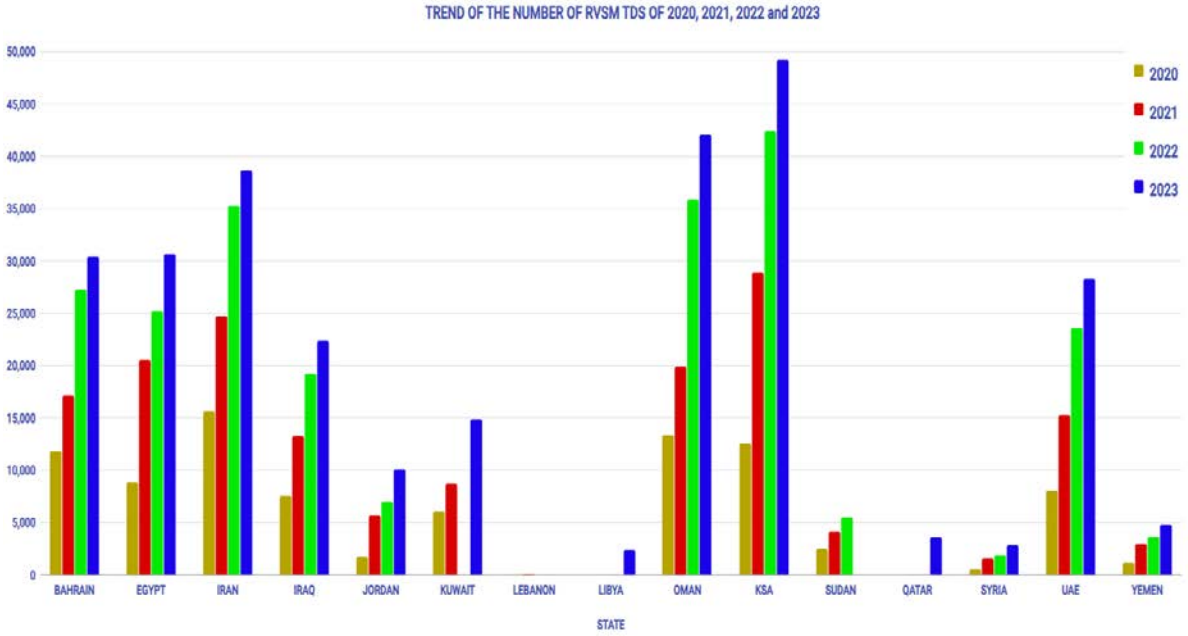
1.6 The descriptions of the traffic data collected from each MIDRMA Member State are depicted in table below:

MID States	No. of Flights	Received Date	Status
BAHRAIN	30479	2023-07-09	
EGYPT	30715	2023-08-06	
IRAN	38703	2023-09-25	
IRAQ	22419	2023-07-07	
JORDAN	10131	2023-07-05	
KUWAIT	14912	2023-07-03	
LEBANON			No Data Submitted
LIBYA	2425	2023-08-01	
OMAN	42083	2023-07-30	
KSA	49280	2023-08-01	
QATAR	3644	2023-08-07	
SUDAN			No Data Submitted
SYRIA	2894	2023-07-12	
UAE	28327	2023-07-25	
YEMEN	4857	2023-08-02	
Total	**279656**		

JUNE 2023 TDS Statistics


MID STATE JULY 2023 RVSM TDS
Frequency
280,868
Total RVSM TDS
49,280
42,082
38,703
30,715
30,479
28,327
22,419
14,912
10,131
4,857
3,644
2,894
2,425
45,000
35,000
25,000
15,000
10,000
5,000
KSA
OMAN
IRAN
EGYPT
BAHRAIN
UAE
IRAQ
KUWAIT
JORDAN
YEMEN
QATAR
SYRIA
LIBYA
Traffic Frequency


MID STATE RVSM TDS FROM 2012 TO 2023
300,000
250,000
200,000
150,000
100,000
214,609
208,397
219,088
220,001
252,672
286,151
281,487
90,345
163,491
227,444
280,868
OCT 2012
JAN 2014
SEP 2015
SEP 2016
SEP 2017
AUG 2018
AUG 2019
JUL 2020
JUL 2021
JUL 2022
JUL 2023



2 Large Height Deviation Reports (LHDs) 2023

2.1 The estimation of the total risk, encompassing Safety Objective 2, integrates the outcomes of Safety Objective 1 with the evaluation of risks originating from various other factors. This secondary component, often referred to as operational risk, is contingent on a multitude of factors, including airspace configuration, traffic density, ATC procedures, individual controller and pilot actions, and specific operational characteristics of sectors. The assessment of operational risk relies on the analysis of event magnitude and duration extracted from operational incident reports, which are subsequently transformed into Large Height Deviation reports.

2.2 MIDRMA has observed a decrease in Large Height Deviation (LHD) reporting from certain member states, particularly those with high traffic volumes, despite the continuous issuance of monthly reminders to all member states. The level of reporting has remained exceedingly low. The table below illustrates the reports received from all member states for the period from January 1st to September 30th, 2023.

MID FIRs	No. of Reported LHDs	No. of Related LHDs
Bahrain	-	-
Baghdad	1	-
Amman	2	2
Tehran	-	-
Cairo	24	10
Damascus	-	1
Khartoum	1	4
Kuwait	-	-
Muscat	68	33

Jeddah/ Riyadh	9	59
Tripoli	-	-
Emirates	4	4
Sana'a	136	8

Large Height Deviation Received from Member States
from 01st Jan 2023 until 30th Sep 2023

Note: In reference to the table above in 2.2.2, there are member states that didn't report any LHD for a long time, such as Bahrain, Kuwait, and Iran, while Iraq ATC reported only ONE LHD since the beginning of 2023.

2.3 Despite the fact that MIDRMA Member States have submitted a small number of LHD reports to date, and considering that the SMR cycle has not yet been completed (with three more months remaining), there is a possibility that the results presented for Safety Objective No. 2 could change if critical LHD reports are submitted.

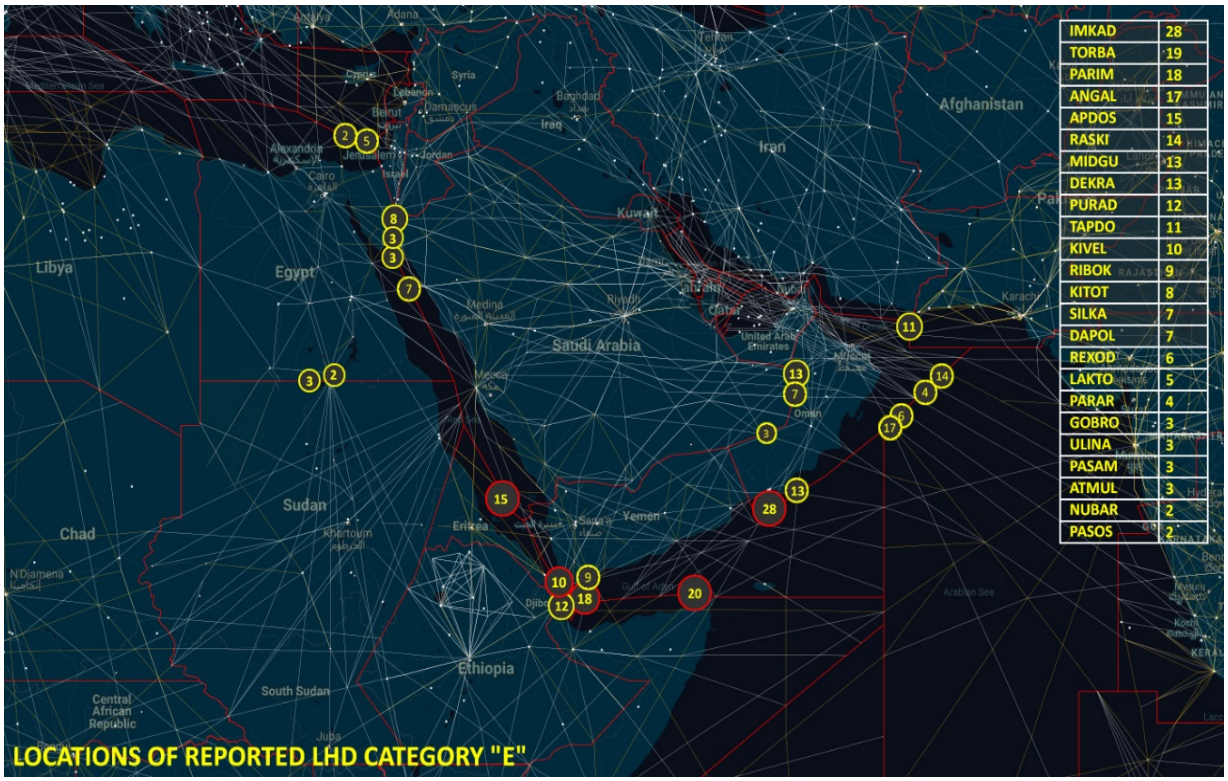
Note: The extreme majority of the received LHD reports are related to ATC transfer of control coordination errors due to human factors (Cat. E) and did not have severe impact on the RVSM airspace operations.

2.4 The table below provides a summary of operational risk associated with Large Height Deviation (LHD) reports, categorized by LHD categories. These reports are used to calculate the overall vertical collision risk, which is presented for Safety Objective No. 2.

LHD Cat.	**Large Height Deviation (LHD) Categories**	**No. of LHDs**	**LHD Duration (Sec.)**
A	Flight crew fails to climb or descend the aircraft as cleared	-	-
B	Flight crew climbing or descending without ATC clearance	-	-
C	Incorrect operation or interpretation of airborne equipment	4	**65**
D	ATC system loop error	5	**280**
E	ATC transfer of control coordination errors due to human factors	-	-
F	ATC transfer of control coordination errors due to technical issues	-	-
G	Aircraft contingency leading to sudden inability to maintain level	-	-
H	Airborne equip. failure and unintentional or undetected FL change	-	-
I	Turbulence or other weather-related cause	1	**10**
J	TCAS resolution advisory and flight crew correctly responds	-	-
K	TCAS resolution advisory and flight crew incorrectly responds	-	-
L	ACFT being provided with RVSM separation is not RVSM approved	-	-
M	Other		
	Total	10	**355**

Summary of Operational Risk associated with Large Height Deviation Reports

2.5 During the last MIDRMA Board meeting, MIDRMA highlighted the issue of non-responsiveness to the received Large Height Deviation (LHD) reports, particularly in relation to the feature allowing direct responses to the reporting unit. This feature is crucial for ensuring that all responses are properly documented and can be readily referenced when necessary. Regrettably, the vast majority of Member States persist in neglecting the utilization of this feature and do not make the effort to investigate and provide replies to the LHD reports they receive.



3 RVSM Safety Protocol at the Eastern Boundaries of Muscat FIR and the increased Number of LHD reports submitted by Mumbai ATCU related to Muscat ATCU:

3.1 MIDRMA has maintained its vigilance in monitoring the Large Height Deviation (LHD) reports along the eastern boundaries of Muscat FIR, as filed by Mumbai and Muscat ACCs. The MIDRMA wishes to bring to the meeting's attention the ongoing status of the Muscat/Mumbai RVSM safety protocol, which has remained open since 2017. It is imperative that a decision be made to close this protocol, given that the associated risks should either be eliminated or reduced to the absolute minimum. Regrettably, MIDRMA does not perceive this happening without confirmation of the installation of OLDI/AIDC systems in both ACCs.

3.2 In **Attachment A** of this working paper, a comprehensive account of Large Height Deviation (LHD) reports, as filed by both Air Traffic Control Units (ATCUs), from January 1st to August 31st, 2023, is provided. It is noteworthy that a significant and abrupt surge in LHD reporting from Mumbai related to Muscat, has been observed during this period. In light of this development, an official communication has been initiated with the Muscat Air Traffic Control, seeking an explanation for the underlying causes behind this sudden escalation. Furthermore, Oman has been formally requested to outline the corrective measures undertaken to address this longstanding issue.

3.3 The table below provides a comparison of the number of LHD reports submitted by Mumbai and Muscat ATCUs in 2022 and 2023.

YEAR	LHD Reported by Muscat	LHD Reported by Mumbai
2022	16	41
2023	25	79

4 RVSM Safety Protocol between Sanaa and Mogadishu FIRs.

4.1 The MIDRMA Board/18 has decided to open an RVSM Safety Protocol between Sanaa and Mogadishu FIRs in response to the increasing number of LHD reports submitted by Sana'a ACC related to Mogadishu and to its neighbouring FIRs. It is worth noting that the first coordination meeting, organized by ICAO MID and attended by ICAO ESAF ARMA, MIDRMA, IATA and relevant ATM representatives near the Horn of Africa, discussed the surge in LHD reports from Sana'a ACC concerning its neighbouring FIRs. During this meeting, the ATM representatives attended this meeting were briefed of the escalating risk associated with the rising number of LHD reports and their impact on the overall ICAO TLS within the MID region. They were urged to promptly implement corrective measures to resolve this problem as soon as possible.

4.2 The table below displays all the LHD reports filed by Sanaa ACC related to its neighbouring ACCs, indicating a significant decrease in the number of reports compared to the year 2022.

4.3 No LHD reports were filed by Sanaa related to Mogadishu from January 1st until September 30th, 2023. Therefore, MIDRMA sees no reason to keep the safety protocol open and requests to close it.

Months	Addis Ababa	Asmara	Mogadishu	Djibouti	Jeddah	Mumbai	Muscat	Total
1-2023	1	0	0	2	1	1	9	14
2-2023	2	1	0	0	3	4	3	13
3-2023	0	1	0	4	3	0	16	24
4-2023	2	2	0	2	1	3	2	12
5-2023	2	2	0	2	1	0	0	7
6-2023	2	5	0	2	5	1	0	15
7-2023	3	10	0	2	6	4	0	25
8-2023	4	3	0	5	3	3	0	18
9-2023	3	0	0	1	2	1	1	8
Total Report	19	24	0	20	25	17	31	136

5 Assessment of Non-RVSM Approved Aircraft 2023

5.1 The MIDRMA, in accordance with its role as a Regional Monitoring Agency (RMA), as specified in ICAO Doc 9937 and 9574, conducts systematic reviews to assess operator compliance with State

RVSM approvals within the ICAO Middle East Region. This essential function is carried out to safeguard the safety of the RVSM airspace by identifying aircraft that operate within it without the required approvals.

5.2 While it would be ideal to conduct daily compliance monitoring across the entire ICAO Middle East airspace, challenges in collecting traffic information render this impractical. In alignment with the guidelines set forth in ICAO Doc 9937, the responsible RMA is mandated to monitor full airspace compliance for a minimum of 30 days annually. In fulfilling this obligation, MIDRMA conducts monthly assessments.

5.3 MIDRMA relies on RVSM traffic data from Bahrain, Baghdad, and Emirates FIRs as the primary source for monitoring non-RVSM approved aircraft within its area of responsibility. This approach is necessitated by the challenge of obtaining monthly traffic data from all Member States. In light of this, MIDRMA wishes to express its sincere appreciation to the Bahrain Civil Aviation Authority, the Iraq Civil Aviation Authority, and the UAE General Civil Aviation Authority for their unwavering commitment to providing their FIRs' RVSM traffic data on a monthly basis. The data received from these Member States is consistently comprehensive and conforms to the required format. And invites the other Member States to provide similar information on regular basis.

5.4 The tables in **Attachment B** of this working paper reflect the MIDRMA Bulletin of Non-RVSM Approved aircraft observed operating within the ICAO MID RVSM airspace and within the RVSM airspace of other RMAs. The expectation derived from this analysis is that States exercising operational authority will take proactive steps to address approval issues well in advance, ensuring that approved aircraft operate within the RVSM airspace. This proactive approach aims to prevent undesirable actions against legitimate operators. Furthermore, it is expected that States encountering such aircraft operating within their airspace will take appropriate measures.

Attachment A

LHD Reports Submitted by Muscat related to Mumbai

#	ID	Date of Occ	Reported By	Related to	Location	Nature of the occurrence:	Category
1	11226	Mar 03, 2023	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
2	11227	Mar 03, 2023	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
3	11228	Apr 04, 2023	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
4	11229	Apr 04, 2023	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
5	11230	Apr 04, 2023	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
6	11231	Apr 07, 2023	Muscat	Mumbai	KITAL	ACFT Entered FIR Without Coordination	E
7	11232	Apr 12, 2023	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
8	11375	Aug 03, 2023	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
9	11376	Aug 04, 2023	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
10	11377	Aug 05, 2023	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
11	11378	Aug 06, 2023	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
12	11379	Aug 07, 2023	Muscat	Mumbai	REXOD	Revised FL Not Coordinated	E
13	11380	Aug 08, 2023	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
14	11381	Aug 09, 2023	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
15	11382	Aug 09, 2023	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E
16	11383	Aug 10, 2023	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
17	11384	Aug 12, 2023	Muscat	Mumbai	REXOD	Revised FL Not Coordinated	E
18	11385	Aug 16, 2023	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
19	11386	Aug 18, 2023	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
20	11387	Aug 19, 2023	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E
21	11388	Aug 22, 2023	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
22	11389	Aug 28, 2023	Muscat	Mumbai	PARAR	ACFT Entered FIR Without Coordination	E
23	11390	Aug 30, 2023	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E
24	11391	Aug 30, 2023	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
25	11392	Aug 30, 2023	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E

LHD Reports Submitted by Mumbai related to Muscat

#	ID	Date of Occ	Reported By	Related to	Location	Nature of the occurrence	Category
1	LHD001819	06/01/2023	Mumbai	Muscat	KITAL	No or late estimate time revision	E
2	LHD001820	15/01/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
3	LHD001859	02/02/2023	Mumbai	Muscat	BIBGO	No transfer information (i.e. 'negative transfer')	E
4	LHD001863	08/02/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
5	LHD001864	14/02/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
6	LHD001865	16/02/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
7	LHD001866	19/02/2023	Mumbai	Muscat	PARAR	No transfer information (i.e. 'negative transfer')	E
8	LHD001867	10/03/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
9	LHD001868	14/03/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
10	LHD001869	16/03/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
11	LHD001870	16/03/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
12	LHD001877	16/03/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
13	LHD001878	19/03/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
14	LHD001879	20/03/2023	Mumbai	Muscat	LOTAV	No transfer information (i.e. 'negative transfer')	E
15	LHD001880	24/03/2023	Mumbai	Muscat	PARAR	No or late route revision	E
16	LHD001881	24/03/2023	Mumbai	Muscat	PARAR	No or late route revision	E
17	LHD001882	24/03/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
18	LHD001883	24/03/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
19	LHD001884	24/03/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
20	LHD001885	26/03/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
21	LHD001886	29/03/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
22	LHD001887	31/03/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
23	LHD001963	08/04/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
24	LHD001964	17/04/2023	Mumbai	Muscat	SAPNA	No transfer information (i.e. 'negative transfer')	E
25	LHD001965	18/04/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
26	LHD001966	27/04/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
27	LHD001967	30/04/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
28	LHD002011	04/05/2023	Mumbai	Muscat	RASKI	No transfer information (i.e. 'negative transfer')	E
29	LHD002012	13/05/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
30	LHD002013	18/05/2023	Mumbai	Muscat	ANGAL	No or late FL revision	E
31	LHD002014	23/05/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
32	LHD002015	25/05/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
33	LHD002016	25/05/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
34	LHD002017	30/05/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
35	LHD002018	31/05/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
36	LHD002019	06/06/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
37	LHD002020	19/06/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
38	LHD002021	23/06/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
39	LHD002022	26/06/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E

40	LHD002038	04/07/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
41	LHD002039	05/07/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
42	LHD002040	21/07/2023	Mumbai	Muscat	PARAR	No transfer information (i.e. 'negative transfer')	E
43	LHD002041	26/07/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
44	LHD002042	29/07/2023	Mumbai	Muscat	ORLID	No or late estimate time revision	E
45	LHD002043	29/07/2023	Mumbai	Muscat	ORLID	No or late estimate time revision	E
46	LHD002091	05/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
47	LHD002092	07/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
48	LHD002093	08/08/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
49	LHD002094	10/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
50	LHD002095	13/08/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
51	LHD002096	14/08/2023	Mumbai	Muscat	PARAR	No transfer information (i.e. 'negative transfer')	E
52	LHD002097	15/08/2023	Mumbai	Muscat	TOTOX	No or late estimate time revision	E
53	LHD002098	15/08/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
54	LHD002099	16/08/2023	Mumbai	Muscat	ORLID	No transfer information (i.e. 'negative transfer')	E
55	LHD002101	17/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
56	LHD002102	17/08/2023	Mumbai	Muscat	REXOD	No or late FL revision	E
57	LHD002103	18/08/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
58	LHD002104	19/08/2023	Mumbai	Muscat	ORLID	No or late estimate time revision	E
59	LHD002105	20/08/2023	Mumbai	Muscat	RASKI	No or late estimate time revision	E
60	LHD002106	20/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
61	LHD002107	20/08/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
62	LHD002108	21/08/2023	Mumbai	Muscat	KITAL	No or late estimate time revision	E
63	LHD002109	22/08/2023	Mumbai	Muscat	ANGAL	No transfer information (i.e. 'negative transfer')	E
64	LHD002110	23/08/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
65	LHD002111	23/08/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
66	LHD002112	23/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
67	LHD002113	23/08/2023	Mumbai	Muscat	TOTOX	No or late FL revision	E
68	LHD002114	24/08/2023	Mumbai	Muscat	ORLID	No or late FL revision	E
69	LHD002115	24/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
70	LHD002116	24/08/2023	Mumbai	Muscat	ORLID	No or late FL revision	E
71	LHD002117	24/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
72	LHD002118	25/08/2023	Mumbai	Muscat	KITAL	No or late FL revision	E
73	LHD002119	25/08/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
74	LHD002120	25/08/2023	Mumbai	Muscat	RASKI	No or late estimate time revision	E
75	LHD002121	27/08/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
76	LHD002122	29/08/2023	Mumbai	Muscat	LOTAV	No or late FL revision	E
77	LHD002123	29/08/2023	Mumbai	Muscat	PARAR	No or late FL revision	E
78	LHD002124	31/08/2023	Mumbai	Muscat	RASKI	No or late FL revision	E
79	LHD002125	31/08/2023	Mumbai	Muscat	KITAL	No or late estimate time revision	E

Attachment B

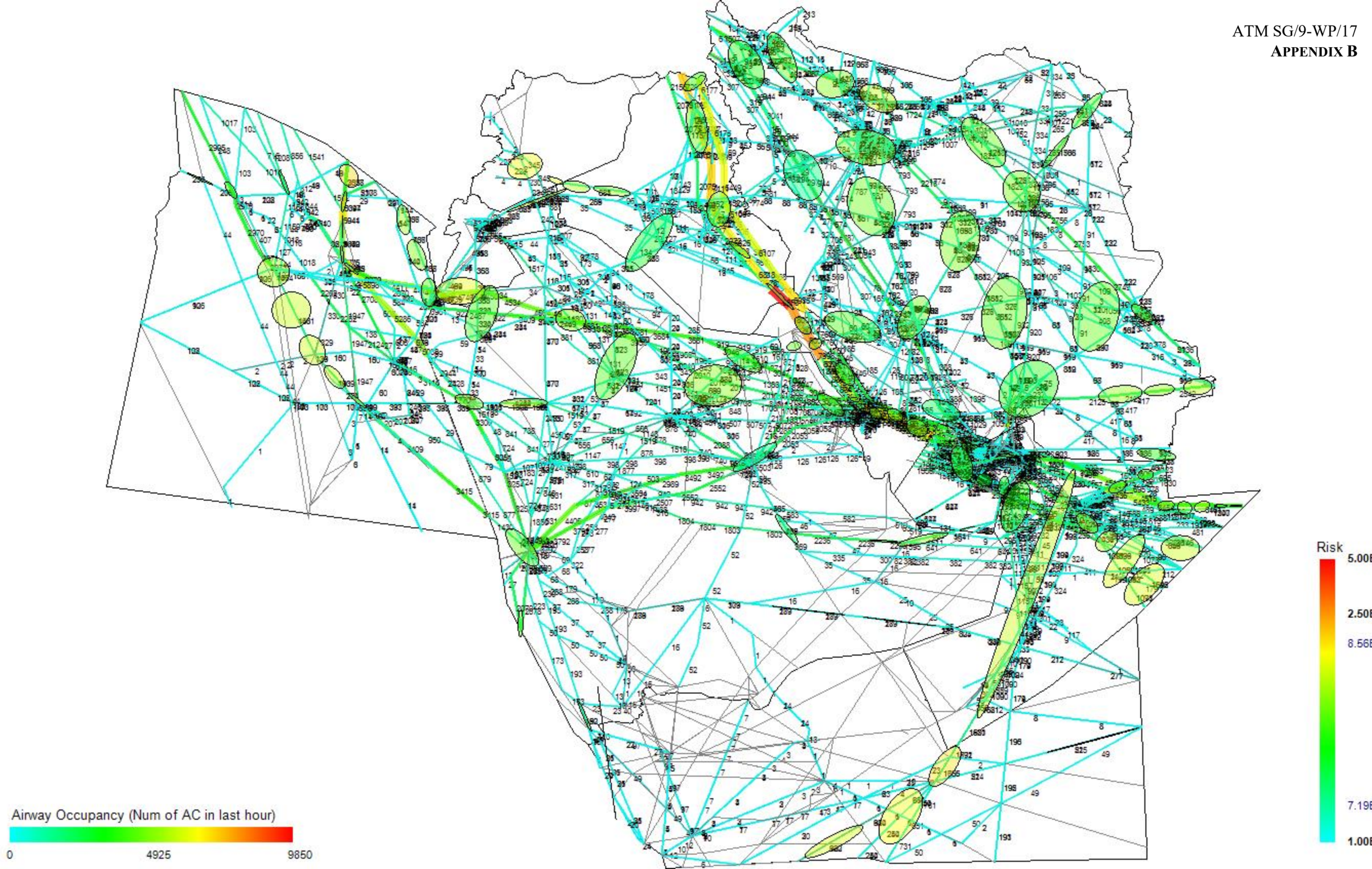
NON-RVSM approved aircraft – Responsibility of MIDRMA Member States

#	Observed Operating RVSM in	ACFT Reg.	ICAO Type	First Observed on	Responsible State
1	Jeddah	STALL	CRJ1	11-06-2022	SUDAN
2	EURRMA	5ALEX	BE200	09-07-2022	LIBYA

NON-RVSM approved aircraft – Responsibility of other RMAs

#	ACFT Reg.	ICAO Type	First Observed on	Responsible RMA
1	PKSJH	A320	06-11-2022	AAMA
2	PKLSW	B739	08-03-2023	AAMA
3	PKBGZ	B738	13-12-2022	AAMA
4	PKSTD	A320	19-01-2023	AAMA
5	PKLVF	B739	20-01-2023	AAMA
6	PKLSV	B739	21-12-2022	AAMA
7	40001A	C17	25-01-2020	AAMA
8	PKLSU	B739	27-11-2022	AAMA
9	PKSTH	A320	27-11-2022	AAMA
10	60208A	C17	30-03-2020	AAMA
11	PKBKM	A320	30-11-2022	AAMA
12	ZSCQP	CRJ9	07-07-2020	AFIRMA
13	ETATF	B350	08-07-2020	AFIRMA
14	5YWBH	C56X	14-07-2020	AFIRMA
15	5YFAN	CRJ2	15-07-2020	AFIRMA
16	5NBOD	GLF4	28-01-2022	AFIRMA
17	CCBGV	B789	08-06-2022	CARSAM
18	FAB2857	KC39	22-05-2022	CARSAM
19	21140	IL76	19-06-2022	CHINARMA
20	URAZN	B753	01-02-2022	EURRMA
21	URAZO	B753	01-02-2022	EURRMA
22	URSQO	B738	02-12-2021	EURRMA
23	URAZR	B77W	03-02-2022	EURRMA
24	EW550TH	IL76	04-12-2021	EURRMA
25	URFSC	IL76	05-12-2021	EURRMA
26	URFSA	IL76	09-05-2021	EURRMA
27	URFSE	IL76	11-12-2022	EURRMA
28	ICJSN	C25C	15-05-2023	EURRMA

29	UR11316	AN12	22-07-2020	EURRMA
30	URFSD	IL76	24-12-2021	EURRMA
31	KJ3452	IL76	03-08-2020	MAAR
32	IN307	IL38	03-12-2020	MAAR
33	KJ3454	IL76	16-03-2020	MAAR
34	K3604	E35L	17-07-2020	MAAR
35	80002A	C17	23-07-2020	MAAR
36	CB8004	C17	24-07-2020	MAAR
37	CB8001	C17	29-07-2020	MAAR
38	N411VP	EA50	01-05-2022	NAARMO
39	N267LG	GLF4	02-01-2023	NAARMO
40	N981DB	H25B	05-04-2022	NAARMO
41	N980BA	GLEX	05-11-2022	NAARMO
42	N44UA	CL60	07-06-2020	NAARMO
43	N685MF	GLF4	08-12-2021	NAARMO
44	N800AJ	CL60	10-02-2023	NAARMO
45	N605AS	PC12	11-04-2022	NAARMO
46	N866G	GALX	14-02-2022	NAARMO
47	N298RB	GLF4	14-05-2021	NAARMO
48	N28JV	PRM1	15-05-2023	NAARMO
49	N1112B	B350	16-07-2020	NAARMO
50	XAASP	CL60	17-11-2022	NAARMO
51	N920SA	F2TH	18-02-2021	NAARMO
52	N651CV	C650	21-11-2022	NAARMO
53	N145DB	E35L	22-01-2022	NAARMO
54	N46HB	F9000	22-08-2022	NAARMO
55	N320MK	GLF3	24-09-2022	NAARMO
56	N890DA	GLF5	25-02-2023	NAARMO
57	N604DT	CL60	26-02-2022	NAARMO
58	XAAYL	GLEX	26-04-2023	NAARMO
59	N405LL	H25B	29-05-2022	NAARMO


Airway Occupancy (Num of AC in last hour)
0
4925
9850
Risk
5.00E-009
2.50E-010
8.56E-011
7.19E-015
1.00E-015

Airway Occupancy (Num of AC in last hour)

0 4925 9850

Risk

5.00E-009

2.50E-010

8.56E-011

7.19E-015

1.00E-015

Airway Occupancy (Num of AC in last hour)

0 6941 13882

Risk

5.00E-009

2.50E-010

8.56E-011

4.01E-014

1.00E-015

Airway Occupancy (Num of AC in last hour)

0 10412 20823

Risk

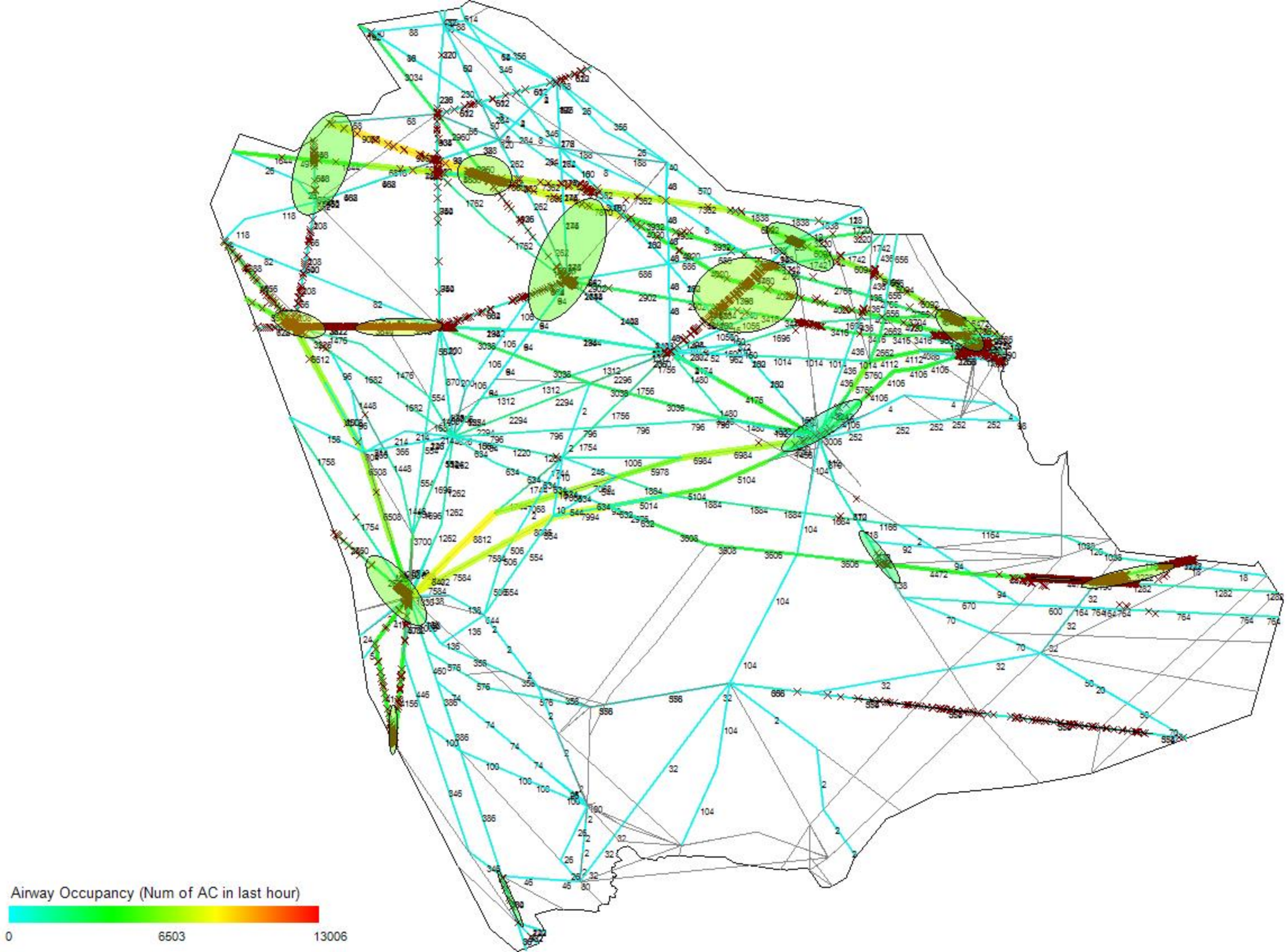
5.00E-009

2.50E-010

8.42E-012

1.69E-014

1.00E-015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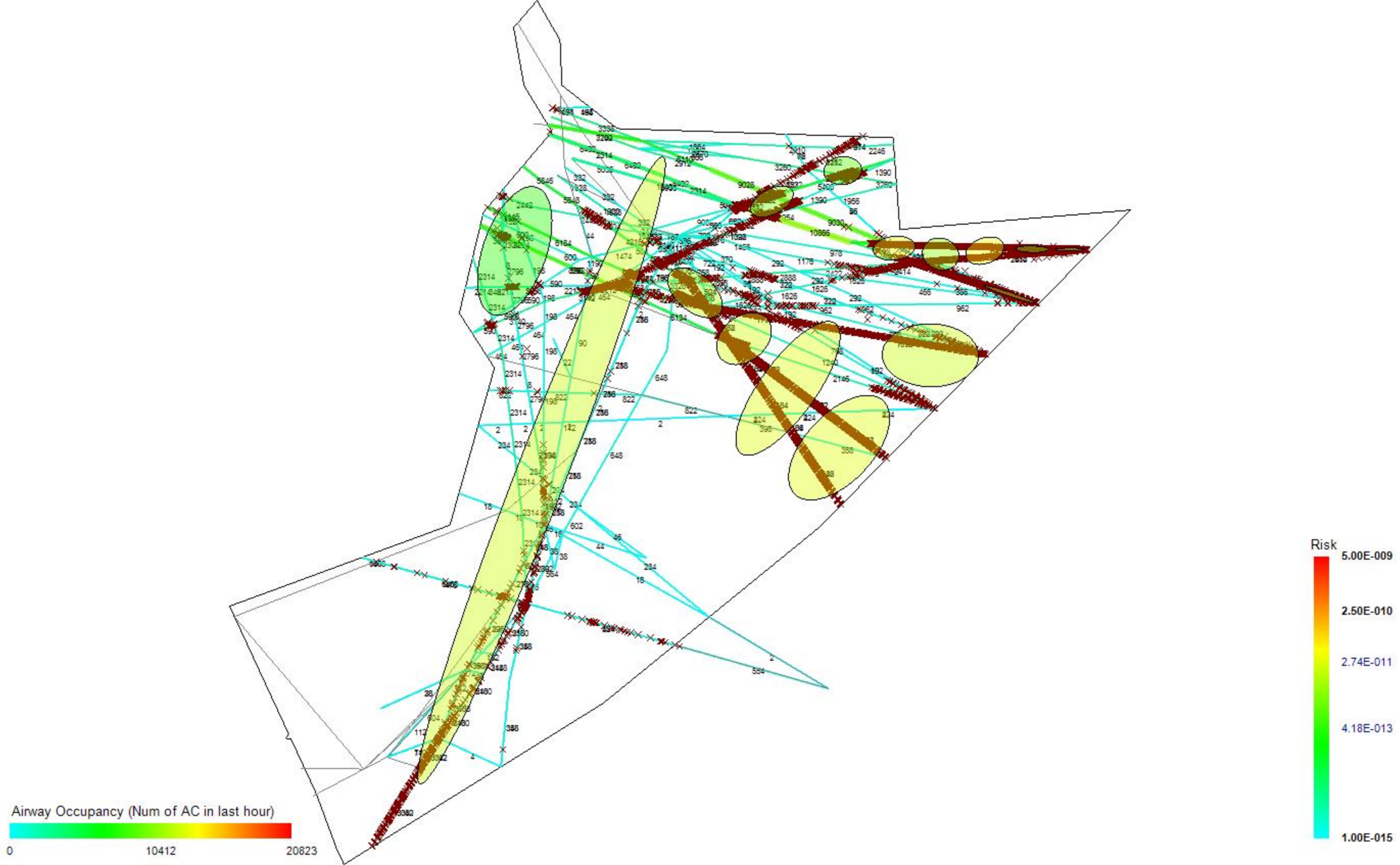
6503
13006
Risk
5.00E-009
2.50E-010
1.25E-011
7.19E-015
1.00E-015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20823
Risk
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2.74E-011
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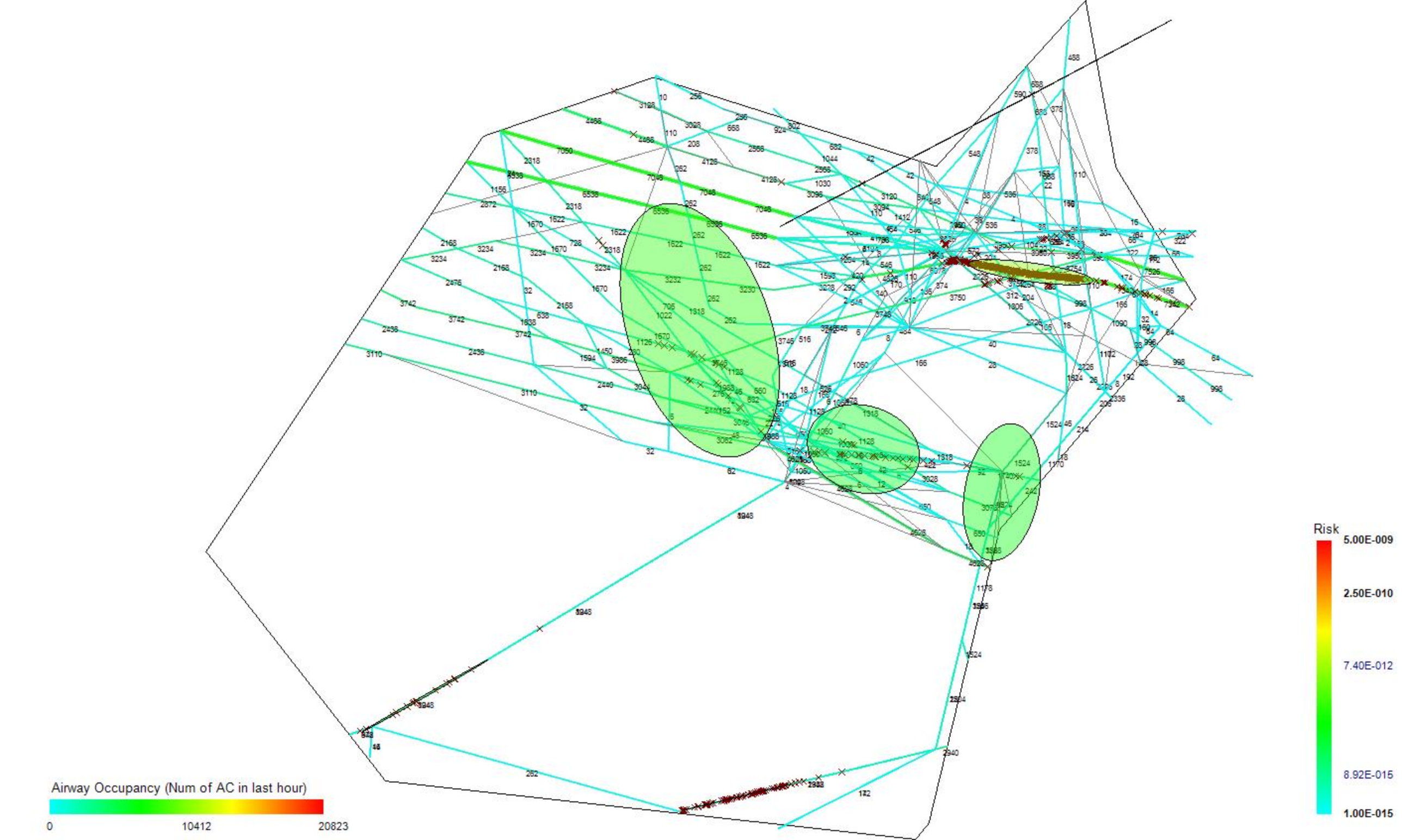
Airway Occupancy (Num of AC in last hour)
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10412
20823
Risk
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2.50E-010
7.40E-012
8.92E-015
1.00E-015