International Civil Aviation Organization

MIDANPIRG/17 and RASG-MID/7 Meeting

(Cairo, Egypt, 15 – 18 April 2019)

Agenda Item 4: Coordination between MIDANPIRG and RASG-MID

MID RVSM SMR 2017

(Presented by MIDRMA)

SUMMARY

This working paper details the results of the MID RVSM Safety Monitoring Report 2017, which demonstrate according to the data used that the key safety objectives of the SMR in accordance with ICAO Doc 9574 were met in operational service.

Action by the meeting is at paragraph 3.

REFERENCES

- MIDANPIRG/16 Report
- MIDRMA Board/15 Report.
- MID RVSM SMR 2016

1. INTRODUCTION

1.1 The MID RVSM Safety Monitoring Report (SMR) 2017 covers the reporting period from 1st September 2017 till 31st August 2018 for the ongoing process of providing periodic updates of information relevant to the continued safe use of the RVSM in the ICAO Middle East Airspace.

1.2 The MID SMR 2017 Report reflects the airspace safety review of the MID RVSM airspace conducted based on a one-month traffic data sample (TDS) collected for September 2017. The MIDRMA encountered a lot of difficulties to process and analyze the TDS due corrupted and wrong data format submitted by some member States, which caused so much delay in developing this Report. The MID SMR 2017 also includes the monthly Large Height Deviation (LHD) reports for the same reporting period submitted by MIDRMA member States through the LHD online reporting system.

2. DISCUSSION

2.1 The MID RVSM Safety Monitoring Report 2017 is at **Appendix A**.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the results of the airspace safety oversight presented in this working paper; and

b) review and endorse the MID RVSM SMR 2017 at **Appendix A**.

Attachment A

THE MID RVSM SAFETY MONITORING REPORT 2017
Prepared by the Middle East Regional Monitoring Agency (MIDRMA)

SUMMARY
The aim of the MID RVSM Safety Monitoring Report is to provide airspace safety review of the MID RVSM airspace and to highlight by means of argument and supporting evidence that the implementation of RVSM in the Middle East 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, the key 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 in the Middle East RVSM airspace .

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 $2.5x10^{-9}$ fatal accidents per flight hour.

The value computed for technical height risk is estimated **$4.966 x10^{-11}$** 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 $5x10^{-9}$ fatal accidents per flight hour.

The value computed for overall risk is estimated **$4.518 x10^{-11}$** 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.

1.2 **Conclusions**:

(i) The estimated risk of collision associated with aircraft height- keeping performance is **4.966 x10^{-11}** 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 **4. 518 x10^{-11}** and meets the ICAO overall TLS of **5 x 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 the RMA that the continued operations of RVSM adversely affects the overall vertical risk of collision.

1.3 Considerations on the RVSM Safety Objectives

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. The 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 compare the level of risk bearing incidents for the current reporting period. It also highlights issues that should be carried forward as recommendations to be adopted for future reports.

2.1 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 safety analysis due to lack of data.

The Data Sampling periods covered by SMR 2017 are as displayed in the below table

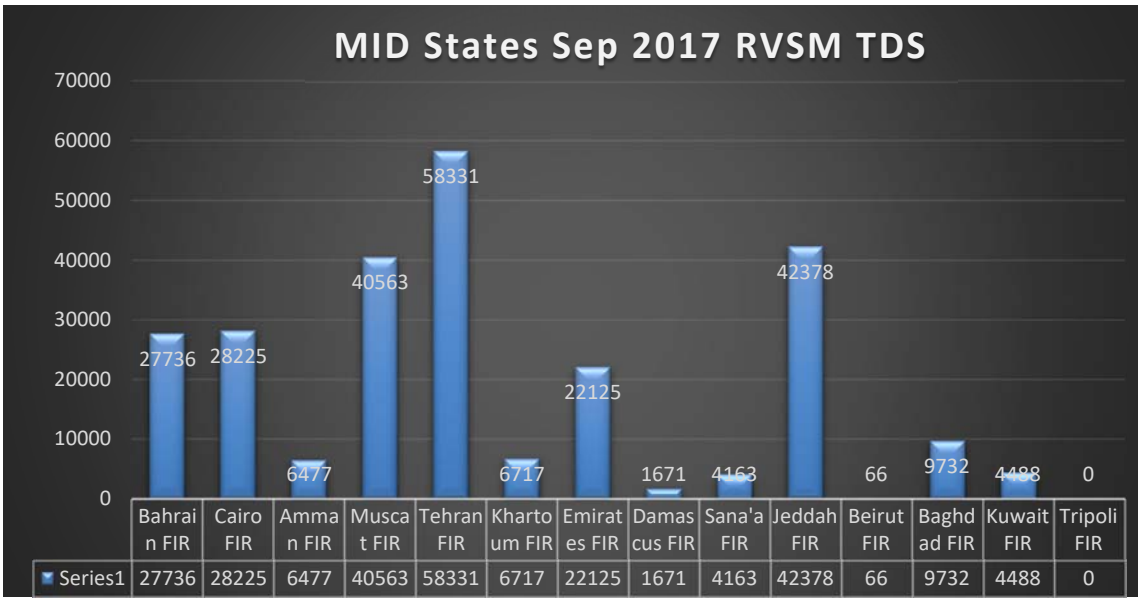
Report Elements	Time Period
Traffic Data Sample	01/09/2017 - 30/09/2017
Operational & Technical Errors	01/09/2017 - 31/08/2018

T-2: Time Period for the Reported Elements

MID States	**No. of Flights**	**Status**	**Received Dates**
Bahrain FIR	27736	Accepted	17/10/2017
Cairo FIR	28225	Accepted	19/10/2017
Amman FIR	6477	Accepted	29/10/2017
Muscat FIR	40563	Accepted	26/10/2017
Tehran FIR	58331	Accepted	18/11/2017
Khartoum FIR	6717	Accepted	26/10/2017
Emirates FIR	22125	Accepted	24/10/2017
Damascus FIR	1671	Accepted	03/10/2017
Sana'a FIR	4163	Accepted	17/10/2017
Jeddah FIR	42378	Accepted	25/02/2018
Beirut FIR	66	Accepted	30/01/2018
Baghdad FIR	9732	Accepted	18/02/2018
Kuwait FIR	4488	Developed by MIDRMA	01/03/2018
Tripoli FIR	-	No TDS Submitted	Excluded
Total	252,672	13 FIRs	

Table 1; Status of the MID States RVSM Traffic Data Sample (TDS) for Sep. 2017

2.1.1 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 **252,672** flights were processed for the 13 FIRs, these flights were evaluated and processed very carefully to ensure accurate results according to the data submitted.



Top 20 Busiest FIR Entry / Exit Points

SN	Point	Location	No of Flights
1	**IMKAD**	Sana'a / Muscat FIRs	**9573**
2	**ULADA**	Bahrain / Jeddah FIRs	**9310**
3	**ROTOX**	Bahrain / Tehran FIRs	**8861**
4	**ALPOB**	Bahrain / Emirates FIRs	**8818**
5	**ULINA**	Amman / Cairo FIRs	**8715**
6	**PASAM**	Cairo / Jeddah FIRs	**8699**
7	**TUMAK**	Bahrain / Emirates FIRs	**7731**
8	**KUVER**	Bahrain / Tehran FIRs	**7623**
9	**DAROR**	Bahrain / Jeddah FIRs	**7070**
10	**NUBAR**	Cairo / Khartoum FIRs	**6913**
11	GABKO	Emirates / Tehran FIRs	6895
12	ALPEK	Emirates / Jeddah FIRs	6176
13	RASKI	Muscat / Mumbai FIRs	6162
14	KITOT	Cairo / Jeddah FIRs	5946
15	ASVIB	Karachi / Tehran FIRs	5812
16	ALRAM	Tehran / Ankara FIRs	5606
17	RASDA	Cairo / Nicosia FIRs	5430
18	LOTAV	Muscat / Mumbai FIRs	5351
19	NALPO	Bahrain / Emirates FIRs	5313
20	SILKA	Cairo / Jeddah FIRs	4984

2.1.2 As usual practice for the preparation of every safety monitoring report to ensure that attention is drawn to the need of collecting the traffic data sample, the MIDRMA circulated a reminder email to all the focal points responsible for submitting the TDS on 27th August 2017 to ensure their readiness for this task before the effective date of Conclusion 16/2, Unfortunately, the deadline for submitting the TDS to the MIDRMA passed and the same problems still exist for this report.

2.1.3 For the third consecutive Safety Monitoring Reports, the MIDRMA Board agreed to exclude Tripoli FIR 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 MIDANPIRG to decide what action should be taken if RVSM operations resume again within Tripoli FIR in the future.

2.1.1 The Collision Risk Model (CRM)

2.2.1 The risk of collision to be modelled is that due to the loss of procedural vertical separation between aircraft flying above FL 290 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.

2.2.2 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 procedural 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.

2.2.3 Three parameters used within the CRM:

a. The Vertical Overlap Probability, denoted as Pz(1 000).

b. The Lateral Overlap Probability, denoted as Py(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.

2.3 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.

2.3.1. 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 **4.966×10^{-11}** fatal accidents per flight hour, which is less than the ICAO TLS **2.5×10^{-9}**.

2.3.2 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;

b. Pz(1000) – the probability of vertical overlap due to technical height-keeping performance, between aircraft flying 1000 ft. separation in MID RVSM airspace is estimated **1.23×10^{-9}** valid and is less than the ICAO requirement of **1.7×10^{-8}**.

c. All aircraft flying 1000ft separation in MID RVSM airspace meet the ICAO Global Height Keeping Performance specification for RVSM;

d. All aircraft flying 1000ft separation in MID RVSM airspace meet the individual ICAO performance specification for the components of total vertical error (TVE).

e. The monitoring target for the MID RVSM height-monitoring programme is an on-going process.

f. The input data used by the CRM is valid.

g. An adequate process is in place to investigate and correct problems in aircraft technical height-keeping performance.

2.3.3 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 Py (0) for the SMR 2017 has the following to consider:

a. Due to lack of radar data available for most of the congested airspace in the Middle East Region to calculate the probability of lateral overlap $\boldsymbol{P_y(0)}$ which is fundamental for the SMR, the MIDRMA continued to calculate the probability of lateral overlap $\boldsymbol{P_y(0)}$ for all the MID RVSM airspace and not only the congested airspace by adopting the ICAO methodology developed for this purpose and by adding this feature in the MID Risk Analysis Software (MIDRAS).

b. The MIDRMA calculated the average of the probability of lateral overlap $\boldsymbol{P_y(0)}$ for the whole MID RVSM airspace is estimated to be **7.68×10^{-8}.**

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

2.3.4 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 **1.23×10^{-9}** . 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 **1.7×10^{-8}**.

According to the technical risk values as shown in the table, the TLS value decreased and the MIDRMA continue to issue the minimum monitoring requirements (MMR) for each MIDRMA member states according to the latest RVSM approvals received from all member states , the MMR table valid for SMR 2017 is available in **Appendix B**.

Note: The MIDRMA is continuously updating the MMR for all Member States; all members are required to check and comply with their MMR through the MIDRMA website (www.midrma.com).

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**	
3.18×10^{-12}	**3.056×10^{-10}**	**6.347×10^{-11}**	**4.966×10^{-11}**	

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

2.3.5 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).

2.3.6 Recommendations for Safety Objective 1:

a. The MIDRMA shall review the content and structure of its aircraft monitoring groups.

b. The MIDRMA shall keep the methods of calculating the technical CRM parameters and the risk due to technical height keeping errors under review;

c. The MIDRMA shall carry out continuous survey and investigation on the number and causes of non-approved aircraft operating in RVSM airspace.

2.4 ASSESSMENT OF OVERALL RISK DUE TO ALL CAUSES AGAINST THE TLS OF 5 X 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 x 10^{-9}** fatal accidents per flight hour.

The computed value for SMR 2017 is estimated **4.518 x10^{-11}** , this value meets the ICAO overall TLS of **5 x 10^{-9}** fatal accidents per flight hour.

Overall Risk Values				
Year 2006	**Year 2008**	**Year 2010**	**Year 2011**	**Year 2012/13**
Not calculated	**4.19x10^{-13}**	**6.92x10^{-12}**	**1.04x10^{-11}**	**3.63x10^{-11}**
Year 2014	**Year 2015**	**Year 2016**	**Year 2017**	
4.91x10^{-11}	**7.351x10^{-10}**	**5.691x10^{-10}**	**4.518 x10^{-11}**	

2.4.1 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, The final conclusions of the data processed 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.

2.4.2 The table below represents the evaluation carried out by the MIDRMA for assessing the LHD reports for SMR 2017 reporting period (01st September 2017 until 31st August 2018) received from each Member State:

MID FIRs	No. of Reported LHD
Bahrain	**19**
Baghdad	**31**
Amman	**4**
Tehran	**136**
Cairo	**9**
Damascus	**-**
Khartoum	**31**
Kuwait	**178**
Muscat	**782**
Jeddah	**36**
Tripoli	**-**
Emirates	**15**
Sanaa	**-**

MID States LHD Reports Received for SMR 2017 Reporting Period

2.4.3 The MIDRMA noticed an increase in the LHD reports at the eastern FIR boundary of Muscat FIR, the reports filed from Muscat, Mumbai and Karachi ATCUs 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.

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.

2.4.4 The MIDRMA Board/15 meeting agreed that a Special Coordination Meeting between Iran, India, Oman and Pakistan with the presence of MAAR, MIDRMA and ICAO APAC and MID Regional Offices, to meet during the ATM SG/4 on 02nd May 2018 to agree on clear action plan to mitigate the risk associated with the high level of coordination failures at the interfaces between the above mentioned States.

2.4.5 The special coordination meeting successfully held in Amman – Jordan during the ATM SG/4 but without the presence of Pakistan, the meeting adopted fruitful and effective short and long term solutions to be implemented by the concerned authorities to close the Safety Protocol.

2.4.6 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.

2.4.7 Table A below presents a summary of operational risk associated with Large Height Deviation (LHD) reports by LHD category, these reports have direct and serious impact to RVSM operations within the MID RVSM Airspace from 01st September 2017 until 31st August 2018.

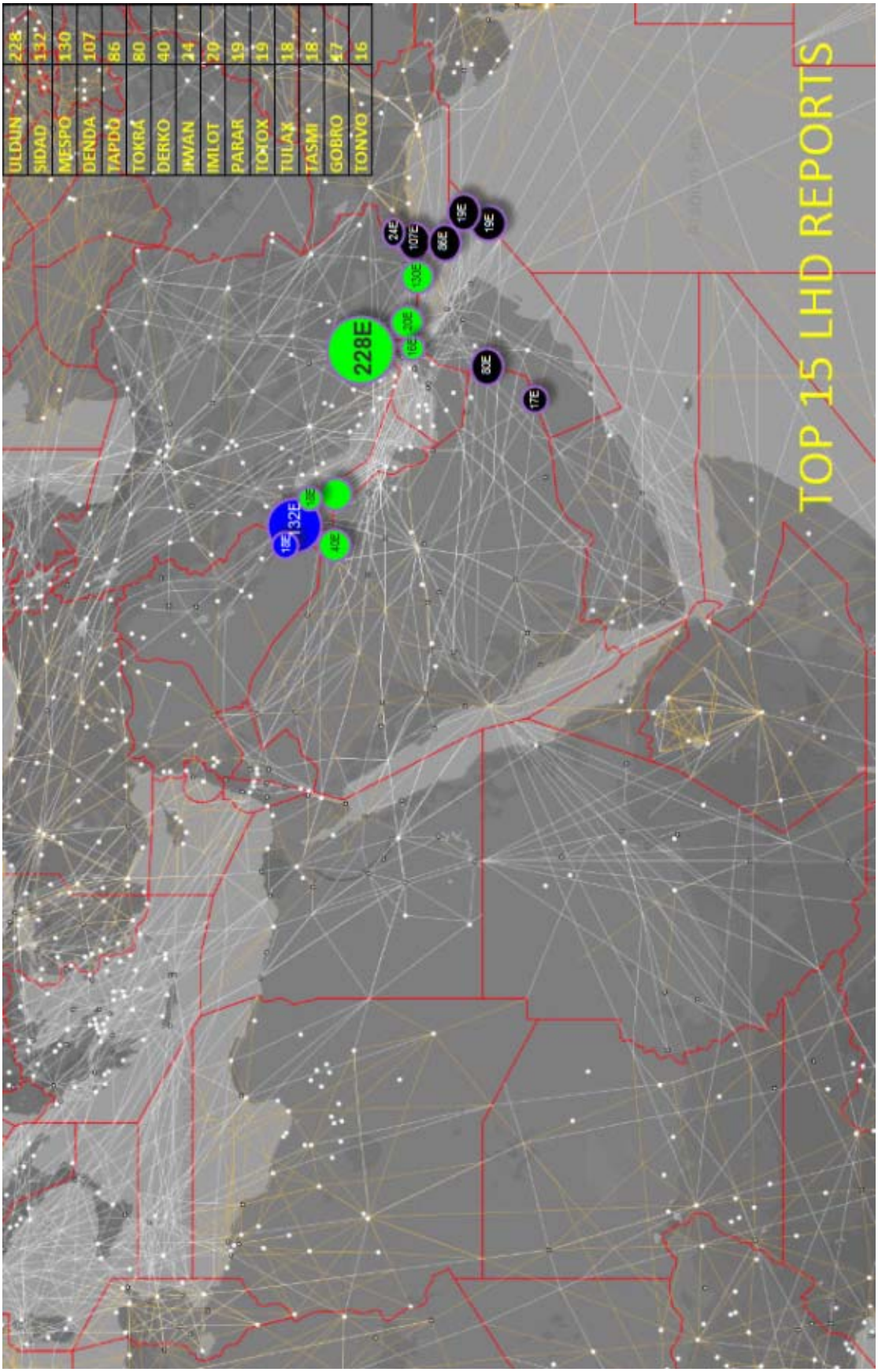
Code	Large Height Deviation (LHD) Category	No. of LHDs	Duration (Sec.)
A	Flight crew fails to climb or descend the aircraft as cleared	**1**	**40**
B	Flight crew climbing or descending without ATC clearance	**2**	**143**
C	Incorrect operation or interpretation of airborne equipment	-	-
D	ATC system loop error	**3**	**52**
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	**3**	**435**
J	TCAS resolution advisory and flight crew correctly responds	-	-
K	TCAS resolution advisory and flight crew incorrectly responds	-	-
L	An aircraft being provided with RVSM sep. is not RVSM approved	-	-
M	Other	-	-
	Total	**9**	**670 Sec.**

Table A: Summary of Operational Risk associated with Large Height Deviation

2.4.8 The contributor to risk-bearing large height deviations within the MID RVSM airspace is split amongst only four classifications and a total of nine LHD reports. This number of LHD reports which reflects nearly 3 million movements in one year does not support high confidence in the calculated overall risk result.

2.4.9 The Map in the next page shows the approximate locations of the top 15 positions of reported LHD events received by the MIDRMA for SMR2017 reporting period. The approximate locations are marked with:

a- Black circles indicate LHD of traffic with procedure separation.
b- Green circles indicate LHD reports within an airspace of radar coverage.
c- Blue circles indicates LHD reports within an airspace of partial radar coverage.


TOP 15 LHD REPORTS
ULDUN 228
SIDAD 132
MESPO 130
DENDA 107
TAPDO 86
TOKRA 80
DERKO 40
IWAN 24
IMLOT 20
PARAR 19
TOKOX 19
TULAX 18
TASMI 18
GOBRO 17
TONVO 16
228E
132E

2.4.10 Effects of Future Traffic Growth

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 clear that even for the most optimistic forecast range of 13%, the overall risk of collision will continue to meet the TLS at least until 2021 unless the RVSM operations effected by large numbers of LHD which they have severe impact in the implementation of RVSM.

2.4.11 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, meets the ICAO overall TLS of **5 x 10^{-9}** fatal accidents per flight hour.

b. The effect of future traffic growth has also been assessed. The overall risk of collision will continue to meet the TLS at least until 2021.

2.4.12 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 handover issues.

b. 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 a continuous basis and copy of those reports are sent to the MIDRMA in due time for operational safety assessment analysis.

2.5 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 situations do not increase and, where possible, that they decrease. This should set the basis for a continuous assurance that the operation of RVSM will not adversely affect the risk of en-route mid-air collision over the years.

2.5.1 The identified safety-related issues are:

a. Confirmation of the approval status of aircraft filling RVSM flight plan (W in field 10), this is done through Bahrain and Emirates TDS received on a monthly basis.

b. Identification of operators requiring monitoring and address the minimum monitoring requirements to all MIDRMA member states.

2.5.2 Conclusions for Safety Objective 3

a. The MIDRMA improved its monitoring capabilities with the new Enhanced GMUs which gave the ability to respond for more height monitoring requests even from outside the Middle East Region.

b. The MIDRMA started to conduct studies and researches for implementing height monitoring using ADSB data.

c. The MIDRMA address the Hot Spots of each MID FIR generated by the (MIDRAS) Software (for information only).

d. Current risk-bearing situations have been identified by using the MIDRAS and the MID Visualization and Simulation of Air Traffic and actions will be taken to ensure resolving all violations to RVSM airspace by non-approved aircraft.

2.5.3 Recommendations for Safety Objective 3

a. The MIDRMA will start coordinating with Member States, which have ADSB to provide the ADSB archived data for RVSM height monitoring.

b. MIDRMA will continue to enhance the (MIDRAS) Software and shall include new features to overcome the issue of corrupted TDS (Traffic Data Sample).

c. The MIDRMA will continue to include in its work program briefings to the focal points appointed for airworthiness issues to ensure their follow up with their monitoring targets and to resolve any non-compliant RVSM approved aircraft. At the same time the MIDRMA will coordinate with the focal points appointed for ATC issues to deliver RVSM safety assessment briefing as necessary or when requested.

d. The MIDRMA shall continue to carry out continuous survey and investigation on the number and causes of non-approved aircraft operating in the MID RVSM airspace.

e. The MIDRMA will continue to encourage States to submit their Large Height Deviation Reports using the MIDRMA online reporting tool which has been upgraded to improve the level of reporting.

Therefore, it is concluded that this Safety Objective is currently met.

- END -

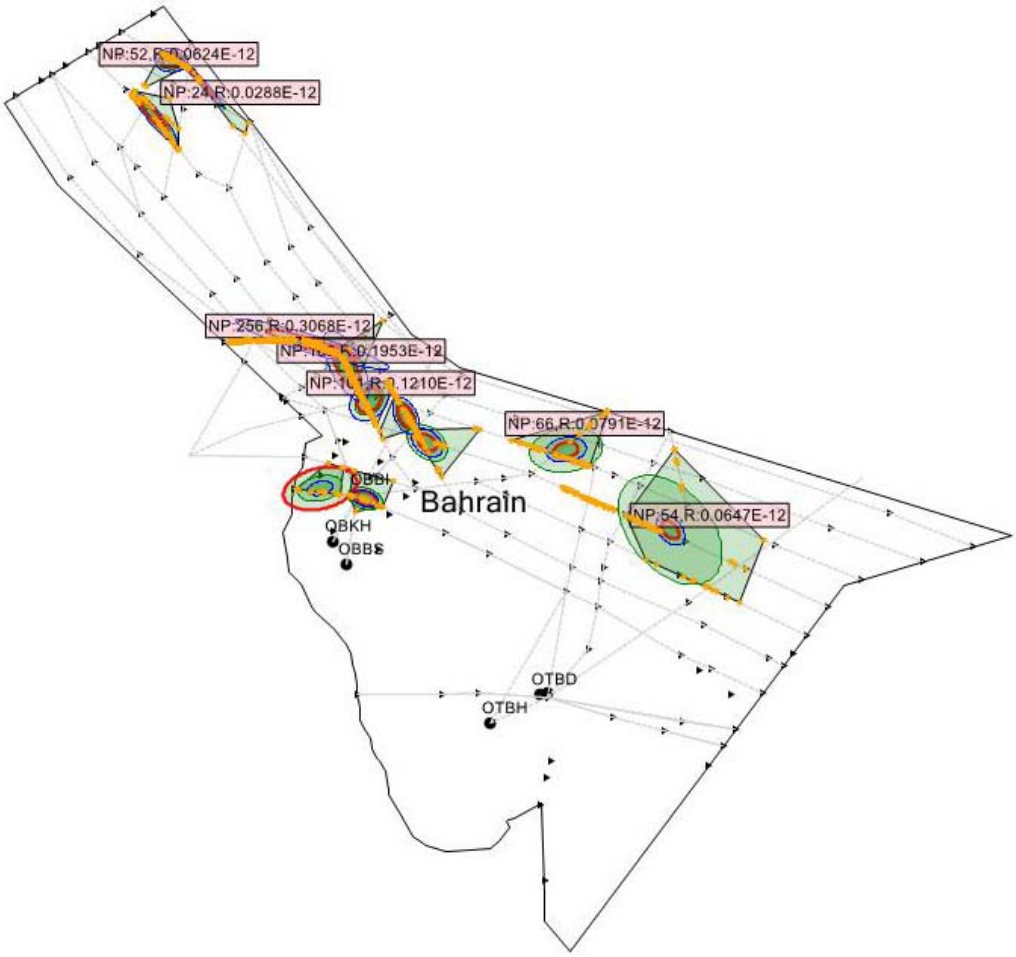
Appendix B

THE MID MMR as of August 2018

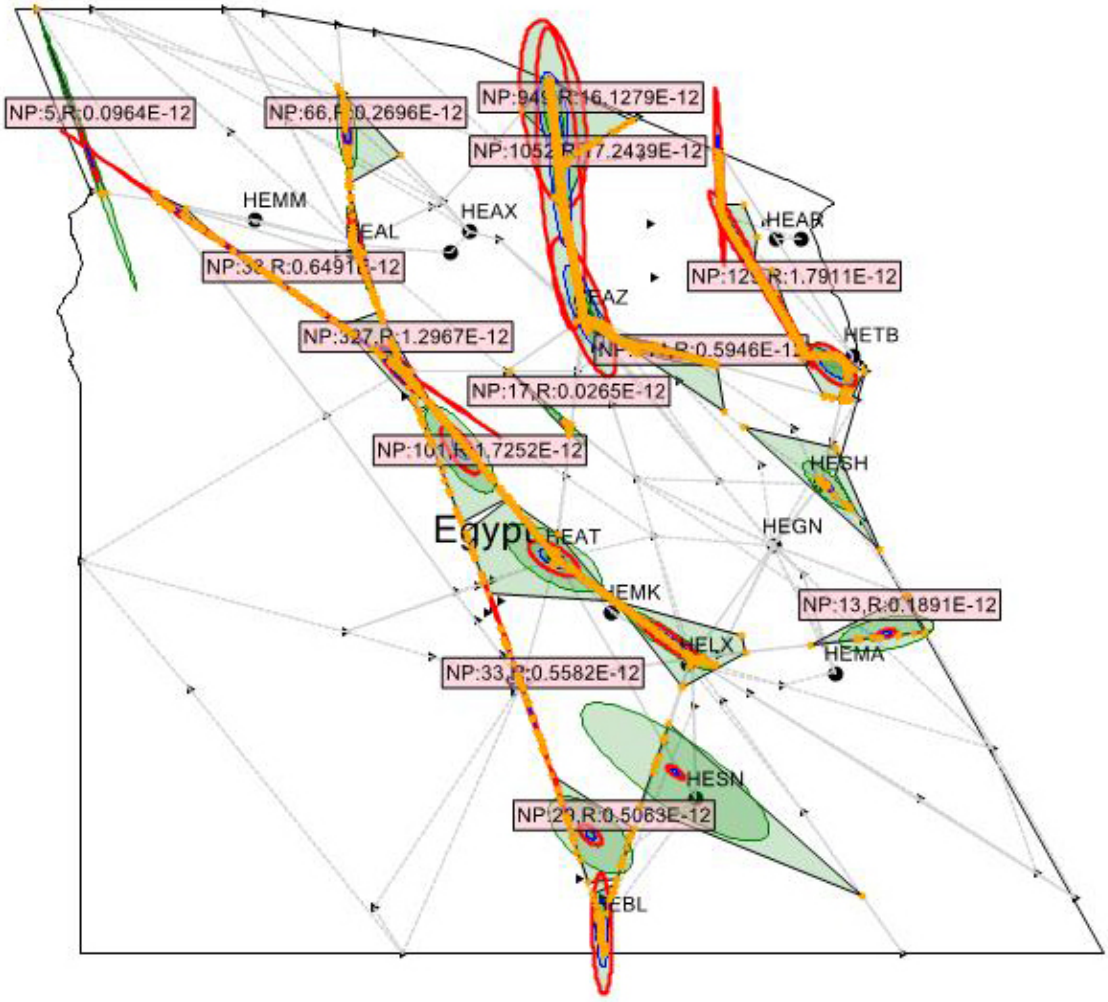
MID STATES	RVSM APPROVED A/C	HAVE RESULTS OR COVERED	NOT COVERED
BAHRAIN	53	53	0
EGYPT	137	128	9
IRAN	233	154	79
IRAQ	40	40	0
JORDAN	44	44	0
KSA	278	275	3
KUWAIT	54	54	0
LEBANON	32	31	1
LIBYA	15	13	2
OMAN	70	70	0
QATAR	259	247	12
SUDAN	14	2	12
SYRIA	11	0	11
UAE	585	570	15
YEMEN	9	0	9
TOTAL	1825	1681	144

Appendix C –MIDRMA Member States Hot Spots Generated from September 2017 TDS (for information ONLY)

Note: Damascus and Beirut FIRs TDS generated no hot spots.



Bahrain FIR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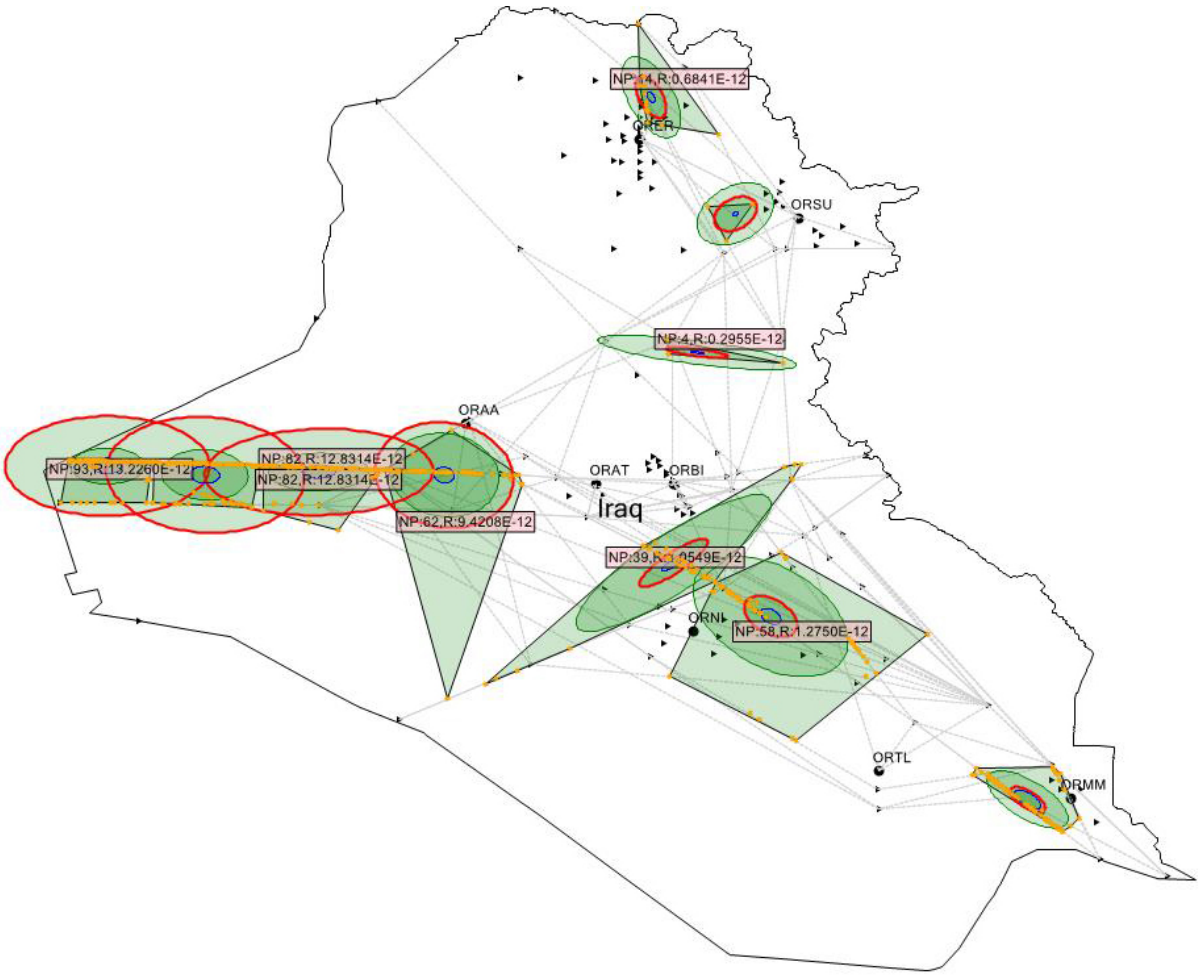
Tehran FIR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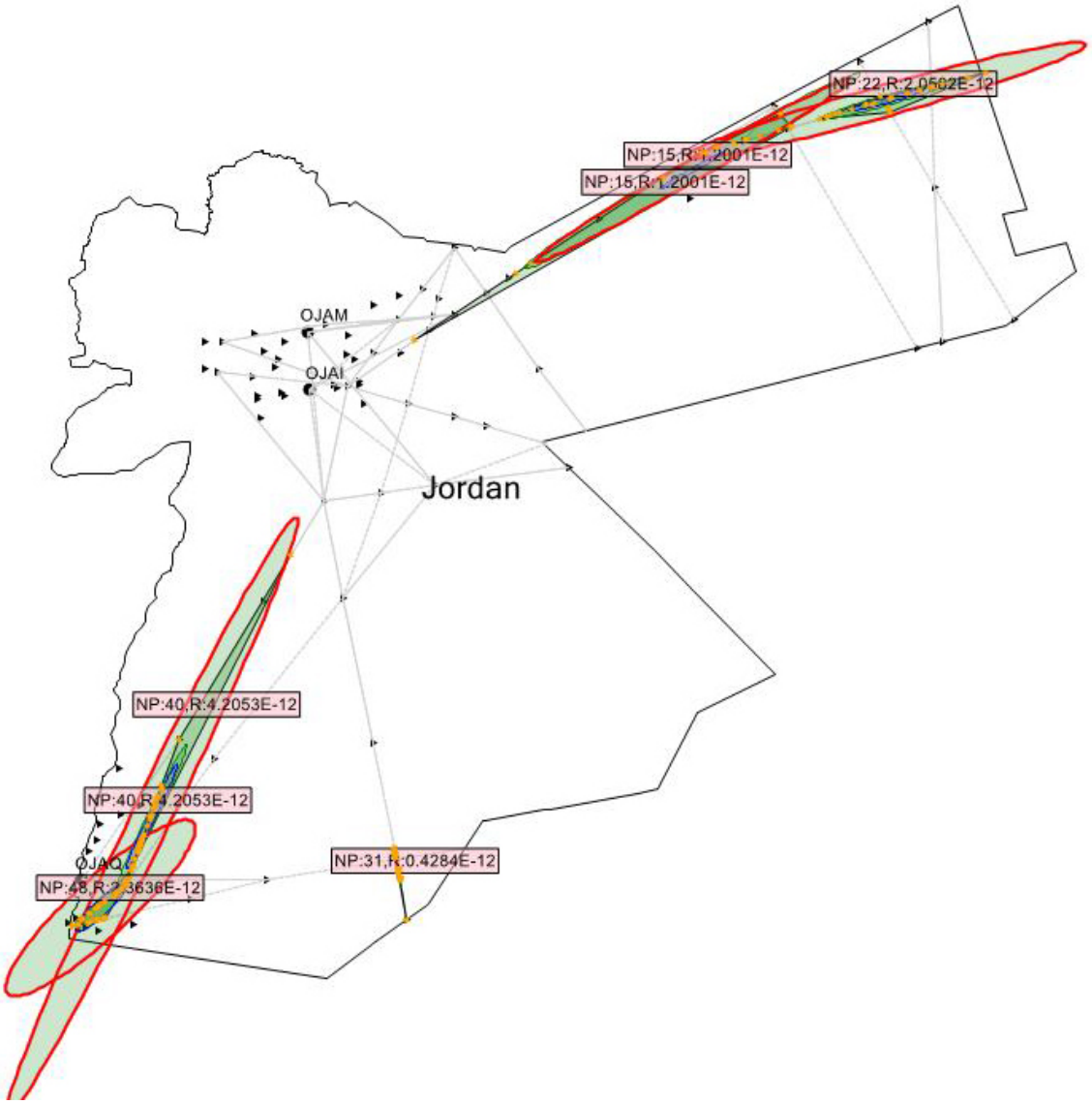
Baghdad FIR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Amman FIR


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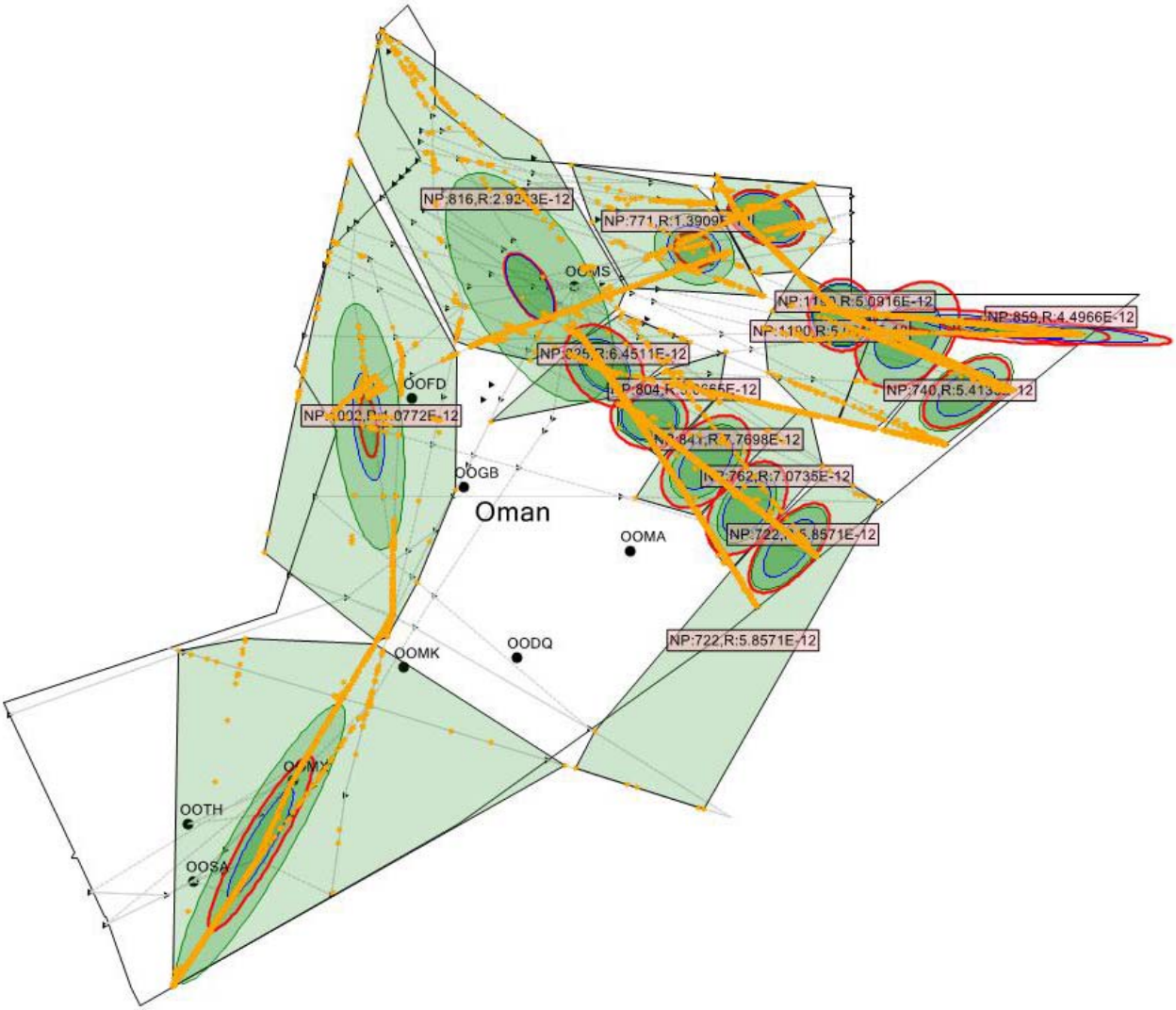
Jeddah FIR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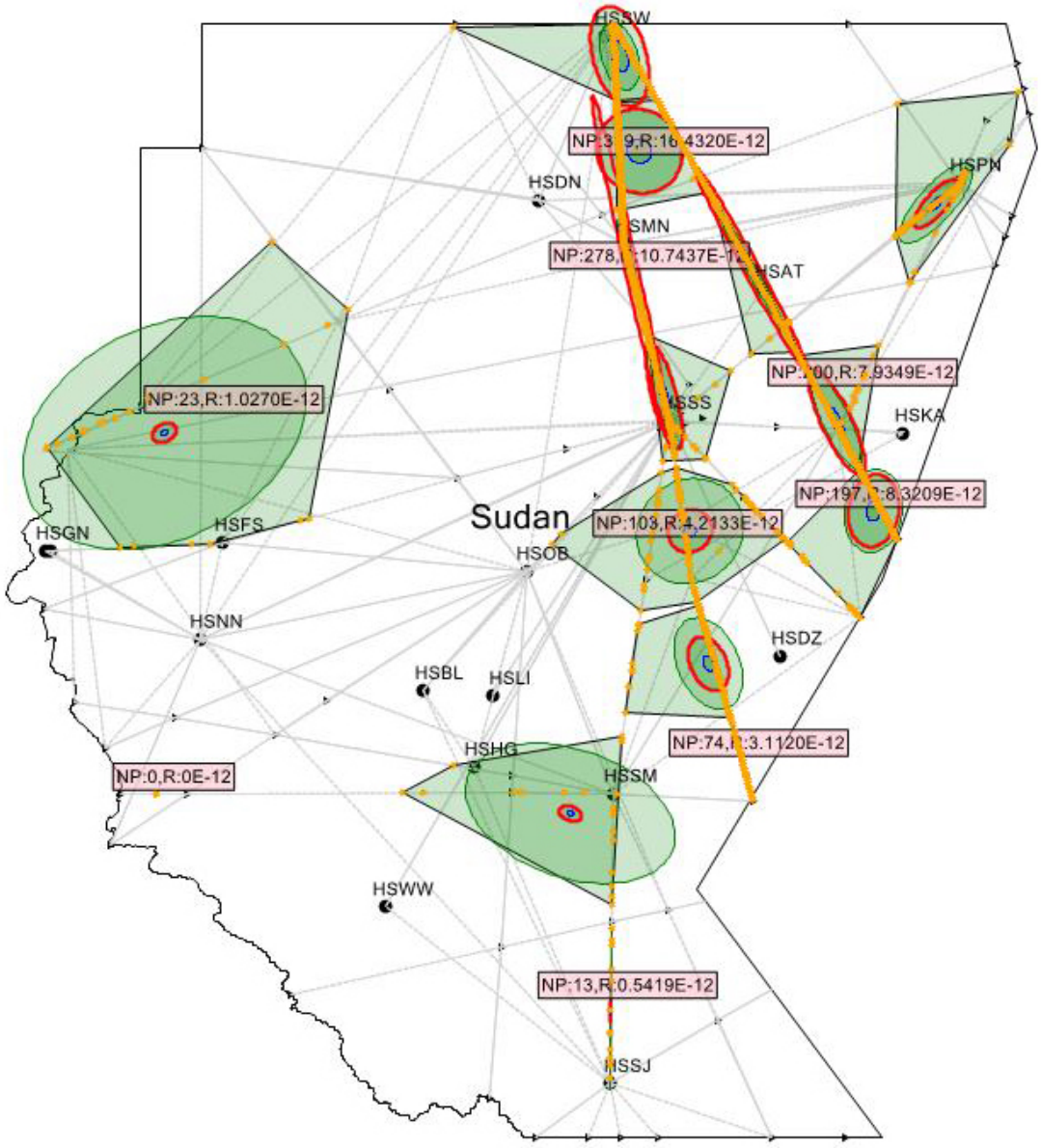
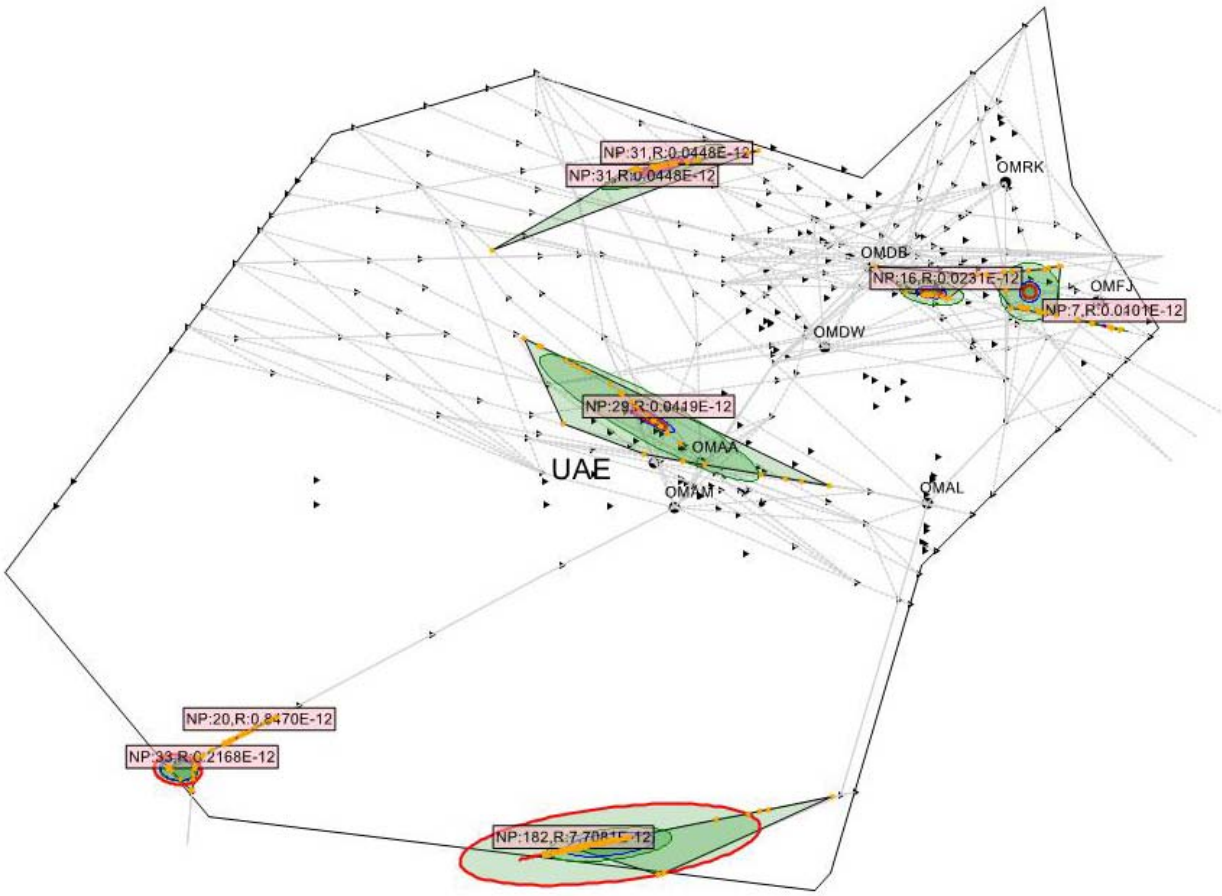
Muscat FIR



Khartoum FIR



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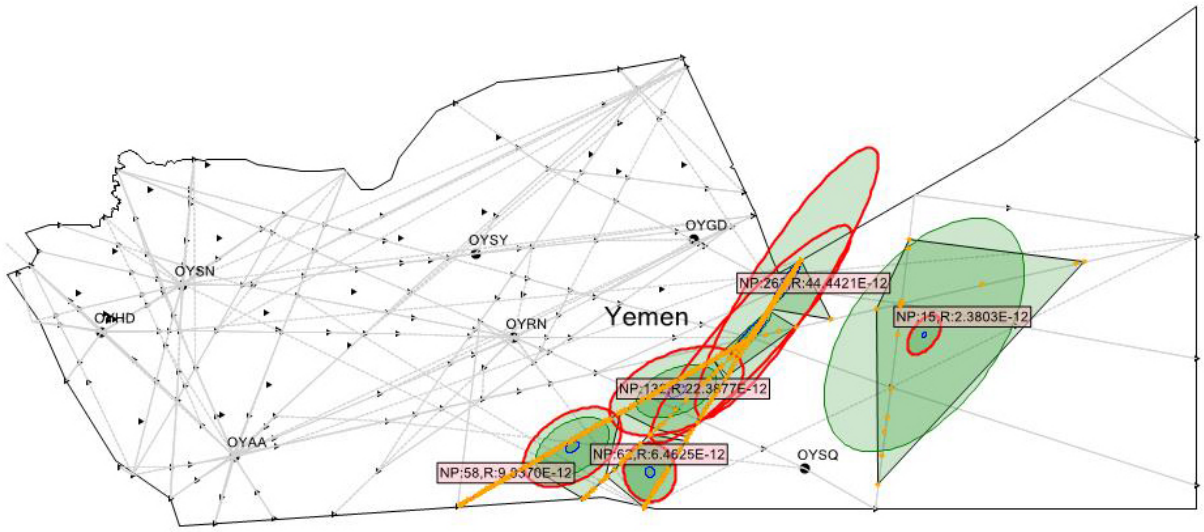

Sana’a FIR

-END-