

MIDANPIRG/20 & RASG-MID/10-REPORT



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**Report of the Twentieth Meeting of the
Middle East Air Navigation Planning and Implementation Regional Group
and Tenth Meeting of the
Regional Aviation Safety Group-Middle East**

MIDANPIRG/20 & RASG-MID/10

(Muscat, Oman, 14 – 17 May 2023)

The views expressed in this Report should be taken as those of the Regional Planning and Implementation Group and not of the Organization. This Report will, however, be submitted to the ICAO Council and any formal action taken will be published in due course as a Supplement to the Report

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

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontier or boundaries.

TABLE OF CONTENTS

	Page
PART I - HISTORY OF THE MEETING	
1. Place and Duration.....	1
2. Opening.....	1
3. Attendance	2
4. Officers and Secretariat.....	2
5. Language.....	3
6. Agenda	3-4
7. Conclusions and Decisions – Definition.....	4
8. List of Conclusions and Decisions.....	4-7

PART II - REPORT ON AGENDA ITEMS

Report on Agenda Item 1.....	1-1
Report on Agenda Item 2.....	2-1/2-7
Report on Agenda Item 3.....	3-1
Report on Agenda Item 4.....	4-1/4-6
Report on Agenda Item 5.1.....	5.1-1/5.1-3
Report on Agenda Item 5.2.....	5.2-1/5.2-7
Report on Agenda Item 5.3.....	5.3-1
Report on Agenda Item 5.4.....	5.4-1/5.4-3
Report on Agenda Item 5.5.....	5.5-1
Report on Agenda Item 5.6.....	5.6-1
Report on Agenda Item 6.1.....	6.1-1/6.1-6
Report on Agenda Item 6.2.....	6.2-1/6.2-4
Report on Agenda Item 6.3.....	6.3-1/6.3-4
Report on Agenda Item 6.4.....	6.4-1
Report on Agenda Item 6.5.....	6.5-1/6.5-7
Report on Agenda Item 6.6.....	6.6-1/6.6-10
Report on Agenda Item 6.7.....	6.7-1/6.7-2
Report on Agenda Item 6.8.....	6.8-1/6.8-2
Report on Agenda Item 6.9.....	6.9-1
Report on Agenda Item 7.....	7-1
Report on Agenda Item 8.....	8-1

APPENDICES

Appendices 2.1A& 2.1B
Appendices 3.1A – 3.1C

Appendices 4.2A

Appendices 5.1A & 5.1B, 5.2A – 5.2G, 5.5A

Appendices 6.1A & 6.1B, 6.2A – 6.2C, 6.3A, 6.5A - 6.5G, 6.6A – 6.6I, 6.7A, 6.8A & 6.8B

ATTACHMENT

List of Participants Attachment A

PART I - HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The Twentieth Meeting of the Middle East Air Navigation Planning and Implementation Regional Group and the Tenth Meeting of the Regional Aviation Safety Group-Middle East (MIDANPIRG/20 & RASG-MID/10) were successfully held in Muscat, Oman, from 14 to 17 May 2023.

2. OPENING

2.1 His Excellency Eng. Naif bin Ali Al-Albri, President of the Civil Aviation Authority, delivered an opening speech on behalf of the Sultanate of Oman, and welcomed all the participants to Muscat to participate in the MIDANPIRG/20 & RASG-MID/10 Meeting. He emphasized that global and regional developments in aviation sector is essential for the work programmes of expert teams and working groups within ICAO. These programmes focus on developing rules, recommendations, procedures, and updates that serve as outcomes for the ICAO 41st General Assembly. He also highlighted that the world is witnessing a faster recovery of civil aviation activity, surpassing the pre-pandemic numbers recorded in 2019. He further mentioned that the discussions and recommendations derived from the working papers and information presented during these meetings will significantly contribute to making appropriate decisions aligned with regional and national strategic plans.

2.2 On behalf of ICAO, Eng. Mohamed Abubaker Farea, Regional Director of ICAO for the Middle East, expressed his sincere gratitude to the Sultanate Oman and especially to H.E Eng. Naif Ali Al-Abri, President of the CAA for hosting this important meeting in Muscat. Eng. Farea thanked Oman CAA for the warm welcome, outstanding hospitality, excellent organisation and the decent premises provided for this important meeting. He added that the hosting of these meetings is another evidence on the support provided by Oman for the Aviation industry and the work programme of the ICAO MID Office.

2.3 Eng. Farea stated that despite the significant decline in air traffic volume due to the COVID-19 pandemic, the Middle East region is experiencing a recent surge in air traffic. The region has shown stable progress and growth during the years 2022 and 2023. He added that the ambitions and aspirations of Middle Eastern countries have led to new challenges in the aviation sector. Being a global destination for various purposes, such as business, religious and leisure tourism, and hosting international events like the FIFA World Cup and Expo, the region faces the challenge of dealing with air traffic congestion and improving airspace capacity to ensure operational efficiency.

2.4 Finally, Eng. Farea highlighted the different way of conducted the business within the MID Office including new administration style, resulted in new assigned Officers on the front lines, whose equipped with modern technologies and skills to onward the work development in modern and more efficient manner than the legacy way to provide all the support to our Members States and all stakeholders.

3. ATTENDANCE

3.1 The meeting was attended by a total of One Hundred and forty-four (144) participants from twelve (12) States (Bahrain, Egypt, Iran, Iraq, Jordan, Oman, Qatar, Saudi Arabia, Syria, UAE, USA and Yemen) and seven (7) International Organizations/Industries (ACAO, BOEING, CANSO, GCC, IATA, IFALPA and MIDRMA). The list of participants is at **Attachment A**.

OFFICERS AND SECRETARIAT

3.2 Mr. Ahmed Al Jallaf, Chairperson of MIDANPIRG, and Mr. Mubarak Saleh Al-Ghelani, First-Vice Chairperson of RASG-MID chaired the meetings.

3.3 Mr. Mohamed Abubaker Farea, Regional Director, acted as the Secretary of the meetings, supported by the following Regional/Technical Officers:

From the ICAO MID Office, Cairo:

Mr. Mashhor Alblowi	Regional Officer, Flight Safety
Ms. Muna Alnadaf	Regional Officer, Communication, Navigation and Surveillance
Mr. Mohamed Chakib	Regional Officer, Safety Implementation
Mr. Mohamed Iheb Hamdi	Regional Officer, Aerodromes and Ground Aids
Mr. Radhouan Aissaoui	Regional Officer, Information Management
Mr. Ahmad Amireh	Regional Officer, Air Traffic Management and Search and Rescue
Mr. Ahmad Kaveh	Regional Officer, Air Traffic Management

From the ICAO EUR/NAT Office, Paris:

Mr. Christopher Keohan	Regional Officer, Meteorology

The meeting was also supported by the following team from ICAO Headquarters:

Mr. Martin Maurino	Technical Officer, Global Aviation Safety
Mr. Elie Elkhoury	Technical Officer, Airspace Management and Optimization

4. LANGUAGE

4.1 The discussions were conducted in English. Documentation was issued in English.

5. AGENDA

5.1 The following Agenda was adopted:

Agenda Item 1: Adoption of the Provisional Agenda (*Plenary*)

Agenda Item 2: Global and Regional Developments (*Plenary*)

2.1 ICAO update

- Review of action taken by the ANC on MIDANPIRG/19 and RASG-MID/9 Report
- Outcomes of the 41st Assembly
- Global Aviation Safety and Air Navigation developments
- Regional developments
- MID Region statistics and forecasts

2.2 Update from States and International Organizations (Achievements/Success Stories and Challenges)

- Agenda Item 3:** Review and Follow-up of Action Items arising from the previous Meetings (*Plenary*)
- 3.1 Follow-up on the PIRG/RASG MID Conclusions and Decisions
 - 3.2 Follow-up on the RASG-MID/9 Conclusions and Decisions
 - 3.3 Follow-up on MIDANPIRG/19 Conclusions and Decisions
- Agenda Item 4:** Coordination between MIDANPIRG and RASG-MID (*Plenary*)
- 4.1 Safety Subjects of interest to MIDANPIRG
 - MID Region Safety priorities and Status of Safety Performance
 - MID - RASP 2023-2025
 - 4.2 Air Navigation Subjects of interest to RASG-MID including RVSM operations and Monitoring
 - 4.3 MID Region Aerodromes Priorities and Challenges
- Agenda Item 5:** RASG-MID Work Programme (*RASG-MID/10*)
- 5.1 Outcomes of the ASRG
 - 5.2 Outcomes of the SEIG
 - 5.3 AGA-OPS
 - 5.4 Outcomes of the AIIG
 - 5.5 RASG-MID Working Arrangements
 - 5.6 Future Work Programme
- Agenda Item 6:** MIDANPIRG Work Programme (*MIDANPIRG/20*)
- 6.1. MID Region Air Navigation priorities and targets
 - 6.2. AIM
 - 6.3. PBN
 - 6.4. AGA-AOP
 - 6.5. ATM-SAR
 - 6.6. CNS
 - 6.7. MET
 - 6.8. Air Navigation Deficiencies
 - 6.9. States' bilateral coordination
- Agenda Item 7:** Future Work Programme and Dates and Venue of MIDANPIRG/21 & RASG-MID/11 (*Plenary*)
- Agenda Item 8:** Any other business (*Plenary*)

6. CONCLUSIONS AND DECISIONS – DEFINITION

6.1 The MIDANPIRG and RASG-MID record their 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.

7. LIST OF CONCLUSIONS AND DECISIONS

<i>PIRG/RASG MID CONCLUSION 1:</i>	<i>EVOLUTION OF AVIATION SAFETY PLANNING</i>
<i>PIRG/RASG MID CONCLUSION 2:</i>	<i>SHARING OF THE NASP</i>
<i>PIRG/RASG MID CONCLUSION 3:</i>	<i>MENA ARCM</i>
<i>PIRG/RASG CONCLUSION 4:</i>	<i>MENA RSOO</i>
<i>PIRG/RASG CONCLUSION 5:</i>	<i>CONTINUOUS COLLABORATION APPROACH TO MANAGING AND ENHANCING SAFETY IN MID REGION</i>
<i>PIRG/RASG CONCLUSION 6:</i>	<i>COORDINATION TO ENHANCE AIRSPACE OVER HIGH SEAS BETWEEN MID REGION AND APAC</i>
<i>RASG-MID CONCLUSION 10/1:</i>	<i>11TH ASR</i>
<i>RASG-MID CONCLUSION 10/2:</i>	<i>SHARING OF SAFETY DATA ANALYSIS</i>
<i>RASG-MID CONCLUSION 10/3:</i>	<i>RSA ON EGPWS/TAWS</i>
<i>RASG-MID CONCLUSION 10/4:</i>	<i>RSA ON DG INSPECTORS OVERSIGHT</i>
<i>RASG-MID CONCLUSION 10/5:</i>	<i>RSA ON OCCURRENCE REPORTING</i>
<i>RASG-MID CONCLUSION 10/6:</i>	<i>RSA ON SMS ASSESSMENT</i>
<i>RASG-MID CONCLUSION 10/7:</i>	<i>MID-RASP 2023-2025 EDITION</i>
<i>RASG-MID DECISION 10/8:</i>	<i>ESTABLISHMENT OF THE ACTION GROUP</i>
<i>RASG-MID DECISION 10/9:</i>	<i>ESTABLISHMENT OF THE ACTION GROUP</i>
<i>RASG-MID CONCLUSION 10/10:</i>	<i>DEVELOPMENT OF NATIONAL AVIATION SAFETY PLAN (NASP) IN MID STATES</i>
<i>RASG-MID CONCLUSION 10/11:</i>	<i>DEVELOPMENT OF SSP IN MID STATES</i>
<i>RASG-MID CONCLUSION 10/12:</i>	<i>ADHERENCE TO ICAO ANNEX 13</i>
<i>RASG-MID DECISION 10/13:</i>	<i>DISSOLUTION OF THE CIVIL HELICOPTER OPERATIONS WORKING GROUP</i>
<i>RASG-MID CONCLUSION 10/14:</i>	<i>SAFETY DATA ANALYSIS COLLECTION RELATED TO CIVIL HELICOPTER OPERATIONS</i>

<i>MIDANPIRG CONCLUSION 20/1:</i>	<i>MID RVSM SMR 2022</i>
<i>MIDANPIRG CONCLUSION 20/2:</i>	<i>MID RVSM SMR 2023</i>
<i>MIDANPIRG CONCLUSION 20/3:</i>	<i>LACK OF HEIGHT MONITORING OF SYRIAN RVSM APPROVED AIRCRAFT</i>
<i>MIDANPIRG CONCLUSION 20/4:</i>	<i>AWARENESS AND TRAINING ON RVSM SAFETY ASSESSMENT</i>
<i>MIDANPIRG CONCLUSION 20/5:</i>	<i>MID RVSM SAFETY ASSESSMENT SEMINAR</i>
<i>MIDANPIRG DECISION 20/6:</i>	<i>MIDRMA SUSTAINABILITY ACTION GROUP</i>
<i>MIDANPIRG CONCLUSION 20/7:</i>	<i>REVISED MID AIR NAVIGATION STRATEGY</i>
<i>MIDANPIRG CONCLUSION 20/8:</i>	<i>REVISED MID ANP VOL III</i>
<i>MIDANPIRG CONCLUSION 20/9:</i>	<i>DEVELOPMENT OF NANP</i>
<i>MIDANPIRG CONCLUSION 20/10:</i>	<i>WEB- BASED MID Air NAVIGATION REPORT (2022)</i>
<i>MIDANPIRG CONCLUSION 20/11:</i>	<i>WEB-BASED MID REGION AIR NAVIGATION REPORT (2023)</i>
<i>MIDANPIRG DECISION 20/12:</i>	<i>RANP/NANP TASK FORCE</i>
<i>MIDANPIRG CONCLUSION 20/13:</i>	<i>PROPOSAL FOR AMENDMENT TO THE MID EANP VOLUME I, TABLES ATM I-1 MID REGION FLIGHT INFORMATION REGIONS (FIRs)/UPPER INFORMATION REGIONS (UIRs) AND SAR I-1 MID REGION SEARCH AND RESCUE REGIONS (SRRs)</i>
<i>MIDANPIRG CONCLUSION 20/14:</i>	<i>PROPOSAL FOR AMENDMENT TO THE MID EANP VOLUME II TO INCLUDE INFORMATION RELATED TO QATAR FACILITIES AND SERVICES</i>
<i>MIDANPIRG CONCLUSION 20/15:</i>	<i>INTENTIONALLY LEFT BLANK</i>
<i>MIDANPIRG CONCLUSION 20/16:</i>	<i>IMPLEMENTATION OF C-DEC225: ESTABLISHMENT OF DOHA FOR/SRR</i>
<i>MIDANPIRG CONCLUSION 20/17:</i>	<i>WEBINAR ON AIM TRAINING MANUAL, FIRST EDITION, 2023</i>
<i>MIDANPIRG CONCLUSION 20/18:</i>	<i>NOTAM TEMPLATE FOR GNSS INTERFERENCE</i>
<i>MIDANPIRG CONCLUSION 20/19:</i>	<i>NOTAM TEMPLATE TO DISSEMINATE</i>

*INFORMATION RELATED TO RISKS TO CIVIL
AVIATION OVER OR NEAR CONFLICT ZONES*

- MIDANPIRG CONCLUSION 20/20: CCO/CDO PUBLICATION, CHARTING & DATABASE CODING*
- MIDANPIRG DECISION 20/21: ESTABLISHMENT OF MID AIM FORUM*
- MIDANPIRG CONCLUSION 20/22: MID REGIONAL IMPLEMENTATION PLAN FOR DIGITAL DATASETS*
- MIDANPIRG CONCLUSION 20/23: WEBINAR ON THE UPDATES TO THE PBN MANUAL – 5TH EDITION*
- MIDANPIRG CONCLUSION 20/24: PBN AIRSPACE DESIGN WORKSHOP*
- MIDANPIRG CONCLUSION 20/25: REVISED VERSION OF THE MID REGION PBN IMPLEMENTATION PLAN (DOC 007)*
- MIDANPIRG CONCLUSION 20/26: PBN CAPACITY-BUILDING AND ASSISTANCE ACTIVITIES*
- MIDANPIRG CONCLUSION 20/27: PROPOSAL FOR AMENDMENT TO THE MID EANP VOLUME II, TABLE ATM II-MID-I: MID REGION ATS ROUTE NETWORK*
- MIDANPIRG CONCLUSION 20/28: PROPOSAL FOR AMENDMENT TO THE MID EANP VOLUME II, TABLE ATM II-MID-2: MID REGION SSR CMP*
- MIDANPIRG DECISION 20/29: DISSOLUTION OF THE FWC2022 TASK FORCE*
- MIDANPIRG DECISION 20/30: MID ATM CONTINGENCY PLANNING AD-HOC ACTION GROUP*
- MIDANPIRG CONCLUSION 20/31: CONTINUATION OF THE CMC/FUA ACTION GROUP*
- MIDANPIRG CONCLUSION 20/32: MID HIGH LEVEL AIRSPACE CONCEPT V2.0*
- MIDANPIRG DECISION 20/33: DISSOLUTION OF THE HIGH-LEVEL AIRSPACE CONCEPT ACTION GROUP (HLAC AG)*
- MIDANPIRG CONCLUSION 20/34: SAR WORKSHOP*
- MIDANPIRG DECISION 20/35: REVIEW OF THE MID REGION ALLOTMENT PLAN*
- MIDANPIRG CONCLUSION 20/36: OPTIMIZATION OF FREQUENCY ASSIGNMENT IN THE MID REGION*

- MIDANPIRG CONCLUSION 20/37: INTER-REGIONAL COMMUNICATION LINKS*
- MIDANPIRG CONCLUSION 20/38: ACCREDITATION PROCEDURE FOR MID EXTERNAL COM OPERATORS*
- MIDANPIRG DECISION 20/39: UPDATE OF THE AMC ROUTING TABLES*
- MIDANPIRG CONCLUSION 20/40: AMHS/AMC WORKSHOP*
- MIDANPIRG CONCLUSION 20/41: VALIDATION ARINC ADDRESSEE*
- MIDANPIRG CONCLUSION 20/42: MID REGION GUIDANCE FOR THE IMPLEMENTATION OF AIDC/OLDI (ICAO MID DOC 006)*
- MIDANPIRG CONCLUSION 20/43: MID REGION ANS CYBERSECURITY ACTION PLAN*
- MIDANPIRG CONCLUSION 20/44: ANS CYBERSECURITY CAPACITY BUILDING ACTIVITIES*
- MIDANPIRG CONCLUSION 20/45: ENHANCEMENT ATM DATA CYBERSECURITY (ADCS) PORTAL*
- MIDANPIRG DECISION 20/46: NAV MON PLAN TEMPLATE*
- MIDANPIRG DECISION 20/47: GNSS RFI MITIGATION*
- MIDANPIRG CONCLUSION 20/48: ANALYSIS OF CNS FACILITIES BRA WEBINAR*
- MIDANPIRG CONCLUSION 20/49: GUIDANCE MATERIAL ON PROTECTING RADALT (ICAO MID DOC 015)*
- MIDANPIRG CONCLUSION 20/50: RADAR DATA SHARING IN THE MID REGION*
- MIDANPIRG CONCLUSION 20/51: MID REGION SURVEILLANCE PLAN (ICAO MID DOC 013)*
- MIDANPIRG CONCLUSION 20/52: 0.25-DEGREE WAFS HAZARD DATA*
- MIDANPIRG CONCLUSION 20/53: ANNEX 3 AMENDMENT 81 WAFS AND SADIS UPGRADES*
- MIDANPIRG CONCLUSION 20/54: MID REGION SIGMET GUIDE*

PART II: REPORT ON AGENDA ITEMS

REPORT ON AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA

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

REPORT ON AGENDA ITEM 2:**GLOBAL AND REGIONAL DEVELOPMENTS****2.1 ICAO Update****Review of action taken by the ANC on MIDANPIRG/19 and RASG-MID/9 Report**

2.1.1 The subject was addressed in WP/2 presented by the Secretariat. The meeting noted that the Air Navigation Commission (ANC) reviewed the MIDANPIRG/19 and RASG-MID/9 Report during its 220th Session, 18 April to 24 June 2022. The outcome of the ANC review was reported to the ICAO Council, AN-WP/9599 and C-WP/15370 refer.

2.1.2 The meeting noted with appreciation that the Commission commended the MID Region for the excellent quality of the regional reports, the progress made in the region and the coordination that took place between the MIDANPIRG and RASG-MID. The discussion of the ANC focused mainly on the followings:

- the actions taken by the region concerning the High-level Conference on COVID-19 (HLCC) recommendations;
- progress made with regard to the regional projects including the Middle East and North African States (MENA) Accident Investigation (AIG) Regional Coordination Mechanism (ARCM) and the MID Regional Flight Procedures Programme (MID FPP);
- regional safety priorities, including emerging risks;
- GNSS signal interference, and mitigating the risk of 5G implementation to safety-critical radio altimeter functions;
- unmanned aircraft operations;
- reduced vertical separation minimum (RVSM) Operations and Monitoring Activities in the MID Region;
- MID Region ATFM and MID FIFA World Cup 2022;
- MID Region Dashboard on Global Reporting Format (GRF) Implementation;
- and
- The challenges faced by MIDANPIRG and RASG-MID.

2.1.3 The Commission noted the achievements of the RASG-MID since the previous report. The Commission also noted that the tenth edition of the MID Regional Aviation Safety Report (MID-ASR), including MID Region safety priorities was endorsed by RASG-MID/9.

2.1.4 The Commission also noted the MIDANPIRG/19 activities and achievements, including the overall implementation level of the priority 1 Aviation System Block Upgrades (ASBU) Threads/Elements; the MID Region PBN Implementation Plan (MID Doc 007); the planning for ADS-B implementation; and the progress made with the implementation of regional projects like the MID Flight Procedure Program (MIDFPP).

2.1.5 The Commission was informed of the challenges faced by the MIDANPIRG and RASG-MID, including the alignment with the sixth edition of the Global Air Navigation Plan (GANP), at the national level; the few States that have a Universal Safety Oversight Audit Programme (USOAP) effective implementation (EI) score below 60 percent due to unstable internal security and/or political situations; and the lack of sharing of air navigation as well as safety data and safety information by the States, making it difficult for the MIDANPIRG and the RASG-MID to conduct data-based activities to address safety risks and deficiencies and properly monitor progress.

2.1.6 The Commission noted that there were no Conclusions or Decisions that required specific action by the ANC. The meeting considered the actions taken by the ANC and the Council on the MIDANPIRG/19 and RASG-MID/9 Reports during the discussions of the relevant agenda items.

Outcomes of the 41st Assembly

2.1.7 The subject was addressed in WP/3 presented by the Secretariat. The meeting noted with appreciation the outcomes of the ICAO 41st Assembly held at ICAO Headquarters from 27 September to 7 October 2022. The Assembly Report is available on the ICAO website, at: <https://www.icao.int/Meetings/a41/Pages/assembly-report-and-minutes.aspx>

2.1.8 The meeting noted that the most relevant outcomes to the MIDANPIRG and RASG-MID Work Programmes are:

- the endorsement of the latest editions of the Global Aviation Safety Plan (GASP) and the GANP;
- the endorsement of the Safety Stream recommendations from ICAO's High-level Conference on COVID-19 (HLCC 2021);
- the evolution of the Universal Safety Oversight Audit Programme (USOAP);
- the new ICAO Implementation Support Policy;
- agreement that regional aviation safety organizations and accident investigation bodies should be better supported through more sustainable funding and legal frameworks; and
- innovation and initiatives that will contribute to a more resilient future for the air transport sector.

2.1.9 The meeting recalled that the 41st ICAO Assembly adopted a long-term global aspirational goal (LTAG) for international aviation of net-zero carbon emissions by 2050 in support of the UNFCCC Paris Agreement's temperature goal. The achievement of the LTAG will rely on the combined effect of multiple CO₂ emissions reductions, including the accelerated adoption of new and innovative aircraft technologies, streamlined flight operations, and the increased production and deployment of sustainable aviation fuels (SAF). Accordingly, the meeting encouraged States and requested the subsidiary groups of MIDANPIRG and RASG-MID to consider LTAG as part of their national and regional planning and activities, as appropriate.

2.1.10 The meeting encouraged States to participate in the following air navigation global events:

- AN World 2023 –Shaping Skies of Tomorrow, ICAO HQ, 28-31 August 2023
- AN World 2023 –ATM Procedures for Today, Singapore, 23-27 October 2023
- DRONE ENABLE Symposium, ICAO HQ, 5-7 December 2023

Global Aviation Safety and Air Navigation developments

GASP 2023-2025, NASP, Safety Management, USOAP CMA

2.1.11 The subject was addressed in PPT/4 presented by the Secretariat.

2.1.12 The meeting was informed on the revised content in the 2023-2025 edition of the Global Aviation Safety Plan (GASP, Doc 10004) including the revision of targets, the status of the global high-risk categories of occurrences, and the migration of implementation support content, from the GASP to other ICAO documents. The meeting noted the latest guidance material and tools, related to the implementation of a national aviation safety plan (NASP), including the revised *Global Aviation Safety Roadmap* (Doc 10161) and the *Secure Portal on Operational Safety Risks and Emerging Issues*.

2.1.13 The meeting was informed on the latest update on Safety Management activities, including the content of Amendment 2 to Annex 19 – Safety Management, as well as developments in the Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA), and upcoming ICAO safety events. Based on the above, the meeting agreed to the following RASG-MID Conclusion:

PIRG/RASG CONCLUSION 1: EVOLUTION OF AVIATION SAFETY PLANNING

That States, nominate a focal point and provide information on the Secure Portal on Operational Safety Risks and Emerging Issues to support work of RASG and provide inputs for future editions of GASP.

PIRG/RASG CONCLUSION 2: SHARING OF THE NASP

That States, be reminded to share the latest version of their NASPs with ICAO HQ and ICAO MID Office for posting on the GASP public website.

Outcomes of CAPSCA/10 Meeting

2.1.14 The subject was addressed in PPT/8 presented by the Secretariat. The meeting noted the CAPSCA/10 Meeting main outcomes. The meeting encouraged States to convey their express of interest to receive the ICAO Technical Assistance Visits in order to measure the efficiency of their Airports Preparedness Plans in case of unexpected Public Health Event e.g., COVID-19. IATA highlighted the need to plan the visits with the annual work programme in coordination with WHO.

Regional Developments

2.1.15 The subject was addressed in WP/5 presented by the Secretariat.

2.1.16 The meeting was informed about the outcomes of the DGCA-MID/6 meeting and the status of implementation of its Conclusions at **Appendix 2.1A**.

2.1.17 The meeting noted the activities undertaken in support of the MIDANPIRG Enhancement Programme (MEP) and encouraged States and stakeholders to collaborate with the MID Office for the provision of necessary assistance to the States in need.

2.1.18 The meeting also noted the progress achieved by the MID Region Air Transport Strategic Plan 2025 - 2040 Drafting Group; and agreed on the way forward for the development of the Sections related to Aviation Safety and Air Navigation Capacity and Efficiency.

MIDANPIRG Enhancement Program (MEP)

2.1.19 The subject was addressed in PPT/11 presented by the Secretariat. The meeting was apprised of the objectives of the MEP initiative and challenges faced by MIDANPIRG.

2.1.20 The meeting recalled that DGCA-MID/6 meeting, through Conclusion 6/4, established the MEP to improve the level of implementation of the MID Air Navigation Plan (ANP) provisions and eliminate the reported Air Navigation deficiencies, through the collaboration of States and stakeholders for the provision of necessary assistance to the States in need. Furthermore, States were requested to provide contact details of their MEP focal points.

2.1.21 ICAO MID Office circulated a follow-up letter to DGCA-MID Conclusion 6/4. It was noted that Replies received from six (6) States (Bahrain, Egypt, Jordan, Saudi Arabia, Syria and UAE). The meeting urged States, have not yet done so, to nominate MEP focal point(s).

2.1.22 The meeting noted with appreciation the progress made under the MEP initiative to assist MID states in implementing regional air navigation plans (ANPs) and eliminating air navigation deficiencies.

2.1.23 The meeting supported the initiative to launch MIDANPIRG Award Competition. The annual competition will recognize excellent work and outstanding efforts exerted by MIDANPIRG Task force/action groups/Working groups. MIDANPIRG Chairperson will reward MIDANPIRG Award to members of winning groups based on selection process and criteria during MIDANPIRG meeting.

2.1.24 The public recognition aims to express appreciation by MIDANPIRG Chairperson, recognize the outstanding work, motivate groups' members and increase engagement and productivity.

2.1.25 The subject was addressed in PPT/6 presented by the Secretariat.

2.1.26 The meeting noted with appreciation that the iPack- National Aviation Safety Plan (NASP) which has been deployed and implemented by Iraq and Sudan. As a result, Iraq and Sudan NASPs have been success fully developed and copies shared with MID office.

2.1.27 The meeting also noted with appreciation that the iPacks -Unmanned Aircraft System (UAS), USOAP, and aerodrome Restart have been deployed and implemented by Jordan and Libya respectively.

Regional Projects (MENA-RSOO & MENA ARCM)

2.1.28 The subject was addressed in WP/9 and PPT/10 presented by the Secretariat.

2.1.29 The meeting noted that the MENA ARCM MoU has been signed by Fourteen (14) States namely Djibouti, Iraq, Iran, Jordan, Kuwait, Libya, Mauritania, Morocco, Palestine, Oman, Saudi Arabia, Sudan, United Arab Emirates, and Yemen.

2.1.30 The meeting also noted that the kick-off of the MENA ARCM operations has been officially announced during the Future Aviation Forum held in Riyadh, Saudi Arabia (9-11 May 2022).

2.1.31 The meeting was informed that the first and Second Meetings of the MENA ARCM Committee were held during the Future Aviation Forum in Riyadh, Saudi Arabia, 9-11 May 2022 and Jeddah, Saudi Arabia from 11 to 12 September 2022, respectively.

2.1.32 The meeting noted the updated progress on MENA ARCM establishment and operation, encouraged States to sign the MENA ARCM MoU if not yet done, and urged all States to support the MENA ARCM activities.

PIRG/RASG CONCLUSION 3: MENA ARCM

That States be encouraged to sign the MENA AIG Regional Cooperation Mechanism (MENA ARCM) MoU, if not yet done.

2.1.33 With respect to MENA RSOO, the meeting noted with appreciation the progress of the establishment and operations of MENA RSOO, in particular, the outcomes of the Second Steering Committee meeting (DGs Level) held on 10 May 2022 in Riyadh, Saudi Arabia, alongside the First Future Aviation Forum. It was highlighted that some MENA States have officially joined the MENA RSOO by presenting their signed copies of the Memorandum of Agreement (MoA) to ACAO. Accordingly, the meeting agreed to the following Conclusion:

PIRG/RASG CONCLUSION 4: MENA RSOO

That,

- a) *States are encouraged to Join the MENA RSOO by signing the revised Memorandum of Agreement; and*
- b) *States and Stakeholders are urged to support the establishment and operations of the MENA RSOO to enhance aviation safety at National and Regional levels.*

Continuous Collaboration Approach to Managing and Enhancing Safety in MID Region

2.1.34 The subject was addressed in PPT/7 presented by the Secretariat. The meeting was apprised of the Continuous Collaboration Approach to Managing and Enhancing Safety in MID Region, which was endorsed by DGCA-MID/6 meeting (Abu Dhabi, 1 – 3 November 2022) at **Appendix 2.1B**, including the challenges and the way forward. The meeting commended the ICAO MID Regional Office for developing this Collaborative Approach for Safety Enhancement and Management in the MID Region. Accordingly, the meeting agreed to the following Conclusion:

PIRG/RASG CONCLUSION 5: CONTINUOUS COLLABORATION APPROACH TO MANAGING AND ENHANCING SAFETY IN MID REGION

That,

- a) *States and Stakeholders are urged to support the implementation of the Continuous Collaboration Approach to Managing and Enhancing Safety in MID Region;*
- b) *Continuous Collaboration Approach to Managing and Enhancing Safety in MID Region to be included as a strategic approach within the RASG-MID and MIDANPIRG frameworks; and*
- c) *Coordinating the prioritization of Member States needs with ICAO MID Regional Office.*

ANS Cyber Resilience

2.1.35 The subject was addressed in PPT/13 presented by the Secretariat and IP/26 submitted by Saudi Arabia. The meeting noted that amendment 12 of the Annex 17 (effective 2011) included provisions to further strengthen Standards and Recommended Practices in order to address new and emerging threats to civil aviation including the security of air traffic service providers.

2.1.36 The meeting was approved the primary and secondary scope of the ATM security, it was highlighted that ATM security is part of Aviation Security and it's a national responsibility.

2.1.37 The meeting recalled that contingency planning is a regulatory requirement for ATSP under Annex 11. It was highlighted that Contingency Planning should include ATM security considerations.

2.1.38 The meeting was apprised of ICAO security management system and risk management system, ATM security oversight programme and ANS Security inspector qualification.

Cybersecurity in Air Navigation Services

2.1.39 The subject was addressed in WP/14 presented by CANSO.

2.1.40 The meeting noted that CANSO, ICAO NACC office and AIRBUS prepared the Air Traffic Management Cybersecurity Policy Template to help states implement cybersecurity mechanisms and culture across entire ATM systems and security operations. The template aims to enhance aviation system resilience, safeguarding information integrity, availability, confidentiality, and hardware/software protection, and support civil aviation security, national security and defence and law enforcement.

2.1.41 The meeting noted that Air Traffic Management Cybersecurity Policy Template as at the link: <https://canso.org/publication/air-traffic-management-cybersecurity-policy-template/> is a living document that will adapt to the changing environment we live in. Implementing a cybersecurity policy protects organisation while increasing safety. Accordingly, the meeting tasked the ACS WG to review and make use of the ATM cybersecurity policy template as appropriate.

2.1.42 The meeting noted with appreciation the offer received from CANSO to organize a Regional workshop to explain the template and start the cybersecurity ANSP evaluations. CANSO will coordinate the details with the ANS Cyber Security Working Group (ACS WG) and ICAO MID Office.

Air Navigation Charges and User Consultation & Engagement process by ANSPs in the MID Region

2.1.43 The subject was addressed in WP/15, presented by IATA. The Meeting noted the concerns raised in the region regarding the publication of Air Navigation Charges revisions without prior engagements with airspace users, and the lack of adoption by States to ICAO Doc 9082 (ICAO's Policies on Charges for Airports and Air Navigation Services) the main reference point outlining policies and recommendations for setting user charges by both airports and ANSPs.

2.2 Update from States and International Organizations (Achievements/Success Stories and Challenges)***Airspace optimization over high seas at the interface between the middle east and ASIA Pacific Regions***

2.2.1 The subject was addressed in WP/16, Presented by Oman, Saudi Arabia and UAE. The meeting noted the need to optimize the airspace over high seas between the MID and APAC Regions, to further enhance safety and enhance capacity and efficiency.

2.2.2 The meeting recalled the safety protocol opened by the MIDRMA between Muscat and Mumbai FIRs. And the expected traffic growth with an average annual rate of 4%.

2.2.3 Based on the above, the meeting agreed on the following Conclusion:

PIRG/RASG CONCLUSION 6: COORDINATION TO ENHANCE AIRSPACE OVER HIGH SEAS BETWEEN MID REGION AND APAC

That,

- a) ICAO MID is tasked to initiate and foster inter-regional and sub-regional initiatives that aim to enhance the airspace at the interface with the ASIA Pacific region; and*

-
- b) *States and aviation stakeholders are encouraged to collaborate and support airspace development initiatives aiming at enhancing safety, improve efficiency of the airspace over the high seas at the interface with Asia Pacific.*

2.2.4 Updates received on the National development from Oman, Saudi Arabia, UAE and Yemen were reflected in the related Agenda Items.

REPORT ON AGENDA ITEM 3: REVIEW AND FOLLOW-UP OF ACTION ITEMS ARISING FROM THE PREVIOUS MEETINGS**3.1 *Follow-up on the PIRG/RASG MID Conclusions and Decisions***

3.1.1 The subject was addressed in WP/17 presented by the Secretariat. The meeting reviewed the progress made for the implementation of the PIRG-RASG Conclusions and Decisions as at **Appendix 3.1A**.

3.2 *Follow-up on the RASG-MID/9 Conclusions and Decisions*

3.2.1 The subject was addressed in WP/18 presented by the Secretariat. The meeting reviewed the progress made for the implementation of the RASG-MID/9 Conclusions and Decisions as at **Appendix 3.1B**.

3.3 *Follow-up on MIDANPIRG/19 Conclusions and Decisions*

3.3.1 The subject was addressed in WP/19 presented by the Secretariat. The meeting reviewed the progress made in the implementation of MIDANPIRG/19 Conclusions and Decisions. The actions taken by States and the Secretariat on the above-mentioned Conclusions and Decisions were reviewed and the updated list is provided at **Appendix 3.1C**.

REPORT ON AGENDA ITEM 4: COORDINATION BETWEEN MIDANPIRG AND RASG-MID**4.1 *Safety Subjects of Interest to MIDANPIRG*****MID Region Safety priorities and Status of Safety Performance**

4.1.1 The subject was addressed in PPT/20 presented by the Secretariat. The meeting was apprised of the MID Region safety priorities.

4.1.2 Based on the analysis of the reactive and proactive safety information for the period 2017-2021, the safety priorities defined for the MID Region are:

Regional Operational Safety Risks

- a. Runway Excursion (RE) and Abnormal Runway Contact (ARC) during landing;
- b. Loss of Control Inflight - (LOC-I)
- c. Mid Air Collision- (MAC)
- d. Controlled Flight Into Terrain- (CFIT)
- e. Runway Incursion- (RI)

Organizational issues

- a. States' Safety Oversight Capabilities
- b. Safety management
- c. Human Factors and Competence of Personnel
- d. Cybersecurity

Emerging Risks

- a. GNSS interference
- b. COVID-19 Pandemic outbreak
- c. Ensure the Safe Operations of UAS
- d. Impact of Security on Safety
- e. 5G interference with Radio Altimeter

4.1.3 The meeting noted with appreciation the status of the MID region Safety performance.

MID - RASP 2023-2025 Edition

4.1.4 The subject was addressed in PPT/21 presented by the secretariat.

4.1.5 **Covered under Agenda Item 5.2 (outcome of SEIG)**

Protecting Aviation from potential harmful operation of the 5G

4.1.6 The subject was address in WP/22, presented by the secretariat. The meeting recalled that MIDANPIRG/19, through Conclusion 19/23, established Radio Altimeter Action Group to develop guidance material to protect the aircraft operations from potential Radio Altimeter interference associated with the deployment of cellular broadband/5G ground infrastructure near the bands used by Radio Altimeter.

4.1.7 The meeting noted with appreciation the activities conducted by the RADALT AG including the conduct of 5G/RADALT Webinar and the development of the Guidance material as tasked by MIDANPIRG/19.

4.1.8 The meeting noted that the guidance material developed by the RADALT Action Group will be used by Frequency Spectrum Management Panel (FSMP) to develop ICAO circular on the subject. The meeting commended the Action Group for the great efforts.

4.2 Air Navigation Subjects of interest to RASG-MID including RVSM operations and Monitoring

4.2.1 The subject was addressed in WP/23 and IP/32 presented by the MIDRMA and the Secretariat. The meeting recalled the MIDANPIRG Conclusion 19/2 related to the collection of data required for the development of SMR 2022, and the MIDRMA Board Decision 18/3 related to the Non-Compliance with MMR Requirements.

4.2.2 The meeting noted with concern, that Safety Objectives No. 1 and 3 continue to be met; however, the MID RVSM Airspace failed to meet Safety Objective No. 2. The value computed for the overall risk is estimated 1.724×10^{-7} , which is above the ICAO overall TLS of 5×10^{-9} . It was highlighted that the deterioration of the TLS (Safety Objective No. 2) is due mainly to an isolated incident for an aircraft operated within the MID RVSM Airspace between Sana'a and Mogadishu FIRs.

4.2.3 The meeting noted that the MIDRMA opened a safety protocol between Sana'a and Mogadishu ACCs, in coordination with the AFI RMA (ARMA) and the relevant ICAO Regional Offices. Additionally, the meeting noted the mitigation and corrective measures, included in the SMR2022, taken to avoid similar cases of non-RVSM approved Aircraft intruding the MID RVSM Airspace.

4.2.4 Based on all the above, the meeting agreed to the following Conclusions:

MIDANPIRG CONCLUSION 20/1: MID RVSM SMR 2022

That, the MID RVSM Safety Monitoring Report (SMR) 2022 at Appendix 4.2A, is endorsed.

4.2.5 The meeting recalled the discussion during the MIDANPIRG/19 related to the concern regarding the increased number of LHD reports submitted by Sana'a ACC; The meeting noted that the first coordination meeting was organized by the ICAO ESAF and MID Officers in Cairo, attended by ARMA and MIDRMA, and all the States near the Horn of Africa, to discuss the increased number of LHD reports filed by Sana'a ACC against its neighbouring FIRs. The LHD awareness campaign had been launched including granting access to the AFI State to enable them to monitor and submit LHD reports.

4.2.6 The meeting was apprised of the progress achieved related to the safety protocol between Muscat-Mumbai ACCs and the actions taken by States.

4.2.7 Based on the above, the meeting urged States concerned in coordination with the MIDRMA to take urgent actions to resolve the open safety protocols.

4.2.8 The meeting noted with concern the increased number of RVSM-Approved Aircraft operations without meeting the minimum RVSM monitoring requirements.

4.2.9 The meeting noted with concern the impact on the safety of international air transport due to unknown height-keeping monitoring results of the Iranian and Syrian registered aircraft due to the

limitation imposed on the use of EGMU. The meeting noted that despite all the efforts with U.S authorities, the OFAC license was not renewed to monitor the Iranian-registered aircraft and a new OFAC license had not been issued yet to allow the monitoring of the Syrian-registered aircraft.

4.2.10 The meeting noted the completion of monitoring of all Iranian registered aircraft (before expiration of the OFAC license) and the improvement of the number of monitoring Egyptian, Libyan and Sudanese registered aircraft.

4.2.11 Additionally, the meeting agreed to the following Conclusions:

MIDANPIRG CONCLUSION 20/2: MID RVSM SMR 2023

That, in order to support the MIDRMA in the timely development of the MID RVSM Safety Monitoring Report (SMR 2023):

a) States are required to provide the MIDRMA with:

- the FPL/traffic data for the period 1 – 30 June 2023 before 1 August 2023, and*
- LHD data for the period 1 January to 31 December 2023.*

b) only the appropriate “Traffic Data Sample” form, available on the MIDRMA website (www.midrma.com), should be used for the provision of FPL/traffic data to the MIDRMA; and

c) the final version of the MID RVSM SMR 2023 be ready for presentation to and endorsement by the MIDANPIRG/21 meeting.

MIDANPIRG CONCLUSION 20/3: LACK OF HEIGHT MONITORING OF SYRIAN RVSM APPROVED AIRCRAFT

That,

a) ICAO MID Office to contact the Syrian Civil Aviation Authority and address the issue of lack of height Monitoring of their RVSM approved aircraft; and

b) MIDRMA to circulate the status of the Syrian RVSM approved aircraft to all member States to advise all ATCUs regarding the updated status of the Syrian RVSM approved aircraft within their RVSM Airspace. In coordination with Syria and MIDRMA.

4.2.12 The meeting noted the request received from Syria’s request to circulate the list after 30 September 2023 to allow time for implementation of corrective actions.

4.2.13 The meeting highlighted the need for the MIDRMA to continue their efforts related to the awareness and training activities on RVSM safety monitoring with regional events (seminars, webinars, etc.) and individual activities targeting specific States/Focal Points. Accordingly, the meeting requested the MIDRMA to update its 2023 work programme to elevate awareness and promote compliance culture within the Region and individual member States.

4.2.14 Accordingly, the meeting agreed to the following Conclusions:

MIDANPIRG CONCLUSION 20/4: AWARENESS AND TRAINING ON RVSM SAFETY ASSESSMENT

That, with a view to raise the awareness related to the requirements for sustained RVSM safety monitoring activities and improve the knowledge of the States' regulators, MIDRMA Focal Points, ATC and Air Operators personnel:

- a) the MIDRMA include in its work programme regular missions to the Member States, during which briefings on the MIDRMA activities and RVSM safety monitoring requirements be provided to concerned personnel;*
- b) for improved effectiveness, the MIDRMA visit to a State be conducted, to the extent possible, back-to-back with the GMU height monitoring mission(s) related to the air operator(s) based in this State; and*
- c) MIDRMA to issue on regular basis flyers and newsletters addressing trending and emerging challenges related to RVSM safety monitoring.*

MIDANPIRG CONCLUSION 20/5: MID RVSM SAFETY ASSESSMENT SEMINAR

That, with a view to raise awareness related to the requirements for sustained RVSM safety monitoring and improve the knowledge of all involved parties, in particular with respect to the Vertical Collision Risk Methodology and Altimetry System Errors, the MIDRMA, in coordination with ICAO, organize a MID RVSM Safety Assessment Seminar, in 2023.

4.2.15 The meeting urged Libya to join the MIDRMA by signing the MIDRMA Agreement.

MIDRMA Sustainability

4.2.16 The subject was addressed in WP/25, presented by the secretariat. The meeting recalled the history of the establishment of the MIDRMA project hosted by Bahrain since 2008.

4.2.17 The meeting noted that the MIDRMA Board/18 Meeting discussed the subject related to the urgency to develop a succession plan for the MIDRMA addressing the staffing needs transfer of knowledge and training, business continuity; to ensure the continued success of the MIDRMA project. Accordingly, the meeting agreed to the following MIDRMA Board Decision to be endorsed:

MIDANPIRG DECISION 20/6: MIDRMA SUSTAINABILITY ACTION GROUP

That:

- a) the MIDRMA Sustainability Action Group is established to develop a Strategic Plan for the MIDRMA to ensure business continuity and sustainability; and*
- b) the Action Group is composed of members designated by:*
 - i. Bahrain;*
 - ii. Jordan;*

- iii. Oman;
- iv. UAE (*Rapporteur*);
- v. MIDRMA; and
- vi. ICAO MID.

4.2.18 The meeting noted that the first MIDRMA Sustainability Action Group was conducted (Virtual, 14 March 2023). The objective of the Action Group is to develop a Strategic Plan for the MIDRMA to ensure business continuity and Sustainability.

4.2.19 The Action Group meeting considered the success of the MIDRMA for the last 18 years as success story, and appreciated the tremendous support provided by Bahrain. It was also emphasized that the MIDRMA success is recognized even amongst the RMAs of other ICAO Regions.

4.2.20 After reviewing the history, current capabilities and resources of the MIDRMA the Action Group agreed on the following Layout/Table of Content of the MIDRMA Strategic Plan:

MIDRMA Business continuity and sustainability, Strategic plan (2024 - 2030)		
1	Duties and responsibilities	
	1.1	Global RMAs duties and responsibilities
	1.2	MIDRMA duties and responsibilities
	1.3	Host State responsibilities (MoA)
	1.4	MIDRMA Board responsibilities (ToR)
3	Financial	
	3.1	Funding mechanism
	3.2	Incomes and expenses
	3.3	Wages
2	MIDRMA Human Resources	
	2.1	Assessment of staffing needs
	2.2	Manpower/Succession Plan (retirement, recruitment, retention and training)
4	Technical	
	4.1	MIDRMA Tools
	4.2	MIDRMA Operating manual
	4.3	Use of advanced technologies for heigh monitoring
	4.4	Guidance material for continued RVSM safety monitoring of the MID Region

4.2.21 The meeting noted with appreciation the progress of the Action Group and invited the action group to present the outcomes to the MIDRMA Board meeting planned in the period 11 – 12 October 2023.

4.2.22 The meeting commended the work of the MIDRMA team and the Board chairman Mr. Ahmad Zainal for his service during the last 18 years.

4.2.23 The meeting may wish to recall the C-DEC225/10 related to the establishment of Doha FIR/SSR. And its implementation plan to transit the services provisions to Doha ACC (MIDANPIRG/20 PPT/43 refers). The meeting was apprised with the training provided to QCAA related to the RVSM implementation.

GNSS Interference

4.2.24 The subject was addressed in PPT/26 presented by the Secretariat and IATA. The meeting noted GNSS interference trend and distribution of GNSS signal loss by FIR.

4.2.25 The meeting noted that the majority of incidents reported occurred in Ankara FIR, Baghdad FIR and Cairo FIR. The meeting agreed on the need to follow-up with these States on implementation of mitigation measures.

4.2.26 Egypt raised concern in mentioning Egypt name in the report, without provision of the necessary data and requested IATA to provide detailed information on the incidents reported.

4.2.27 The meeting recalled that MIDANPIRG/19 tasked AIM SG to develop a standard NOTAM text to be used for GNSS Interference. The developed NOTAM template will be attached to the RSA-14.

4.2.28 The meeting noted that some of the MID States did not issue NOTAM in case of GNSS interference reported. The meeting encouraged States to issue NOTAM to provide timely warning to the aircrew on possible GNSS jamming.

4.2.29 The meeting noted the follow-up activities taken by ICAO and IATA. Furthermore, the meeting was apprised of circular (CR/488 dated 8 July 2022) issued by the ITU Radiocommunication Bureau (BR) on Prevention of harmful interference to Radio Navigation Satellite Service Receivers in the 1559 – 1610 MHz frequency band. In this regard, the meeting urged States to ensure the implementation of mitigation measures as outlined in the RSA-14 and ITU BR.

4.3 *MID Region Aerodromes Priorities and Challenges*

4.3.1 The subject was addressed in PPT/27. The meeting was briefed about the current challenges and priorities identified in the MID Region based on the monitoring mechanism established by the ICAO MID Office. The meeting encouraged States to submit their needs for Capacity Building in order to foster the implementation support.

REPORT ON AGENDA ITEM 5: RASG-MID WORK PROGRAMME**5.1 Outcome of the ASRG**

5.1.1 The subject was addressed in WP/28 and PPT/29 presented by the Secretariat. The meeting was apprised of safety data and safety information analysis and the safety priorities for MID Region.

5.1.2 Based on the analysis of the reactive and proactive safety information for the period 2017-2021, the safety priorities defined for the MID Region are:

Regional Operational Safety Risks

1. Runway Excursion (RE) and Abnormal Runway Contact (ARC) during landing
2. Loss of Control Inflight - (LOC-I)
3. Mid Air Collision- (MAC)
4. Controlled Flight Into Terrain- (CFIT)
5. Runway Incursion- (RI)

Organizational issues**States' Safety Oversight Capabilities**

5.1.3 USOAP-CMA audits had identified that State's inability to effectively oversee aviation operations remains a global concern. In respect of MID Region, the regional average overall Effective Implementation (EI) (13 out of 15 States have been audited) is 74.67 %, which is above the world average 68.68 % (as of 24th May 2021). Three (3) States are currently below EI 60%.

5.1.4 All eight areas have an EI above 60%. However, the areas of AIG and ANS still need more improvement. Regarding the Critical Elements (CEs), CE4 (Qualified technical personnel) improved and is above 60% (62.39%) EI, whereas CE8 (resolution of safety issues) is the only one below EI 60% (58.89%) EI.

Safety Management

5.1.5 States should build upon fundamental safety oversight systems to implement SSPs according to Annex 19; States shall require that applicable service providers under their authority implement an SMS. The average EI for SSP foundation PQs for States in the MID Region is 76.18%.

5.1.6 Implementation of SSP is one of the main challenges faced by the State in the MID Region. The RASG-MID addresses the improvement of SSP implementation in the MID Region as one of the top Safety Enhancement Initiatives (SEIs). In connection with this, the RSC/7 endorsed the MID Region Safety Management Implementation Roadmap and the establishment of the Safety Management Implementation Team (SMIT) to support MID States in the implementation of the SSP. The SMIT handbook endorsed by the RASG-MID/9 to guide the work of the SMIT team to support States in an effective way.

Human Factors and Competence of Personnel

5.1.7 As new technologies emerge on the market and the complexity of the system continues increasing, it is of key importance to have the right competencies and adapt training methods to cope with new challenges. The CRM has been identified as most important human factors issue in the domain of commercial air transport and safety actions would be identified and developed.

Cybersecurity

5.1.8 The global civil aviation ecosystem is accelerating towards more digitalization. This implies that any exchange of information within any digital workflow of the aviation community needs to be resilient to information security threats which have consequences on the safety of flight or the availability of airspace and beyond. Aware of the complexity of the aviation system and of the need to manage the cybersecurity risk the MID Region needs to consider and address information security risks in a comprehensive and standardized manner across all aviation domains. In addition, it is essential that the aviation industry and civil aviation authorities share knowledge and learn from experience to ensure systems are secure from individuals/organizations with malicious intent.

Emerging Safety Risks

5.1.9 Emerging safety issues are risks that might impact Safety in the future, these may include a possible new technology, a potential public policy, a new concept, business model or idea that, while perhaps an outlier today, could mature and develop into a critical mainstream issue in the future or become a major trend in its own right.

- GNSS interference
- COVID-19 Pandemic outbreak
- Ensure the Safe Operations of UAS
- Impact of Security on Safety
- 5G interference with Radio Altimeter

5.1.10 The meeting reviewed and endorsed the 11th MID-ASR and agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 10/1: 11th ASR

That, the Eleventh MID Annual Safety Report is endorsed and be posted on the ICAO MID Website.

5.1.11 The MID Annual safety reports (ASRs) are available at: [11th MID ASR-2022.pdf \(icao.int\)](https://www.icao.int/mid/ASR-2022.pdf)

5.1.12 The meeting noted the main challenges facing the ASRG for the development of the ASRs, in particular.

- limited sharing of safety information and safety data analysis by the States; and
- low participation in the meetings from the States and organizations.

5.1.13 The meeting recognized the importance of the collection and analysis of safety data and safety information so that to identify proactively the safety risks and address them in timely manner. The meeting agreed that the ASRG to explore ways of establishing MID region safety intelligence platform.

5.1.14 In connection with the above, the meeting reiterated the importance of sharing of safety data analysis for improved ASRs development and urged States to provide the ICAO MID Office by end of May 2023 the safety data analysis and their associated safety recommendations for the period (2018 – 2022). Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 10/2: SHARING OF SAFETY DATA ANALYSIS

That, in order to present an improved version of the 12th MID-ASR to the MID-ASRG/5

*meeting, States be urged to provide the ICAO MID Office by 30 May 2023 with the number of accidents, serious incidents and incidents, safety data analysis/information, and their associated safety recommendations in **Appendix 5.1A** for the past 5 years (2018 – 2022) and using the template in **Appendix 5.1B**.*

Potential Collaboration on Continued Operations Safety (COS)

5.1.15 The subject was addressed in PPT/30, IP/15, AND IP/16 presented by the FAA. The meeting was apprised and thanked the FAA for sharing the potential collaboration on Continued Operational Safety (COS).

5.1.16 The meeting noted the identified potential benefits that the States of Design (SoD) and States of Registry (SoR) can garner by sharing COS information including allowing for the development of relationships and establishing authority to authority contacts, providing infrastructure for rapid response to major disruptions, reducing the need for unilateral actions and allowing the SoD to assess the available data and take necessary actions promptly.

5.1.17 The meeting also noted the background on how the FAA established such collaborative forums in other regions, described how these forums operate and discussed potential topics for consideration.

REPORT ON AGENDA ITEM 5: RASG-MID WORK PROGRAMME**5.2 Outcomes of the SEIG****UPDATE ON THE IMPLEMENTATION PROGRESS OF THE SAFETY ENHANCEMENT INITIATIVES (SEIs)**

5.2.1 The subject was addressed in WP/31 and PPT/32 presented by the Secretariat. The Middle East Regional Aviation Safety Plan (MID-RASP) 2020-2022 Edition considers and supports the objectives and priorities of GASP 2020-2022 Edition. MID-RASP also emphasizes the importance of identifying and mitigating risks at MID region level.

5.2.2 The Eighth meeting of the Regional Aviation Safety Group– Middle East (RASG-MID/8) was held in Cairo, Egypt, Virtual Meetings, 15-22 February 2021; reviewed and endorsed the MID-RASP 2020-2022 Edition including the SEIs list and their respective actions through RASG-MID Conclusion 8/3.

5.2.3 The meeting was apprised with appreciation on the updated SEIs and their respective safety actions at **Appendix 5.2A** and noted that 34 Safety actions out of 53 have been implemented and completed.

SEIs GUIDANCE MATERIAL DEVELOPMENT

5.2.4 The meeting was apprised with appreciation on the guidance material developed by IATA on measures to improve the effectiveness of Enhanced Ground Proximity Warning System (EGPWS)/Terrain Awareness and Warning System (TAWS) to mitigate the risks related to CFIT.

5.2.5 The meeting noted that the industry is aware that the mandate of EGPWS/TAWS and the immediate response to EGPWS/TAWS warnings has been proven to be a great barrier to prevent CFIT accidents when used as intended.

5.2.6 The meeting also noted that experience has also proved that State safety oversight is an essential tool in ensuring that safety recommendations and best practices are an integral part of airlines' operations. Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 10/3: RSA ON EGPWS/TAWS

*That, the guidance material (RSA-16) on measures to improve the effectiveness of Enhanced Ground Proximity Warning System (EGPWS)/Terrain Awareness and Warning System (TAWS) at **Appendix 5.2B** is endorsed.*

5.2.7 The meeting noted with appreciation the guidance material developed by the States of Bahrain and Oman to support States' inspectors to conduct oversight to ensure safe transport of Dangerous goods by air.

5.2.8 The guidance material intends to address the regulatory, technical and operational aspects of safe transport of Dangerous Goods by air and was developed with the purpose of providing guidelines for competent authorities involved to ensure the implementation of safety controls for movement of DG by air. Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 10/4: RSA ON DG INSPECTORS OVERSIGHT

*That, the guidance material (RSA-18) to support States inspectors to conduct oversight to ensure safe transport of dangerous goods by air at **Appendix 5.2C** is endorsed.*

5.2.9 The meeting noted with appreciation the guidance material developed by the State of UAE to support States' on developing occurrence reporting system for the CAA and on establishing an effective operation of the mandatory and voluntary reporting systems.

5.2.10 The meeting also noted that occurrence reports are a core data source used to inform the CAAs decision and policy making, it also assists in setting State's Strategic Safety Objectives and safety intelligence. Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 10/5: RSA ON OCCURRENCE REPORTING

*That, the guidance material (RSA-17) to support States' on developing an occurrence reporting system for the CAA and on establishing an effective operation of the mandatory and voluntary reporting systems at **Appendix 5.2D** is endorsed.*

5.2.11 The meeting was apprised with appreciation on the guidance material developed by the State of UAE to support States' on developing and conducting an SMS Assessment on its Service providers.

5.2.12 The meeting noted that as part of the State Safety Assurance; and as the SSP sets out the requirements for the State and service providers' safety assurance processes; the oversight and surveillance activities on service providers and the internal review of its regulatory and administrative processes. Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 10/6: RSA ON SMS ASSESSMENT

*That, the guidance material (RSA-19) to support States' on developing and conducting an SMS Assessment on their Service providers at **Appendix 5.2E** is endorsed.*

MID Region Safety Priorities and Targets

5.2.13 Covered under Agenda item 4.1 "Safety Subjects of Interest to MIDANPIRG".

GASP & NASP Update

5.2.14 The meeting was informed about the latest amendments to the 2023-2025 edition of the GASP including the revision of targets taking into account several factors such as the impact of the COVID-19 pandemic on aviation safety-related activities.

5.2.15 The meeting also informed that the Guidance related to the development and implementation of a national aviation safety plan (NASP) is updated and published to coincide with the 2023-2025 edition of the GASP.

5.2.16 The meeting was informed that a dedicated NASP Implementation Package (iPACK) was also launched in 2022 to assist States with the development of their plans.

MID RASP 2023-2025 Edition

5.2.17 The Middle East Regional Aviation Safety Plan (MID-RASP) 2023-2025 Edition presents the strategic direction for the management of aviation safety in the MID Region, to strengthen Member States Safety Oversight System, and risk-based approach to managing safety and support effective implementation of States' Safety Programmes (SSP) and Safety Management System (SMS) including the development of NASPs.

5.2.18 The MID-RASP 2023-2025 Edition identifies MID Region Safety Performance Measurement and Monitoring (SPMM) with specific safety targets in line with GASP and the RASG-MID would continuously monitor the implementation of the Safety Enhancement Initiatives (SEIs) and measure safety performance of regional civil aviation, to ensure the intended targets are achieved using the MID Region SPM.

5.2.19 The MID-RASP provides strategy for improving safety within a specified timeframe, through defined SEIs in a coordinated, cooperative and collaborative approach among States, international organizations, and industry to achieve Safety Targets.

5.2.20 The MID-RASP strategic approach would focus on organizational challenges/issues, regional operational safety risks, and emerging risks as indicated below:

- a) Organizational challenges/issues including the States 'safety oversight, safety management, aircraft accident and incident investigation, human factors and competence of personnel, and Cybersecurity.
- b) Regional operational safety risks, the focus would be on Regional high risks categories (R-HRC) identified in the GASP 2023-2025 Edition mainly the LOCI-I, CFIT, RE, RI, and MAC; and
- c) Emerging risks, the focus would be on COVID-19 pandemic outbreak, Civil drones (Unmanned Aircraft Systems), GNSS interference, impact of security on safety, and 5G interference with Radio altimeter.

5.2.21 The meeting commended the ICAO MID Office efforts for developing the MID-RASP 2023-2025 Edition including the SEIs & safety action and the MID Region safety performance measurement and monitoring; which would mainly support States to effectively implement their SSP in a timely manner, and to strengthen the implementation of SMS in their aviation industry including the National Aviation Safety plan (NASP); State's safety oversight system; and a risk-based approach to managing safety as well as a coordinated approach to collaboration between States, international organizations, and industry.

5.2.22 Thus, to address regional operational risks, organizational issues, and emerging risks; 24 Safety Enhancement Initiatives (SEIs) and 61 safety actions have been identified, developed and proposed. Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 10/7: MID-RASP 2023-2025 EDITION

That,

- a) *the MID-RASP 2023-2025 Edition including the Safety Enhancement Initiatives (SEIs) and the MID region Safety Performance Measurement and Monitoring (SPMM) at **Appendix 5.2F** is endorsed; and*
- b) *urge States, international organization, and industry to support the MID-RASP 2023-2025 Edition activities including SEIs and their respective safety actions.*

5.2.23 The meeting recognized the importance to develop harmonized mechanism to manage the civil aviation exemption by various CAAs in the MID region and the need to establish an Action Group led by the State of Qatar to develop guidance material. Accordingly, the meeting agreed to the following RASG-MID Decision:

RASG-MID DECISION 10/8: ESTABLISHMENT OF THE ACTION GROUP

That, the Action Group composed of the following States & international organizations and their nominated experts, is established to develop the guidance material to assist MID Region States in the issuance of exemptions related to temporary deviations from standards impacting Articles 38 and 40 of the Chicago Convention.

- Iran: Mr. Mahmoodreza Rohani
- Qatar: Dr. Ramy Saad
- Sudan: Mr. Bahaeldin AbdAlrahim Yassin
- UAE: Mr. Ahmed Salim Abdalla AlSaabri
- IATA: Mr. Jehad Faqir
- ACAO: Mr. Hicham Bennani

5.2.24 The meeting recognized the importance to develop guidance material to support States for the conduct of remote surveillance and the need to establish an Action Group led by the State of Qatar to develop guidance material. Accordingly, the meeting agreed to the following RASG-MID Decision:

RASG-MID DECISION 10/9: ESTABLISHMENT OF THE ACTION GROUP

That, the Action Group composed of the following States and their nominated experts, is established to develop the guidance material to support States for the conduct of remote surveillance.

- Iran: Mr. Jaber Goodarzi
- Jordan: Eng. Rawan Al-Naimat
- Qatar: Dr. Ramy Saad
- Saudi Arabia: Mr. Khalid Alharbi
- Sudan: Mr. Bahaeldin AbdAlrahim Yassin
- UAE: Mr. Eisa Saeed Al Mesmari
- ACAO: Mr. Hicham Bennani

5.2.25 The meeting also agreed to include both proposed guidance material in the draft MID-RASP 2023-2025 Edition as safety actions and be covered under G2-SEI-01.

MID States Progress on NASPs Development

5.2.26 In line with the Safety Strategic Objective of the International Civil Aviation Organization (ICAO), the 2023-2025 edition of the Global Aviation Safety Plan (GASP, Doc 10004) presents the global strategy for the continuous improvement of aviation safety. It also provides a framework in which regional and national aviation safety plans (RASPs and NASPs) are developed and implemented.

5.2.27 The States NASP should be developed in alignment with the GASP and the MID-RASP. However, priority should be given to national safety issues. Moreover, the NASP should be also aligned and coordinated with the MID-RASP (as appropriate).

5.2.28 The meeting noted that States of Iraq, Kuwait, Lebanon, Oman, Saudi Arabia, Sudan, and UAE completed and shared their NASPs with ICAO MID office.

5.2.29 The meeting recognized the challenges facing the States in the development of their NASPs. In this respect, the meeting noted that the ICAO MID Office is planning to conduct Assistance Missions dedicated to NASP in order to support States with NASP development.

5.2.30 The meeting also noted the challenges faced by States in developing their NASPs.

- Coordination and communication with stakeholders
- Senior management commitment
- New technologies (UAS and eVTOL)
- Lack of safety data and safety information
- Lack of NASP workshops/trainings
- Lack of resources including financial

Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 10/10: DEVELOPMENT OF NATIONAL AVIATION SAFETY PLAN (NASP) IN MID STATES

That, States

- a) *urged to develop and implement the NASP in line with the GASP and MID-RASP, if not yet done so;*
- b) *encouraged to continue to use existing ICAO guidance material and tools to implement their NASPs;*
- c) *encouraged to share the latest version of their NASPs with ICAO HQ and ICAO Regional MID office for posting on the GASP public website;*
- d) *encouraged to request assistance from the ICAO MID Regional Office related to the development of their NASPs including the conduct of assistance missions and/or customized NASP Workshop for each State; and*
- e) *encouraged to share their experiences related to the development of their NASPs during the SEIG meetings and/or Regional NASP Workshop to be organized by the ICAO MID Regional Office in 2024.*

State Safety Programme (SSP)

5.2.31 The meeting recalled the Regional Roadmap for Safety Management Implementation and the Safety Management Implementation Team (SMIT) Handbook endorsed by through RSC Conclusion 7/10 and Conclusion RASG-MID 9/4 respectively. States should build upon fundamental safety oversight systems to implement effective SSPs. As per Annex 19, States shall require that applicable service providers under their authority implement an SMS. The SMS enables service providers to capture and transmit safety information, which contributes to safety risk management. An SSP requires the implementation of a risk-based approach to measure and monitor the safety performance of the State's civil aviation system and the progress towards achieving the State's safety objectives. In this context, the role of the State evolves to include the establishment and achievement of safety performance targets, as well as effective oversight of its service providers' SMS.

5.2.32 The meeting recognized the challenges facing the States on the development of SSP. In this respect, the meeting was apprised about MID Regional Office to conduct Assistance Missions dedicated to SSP in order to support States with SSP development. Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 10/11: DEVELOPMENT OF SSP IN MID STATES

That, States be:

- a) *encouraged to effectively implement their State Safety Programme in a timely manner, and to strengthen the implementation of safety management systems in their aviation industry;*
- b) *encouraged to request assistance from the ICAO MID Regional Office related to the development and implementation of their SSPs including the conduct of assistance missions and/or customized SSP implementation Workshop for each State;*
- c) *encouraged to support the SMIT activities;*
- d) *share their experiences on the development of their SSPs during the SEIG meetings;*
- e) *encouraged to share their latest version of SSP manuals with ICAO MID Office; and*
- f) *States are urged to provide the ICAO MID Office by 30 June 2023 with the SSP information using the template in Appendix 5.2G to support MID office in identifying and prioritising the needs of States on SSP development and implementation.*

IATA PPTs (GNSS Interference and Risk Based IOSA

5.2.33 The meeting was informed about the IATA presentations on the GNSS interference analysis, 2022 Mid-year accident update and the risk based IOSA.

Acceptable Level of Safety Performance (ALoSP) process

5.2.34 The subject was addressed in WP/89 presented by UAE.

5.2.35 The meeting was apprised and thanked UAE for sharing the Acceptable Level of Safety Performance (ALoSP) process for Air Navigation Service providers and Aerodrome operators, which aims to highlight the importance of monthly reporting using the Safety Performance Management Tool in achieving acceptable levels of safety and its application within the framework of the UAE State Safety Program.

5.2.36 The meeting noted with appreciation that the UAE kindly offered to provide virtual training and support required to establish or enhance a State Safety Performance Management Tool.

Judicial enforcement for aviation inspectors

5.2.37 The subject was addressed in WP/90 presented by Qatar.

5.2.38 The meeting was apprised and thanked Qatar for proposing the development of guidance material on the enhancement of understanding the concept of judicial enforcement for aviation inspectors.

5.2.39 The meeting supported the proposal to be covered in MID-RASP 2023-2025 Edition under the Goal 2: Safety Enhancement initiative G2-SEI-01. Accordingly, the meeting agreed that Qatar to take the lead in developing the guidance material with the support of UAE and Saudi Arabia.

Saudi Arabia's Experience

5.2.40 The subject was addressed in IP/28 and IP/29 submitted by Saudi Arabia.

5.2.41 The meeting noted the Saudi Arabia experience related to the Safety and Quality management and the development of Kingdom of Saudi Arabia State Safety Programme (SSP).

REPORT ON AGENDA ITEM 5: RASG-MID WORK PROGRAMME**5.3 AGA OPS**

5.3.1 The subject was addressed in PPT/33, WP/87 and WP/88 respectively presented by the Secretariat, Oman and UAE.

5.3.2 The meeting noted with appreciation the Aerodromes Dashboards indicating the MID States' performances pertaining to the implementation of Aerodrome Certification, Runway Safety Teams and the Global Reporting Format implementation/deployment.

5.3.3 The meeting noted the Implementation Support Activities provided by the ICAO MID Office Aerodromes Design and Operations that were planned in line with the MID Regional Aviation Safety Plan (MID-RASP) Safety Enhancement Initiatives (SEIs).

5.3.4 The meeting noted the guidelines proposed by Oman and agreed that these guidelines will serve as a tool to support, reinforce safety oversight capabilities and flourish the external interfaces and interaction collaboration between states in the MID Region with the implementation of the SSP component within the state.

5.3.5 The meeting agreed that this initiative will be considered as safety action in the MID-RASP 2023-2025 Edition and the Aerodromes Safety Planning and Implementation Group (ASPIG) will be coordinating the development of the related guidelines.

5.3.6 The meeting noted the UAE's progress in the development and publication of their national regulation on Vertiports and which covers the certification, design, and operational requirements for Vertiports.

5.3.7 The meeting invited UAE to convey their regulation to the concerned ICAO Panel, dealing with development of the international provisions about the Vertiports, for their consideration.

5.3.8 The meeting noted with appreciation the willingness of UAE General Civil Aviation Authority to offer their support in providing guidance and training to member States on vertiports certification.

Oman experience on authorisation of landing area

5.3.9 The subject was addressed in IP/20 submitted by Oman.

5.3.10 The meeting noted the Sultanate of Oman experience on the procedure used for the authorisation of landing area.

Saudi Arabia experience on GHSPs Oversight

5.3.11 The subject was addressed in IP/27 submitted by Saudi Arabia.

5.3.12 The meeting noted the Saudi Arabia process on the GHSPs Oversight which emphasizes the crucial and indispensable role of Aerodrome Operators in the day-to-day safety and operational oversight of their GHSPs.

REPORT ON AGENDA ITEM 5: RASG-MID WORK PROGRAMME**5.4 Outcomes of the AIIG**

5.4.1 The subject was addressed in WP/34 presented by the Secretariat.

MENA ARCM/1 Meeting***Development of MENA ARCM Platform***

5.4.2 The meeting mainly recalled that:

- The ACAC/EC/42 Meeting (Rabat, Morocco, 17-18 Dec 2012) has approved, by decision 6-EC/42 the common ICAO-MID and ACAC strategy on the implementation of a RAIO in the MENA region which has been developed as result of the ACAC/ICAO Workshop (Rabat, Morocco, 12-13 Dec 2012) on the Air Safety regional programmes.
- The DGCA-MID/4 meeting (Muscat, Oman, 17-19 October 2017) endorsed the Strategy for the Enhancement of Cooperation in the Provision of AIG Services in the MENA Region.
- The DGCA-MID/5 meeting (Kuwait, 4- 6 November 2019) endorsed the AIG Regional Cooperation Mechanism (ARCM).
- The 5th virtual DGCA-MID meeting reviewed and endorsed the MENA ARCM MoU (in both languages Arabic and English) from the AIIG/1 virtual meeting (7-9 September 2021).
- The progress related to the establishment of the MENA ARCM and noted with appreciation that so far, tenth (10) States signed the MENA ARCM MoU at namely Iraq, Iran, Kuwait, Morocco, Palestine, Oman, Saudi Arabia, Sudan, UAE, and Yemen.

5.4.3 The meeting was informed about the importance of the development of the MENA ARCM database platform to define the available resources and capabilities among the Member States.

Questionnaire on Establishing a Platform for Sharing Safety Recommendations Issued by the MENA States

5.4.4 The meeting recalled that the RASG-MID/9 endorsed the establishment of a repository for MENA ARCM Member States to allow sharing the analysis of their safety recommendations through RASG-MID conclusion 9/7.

5.4.5 The meeting informed that the ICAO MID office would circulate a State Letter on the questionnaire to the MENA ARCM Member States.

JOINING RAIO-CP

5.4.6 The meeting was also informed that the MENA ARCM joined the RAIO-CP.

MENA ARCM Ceremony

5.4.7 The MENA AIG Regional Cooperation Mechanism (MENA ARCM) is a mechanism, which will foster cooperation among MENA member States for the provision of AIG functions. The ceremony was an opportunity for other states to sign the MoU and join the MENA ARCM.

5.4.8 The meeting was informed that the MENA ARCM MoU has been signed by Fourteen (14) States namely Djibouti, Iraq, Iran, Jordan, Kuwait, Libya, Mauritania, Morocco, Palestine, Oman, Saudi Arabia, Sudan, United Arab Emirates, and Yemen.

5.4.9 The meeting was also informed that the kick-off of the MENA ARCM operations has been officially announced during the Future Aviation Forum held in Riyadh, Saudi Arabia (9-11 May 2022).

MENA ARCM/2 Meeting

5.4.10 The meeting was informed that the Eng. Albara'a, Director of Engineering Lab, Accident Investigation Bureau, and Kingdom of Saudi Arabia was unanimously elected as the Coordinator for the MENA ARCM.

Development of the MENA ARCM database Platform

5.4.11 The meeting was informed about the work achieved by the MENA ARCM Database Team presented by the MENA ARCM coordinator. Accordingly, the meeting:

- noted that Questionnaire on the database was circulated to the MENA ARCM member States. It is also noted that 7 States (Jordan, Libya, Palestine, Oman, Saudi Arabia, Sudan and UAE) only replied to the Questionnaire and provided the data.
- urged the remaining States to provide their replies to the coordinator as soon as possible within 15 days.
- noted with appreciation the action plan (working program) for the next 6 months, presented by the coordinator.
- agreed on the developed database using initially the excel sheet. In addition, the meeting agreed to explore other option for the development of the platform.

MENA ARCM database Platform Management

5.4.12 The meeting was informed about the progress made on the MENA ARCM database platform management and noted the followings:

- ICAO will host the database supported by ACAO.
- MENA ARCM Coordinator to collect the data from the MENA ARCM Member States in coordination with the assigned States Focal Points.
- The coordinator to share the received/updated data with ICAO and ACAO.
- ICAO and ACAO to circulate the received/updated Data among MENA ARCM member States.
- The frequency of reporting/updating data to be biannually and as needed.
- The coordinator to clearly define the area of cooperation / parameters.
- The coordinator to collect the unscheduled trainings and be provided to ACAO and ICAO, so that to be circulated to the MENA ARCM Member States.

MENA ARCM technical Assistance Mechanism

5.4.13 The meeting was informed about the MENA ARCM technical assistance mechanism proposed by the UAE and the MENA ARCM coordinator in coordination with the States assigned focal points tasked to:

- review and study the UAE proposal in order to come out with the draft form, processes and procedures;
- develop KPI, so that to measure the MENA ARCM's performance (assistance mechanism); and
- develop the non-disclosure agreement.

Questionnaire on Establishing a Platform for Sharing Safety Recommendations

5.4.14 The meeting was informed about the progress made on the analysis of the questionnaire.

5.4.15 The meeting also noted that the discussion on the establishment of MENA ARCM platform for sharing safety recommendations to be postponed at this stage and will be discussed during the 4th MENA ARCM meeting which will be held in Morocco.

AIIG/2 Meeting

5.4.16 The meeting was informed about the amendments 17 and 18 to Annex 13 and the Analysis & Guidance on USOAP CMA AIG Area.

5.4.17 The meeting was also informed about the AIG Workshop held back-to-back with MENA ARCM/2 meeting hosted in Jeddah, Saudi Arabia and that 18th presentations have been presented by States (Morocco, Saudi Arabia, and UAE), ICAO, and industry (Airbus and Boeing).

Accident and Investigation Reporting

5.4.18 The subject was addressed in PPT/91 presented by IATA.

5.4.19 The meeting noted the status of accident data between the period 2018 to 2022 and 214 accidents in total occurred during the reported period of which 96 final investigation reports have been completed.

5.4.20 It stressed the importance of adhering to the provisions of ICAO Annex 13 where states must submit a Preliminary Report to ICAO within thirty days and final report within 12 months. Accordingly, the meeting agreed to the following RASG-MID Conclusion:

RASG-MID CONCLUSION 10/12: ADHERENCE TO ICAO ANNEX 13

That, the State conducting an investigation must submit a Preliminary report to ICAO within thirty days of the date of the accident and release the final report within twelve months in accordance with ICAO Annex 13 requirement.

REPORT ON AGENDA ITEM 5: RASG-MID WORK PROGRAMME**5.5 RASG-MID Working Arrangements**

5.5.1 The subject was addressed in WP/35 presented by the Secretariat. The meeting recalled that based on a proposal from Saudi Arabia, the RASG-MID/9 meeting, through Decision 9/10 established the Civil Helicopter Operations Working Group (CHOPWG) composed of Seven (7) States. The meeting noted with concern that the First Meeting of the Group organized by the Secretariat was held with participation of Saudi Arabia only and it was cancelled accordingly due to absence of other Member States.

5.5.2 The meeting highlighted that most of the Helicopter Operations are conducted at domestic level. Accordingly, the meeting agreed to dissolve the CHOPWG due to low international Commercial Civil Operations and agreed to the following Decision:

**RASG-MID DECISION 10/13: DISSOLUTION OF THE CIVIL HELICOPTER
OPERATIONS WORKING GROUP**

That,

- a) the CHOPWG is dissolved;*
- b) the RASG-MID Organizational Structure be updated as at **Appendix 5.5A**;
and*
- c) the RASG-MID Procedural Handbook be revised and presented to RASG-MID/11 Meeting for endorsement.*

5.5.3 In the same vein, the meeting recognized the importance of collecting and analyzing the Safety Data and Information related to Civil Helicopter Operations in the MID Region to be included in MID Region Annual Safety Report, which would enable the development of the safety Enhancement Initiatives to be considered in the MID RASP. Accordingly, the meeting agreed to the following Conclusion:

**RASG-MID CONCLUSION 10/14: SAFETY DATA ANALYSIS COLLECTION
RELATED TO CIVIL HELICOPTER
OPERATIONS**

That States are urged to share their Safety Data Analysis to be included in MID Region Annual Safety Report.

REPORT ON AGENDA ITEM 5: FUTURE WORK PROGRAMME**5.6 *Future Work Programme****Update on GASP*

5.6.1 The subject was addressed in PPT/36 presented by the Secretariat.

5.6.2 The meeting was informed on detailed amendments to the 2023-2025 edition of the GASP including the content of the plan.

5.6.3 The meeting noted the work being undertaken by the ICAO GASP Study Group (GASP-SG), which includes representation from MID States, to support the development and implementation of NASPs.

5.6.4 The meeting was informed of the latest developments related to the GASP and the evolution towards the 2026-2028 edition of the plan, including key milestones, such as the 14th Air Navigation Conference, to be held at ICAO Headquarters in Montreal, in 2024.

REPORT ON AGENDA ITEM 6: MIDANPIRG WORK PROGRAMME**6.1 MID Region Air Navigation Priorities and Targets***Outcome of the GANP/NANP Workshop*

6.1.1 The subject was addressed in PPT/38 presented by the Secretariat.

6.1.2 The Meeting noted that the Assembly, through Resolution A41-6, endorsed the 2023-2025 edition of the Global Air Navigation Plan (GANP) as the global strategic directions for safety and the evolution of the air navigation system.

6.1.3 The meeting was provided with the highlights of the seventh edition of the GANP 7th edition which encompassed minor updates.

6.1.4 The meeting noted also that The ICAO MID Workshop on the Global Air Navigation Plan and National Air Navigation Plan (GANP & NANP) was successfully held in the ICAO Middle East Office, Cairo, Egypt, 5 – 8 March 2023.

6.1.5 It was highlighted that the GANP-NANP workshop reviewed and updated the MID Region Air Navigation Strategy (ICAO MID Doc 002).

6.1.6 The meeting was apprised of the revised version of the MID Region Air Navigation Strategy (ICAO MID Doc 002) and agreed to the following MIDANPIRG Conclusions:

MIDANPIRG CONCLUSION 20/7: REVISED MID AIR NAVIGATION STRATEGY

That, the Revised MID Air Navigation Strategy (Doc 002) is endorsed and be published by the ICAO MID Office.

MIDANPIRG CONCLUSION 20/8: REVISED MID ANP VOL III

That, the Revised MID ANP Vol III is endorsed and be published by the ICAO MID Office.

6.1.7 The meeting urged States to expedite implementation of the performance-based approach and develop their National Air Navigation Plan (NANP). Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/9: DEVELOPMENT OF NANP

That, in order to enable prioritization and optimum allocation of resources for all planned projects within States:

- a) *States be urged to develop NANP based on a performance-based approach and the six-step performance management process six-step performance management process described in the Manual on Global Performance of the Air Navigation System (Doc 9883) and the Revised MID Air Navigation Strategy (Doc 002); and*
- b) *ICAO MID to conduct assistance missions/Workshops at National level on GANP/NANP in 2023-2024.*

Web-based MID AN Report for 2022

6.1.8 The subject was addressed in PPT/39 presented by the Secretariat.

6.1.9 The meeting noted that the Web-based MID Air Navigation Report for 2022 has been developed to increase users' engagement, improve information accessibility and increase visibility. The link to the web-based report is <https://www.icao.int/MIDANReport/Pages/default.aspx>

6.1.10 Based on the analysis of the implementation status, the following have been raised:

- the overall status of implementation of Priority 1 ASBU Threads/Elements is 56%.
- from a regional perspective, the progress for the implementation of SNET, ACAS, GADS and ASUR is very good. However, the progress for the implementation of FICE, RSEQ, NOPS and NAVS is far below the regional targets.
- Bahrain, Qatar, Saudi Arabia and UAE have very good implementation level.
- the lack and /or incomplete of data received affected the data analysis accuracy of the implementation status in many States.
- Revised priority 1 threads/elements to the MID Region Air Navigation Strategy decreased the overall ASBU implementation level in the MID Region.

6.1.11 The meeting reviewed the Web-based MID Air Navigation Report (2022) and agreed to the following MIDANPIRG Conclusion:

**MIDANPIRG CONCLUSION 20/10: WEB- BASED MID AIR NAVIGATION
REPORT (2022)**

That, the Web-based MID Air Navigation Report (2022) is endorsed.

6.1.12 It was recalled that the Global Air Navigation Plan required States to report the status of their ASBU implementation and in accordance with ICAO Assembly Resolution A41-6 (ICAO global planning for safety and air navigation). In this respect, the meeting invited States to provide the ICAO MID Office, with necessary data for the development of the MID Region Air Navigation Report 2023 whilst ensuring the completeness of the reported data and their timely availability. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

**MIDANPIRG CONCLUSION 20/11: WEB-BASED MID REGION AIR
NAVIGATION REPORT (2023)**

That,

- a) *States be invited to provide the ICAO MID Office with the following data for the development of the MID Region Air Navigation Report (2023) by 1 December 2023:*
 - i. *Status of ASBU Implementation; and*
 - ii. *States' implementation of the Performance Based approach using the agreed Template as at **Appendix 6.1A***
- b) *the MID Air Navigation Report (2023) be presented to the MIDANPIRG/21 for endorsement.*

National Air Navigation Plans in the MID Region: A Framework for seamless ATM

6.1.13 The subject was addressed in PPT/40 presented by UAE.

6.1.14 The meeting reiterated that the NANP should align with international efforts described in the ICAO Aviation System Block Upgrade (ASBU) and the MID Region Air Navigation Plan (ANP), which is proposed to be developed under six interconnected areas: airport operations, communication, navigation and surveillance, air traffic management, aeronautical information management, meteorology, and integration of future aviation systems.

6.1.15 The meeting noted that the NANP should include a detailed description of the roadmap for increasing airspace and aerodrome capacity. Regulatory decisions and key policies on future projects and investments in air navigation should be based on the NANP.

6.1.16 The meeting agreed that developing NANPs would be challenging for some States, therefore, a qualified level of collaboration is beneficial. Therefore, the meeting agreed to a task force to facilitate regular exchange on a regional level concerning the planning, developing, and implementation of NANP.

6.1.17 Furthermore, the NANP task force will provide a platform for States' specialists to promote plan development and share best practices and lessons learned in order to expedite NANPs in a coordinated manner. The task force's primary responsibility is to track the progress of NANP implementation in the States and ensure harmonization of the process.

6.1.18 The meeting noted that the GANP includes minor changes every three (3) years and major changes every six (6) years. Therefore, reviewing and updating the MID Region Air Navigation Strategy and MID ANP, Vol III, would be required to be done regularly by experts' group.

6.1.19 Based on all the above, the meeting agreed to establish RANP/NANP Task force to ensure alignment of the MID Region Air Navigation Strategy and MID ANP Vol III with the latest edition of the GANP and assist States developing NANPs. The Task force be composed from States' experts and chairperson of all MIDANPIRG subsidiary bodies. Accordingly, the meeting agreed to the following MIDANPIRG Decision:

MIDANPIRG DECISION 20/12: RANP/NANP TASK FORCE

That,

- a) RANP/NANP Task Force be established to ensure alignment of the MID Region Air Navigation Strategy and MID ANP Vol III with the latest edition of the GANP and assist States developing NANPs;*
- b) the terms of reference of the RANP/NANP Task Force be developed during the first meeting of RANP/NANP Task Force; and*
- c) States support the RANP/NANP Task Force through:*
 - i. assignment of Focal Point to contribute to the work of the Task Force; and*
 - ii. sharing states' experience and provision of required data in timely manner.*

AOP Area / Table I-I

6.1.20 The subject was addressed in PPT/42. The meeting noted the necessity to maintain, as deemed necessary, the AOP Table I-I included in the MID eANP. The meeting highlighted the importance of sustaining the synergy between the stable elements and the dynamic/flexible ones

included respectively in Volume I, II and III of the MID eANP.

6.1.21 The meeting recognized the benefit of an updated AOP Table I-I in maintaining the reliability of the Aerodromes Dashboards designed to monitor the implementation levels of both Air Navigation and Safety requirements.

6.1.22 The meeting encouraged States wishing to effect a change to communicate to the facts that lead the State to the conclusion that the amendment is necessary. The meeting noted that the ICAO MID office will make the necessary coordination with all stakeholders and end users in order to process the Proposal of Amendment as per the endorsed procedure.

MID Air Navigation Plan, Vol I

6.1.23 The subject was addressed in WP/44 presented by the Secretariat. The meeting noted that the MID ANP Vol I was published without completing the Table ATM I-1 Flight Information Regions (FIRs)/ Upper Information Regions (UIRs) boundary coordinates (and Table SAR I-1 on Search and Rescue Regions (SRRs).

6.1.24 The meeting reiterated the MSG/5 Conclusion 5/5, on Publication of FIR Boundary Points, and urged States to implement its provisions in coordination with their adjacent States, as appropriate. The Guidelines for the publication of FIR boundary description and, the inconsistencies related to the FIRs and SRRs in the MID Region are in Appendices 6.3A and 6.3B, respectively.

6.1.25 In addition, the meeting reiterated that a review of the FIRs descriptions should be conducted by States and stressed the importance to be supported by a process for checking alignment, and validation of data accuracy.

6.1.26 Moreover, the meeting agreed that a step-by-step approach should be used in populating the Tables ATM I-1 and SAR I-1. In this regard, the meeting noted that the descriptions of Baghdad, Beirut and Damascus FIRs do not raise any concern since no inconsistency with their adjacent States was identified.

6.1.27 Furthermore, the meeting, recalling the ICAO Council C-DEC 225/10, agreed that the Doha FIR / SRR to be incorporated in the Tables ATM I-1 and SAR I-1.

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

MIDANPIRG CONCLUSION 20/13: PROPOSAL FOR AMENDMENT TO THE MID EANP VOLUME I, TABLES ATM I-1 MID REGION FLIGHT INFORMATION REGIONS (FIRs)/UPPER INFORMATION REGIONS (UIRs) AND SAR I-1 MID REGION SEARCH AND RESCUE REGIONS (SRRs)

That, the ICAO MID Office coordinate with the States concerned and process Proposal(s) for Amendment to the MID ANP Vol I, Tables ATM I-1 MID Region Flight Information Regions (FIRs)/ Upper Information Regions (UIRs) and SAR I-1 MID Region Search and Rescue Regions (SRRs) in accordance with standard procedure.

MID ANP VOL II

6.1.29 The subject was addressed in WP/45 presented by the Secretariat.

6.1.30 The meeting was apprised of the consequential amendments to the MID Air avigation Plan, Vol II and the required amendments to update the relevant Tables of the MID eANP Vol II.

6.1.31 The meeting noted that the information related to Qatar facilities and services should be included in Volume II, therefore, the following tables of the MID ANP VOL II should be updated:

- a. GEN II-1 - HOMOGENEOUS ATM AREAS AND/OR MAJOR TRAFFIC FLOWS IDENTIFIED IN THE MID REGION;
- b. CNS II-3 - ATS DIRECT SPEECH CIRCUITS PLAN;
- c. ATM II-MID-2 - MID SSR CODE ALLOCATION LIST;
- d. MET II-1 - METEOROLOGICAL WATCH OFFICES; AND
- e. SAR II-1 - RESCUE COORDINATION CENTRES (RCCs) AND RESCUE SUB CENTRES (RSCs) IN THE MID REGION.

6.1.32 The meeting requested the ICAO MID Office to coordinate with Qatar regarding the required update and process a PfA to the MID ANP Vol II. Accordingly, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 20/14: PROPOSAL FOR AMENDMENT TO THE MID EANP VOLUME II TO INCLUDE INFORMATION RELATED TO QATAR FACILITIES AND SERVICES

*That, the ICAO MID Office process the Draft Proposal for Amendment to the MID eANP Vol II, at **Appendix 6.1B**, in accordance with standard procedure.*

MIDANPIRG CONCLUSION 20/15: Intentionally left blank.

Progress on C-DEC 225/10 Implementation

6.1.33 The subject was addressed in PPT/43, presented by the Secretariat. The meeting was apprised of the progress achieved with the implementation of ICAO Council Decision, C-DEC225/10 - Establishment of Doha FIR/SRR.

6.1.34 The meeting noted the implementation phases of C-DEC 225/10, in coordination with Bahrain, Iran, Qatar, Saudi Arabia and UAE under the auspices of the MID Office. Phase 1 was initiated by implementing Phase 1A on 8 September 2022; and completed by implementing Phase 1B on 23 March 2023.

6.1.35 The meeting reviewed the implementation plan for Phase 2, which includes the following activities:

- States to provide the MID Office with feedback and comments on a quarterly basis concerning the implementation of C-DEC 225/10;
- the MIDRMA to conduct Phase 2 pre-implementation RVSM Airspace Assessment.
- the consolidated feedback received as well as the RVSM Airspace Assessment results to be considered by the Multi-Lateral Group (Bahrain, Iran, Qatar, Saudi Arabia and UAE);
- the outcome of the Multi-lateral Group to be presented to the ATM Sub Group, to finalize the Roadmap and develop the technical study necessary to support the decision-making for the implementation of Phase 2 which will take place within 2 years after the implementation of Phase 1.
- The roadmap for the implementation of Phase 2 will be presented to MIDANPIRG for endorsement.

6.1.36 Based on all the above, the meeting agreed to the following Conclusion:

**MIDANPIRG CONCLUSION 20/16: IMPLEMENTATION OF C-DEC225:
ESTABLISHMENT OF DOHA FOR/SRR**

That,

- a) the ICAO MID Office to monitor the implementation of the C-DEC225/10 and facilitate coordination between the States concerned, as required;*
- b) States to carry out bilateral and multilateral coordination to finalize the operational and technical requirements, including the necessary letters of agreement;*
- c) MIDRMA to conduct a safety Monitoring assessment for the RVSM airspace within Bahrain and Doha FIRs, highlighting bottlenecks, hotspots and areas of traffic congestion;*
- d) Qatar to provide inputs for the development of the required proposal(s) for amendment to the MID ANP;*
- e) States and other Stakeholders to provide implementation feedback and comments to the MID Office on a quarterly basis for review by the ATM SG; and*
- f) the ATM SG to agree on necessary measures for the conduct of the technical study necessary to support the decision-making for the implementation of Phase 2 and develop a roadmap for the implementation of phase 2 to be presented to MIDANPIRG for endorsement.*

6.1.37 The meeting congratulated Qatar for the establishment of Doha FIR/SRR and commended the efforts made by the States concerned that demonstrated a high level of collaboration. The meeting encouraged all parties concerned to continue with their efforts toward the complete implementation of C-DEC 225/10.

REPORT ON AGENDA ITEM 6: MIDANPIRG WORK PROGRAMME**6.2 AIM**

6.2.1 The subject was addressed in WP/46 presented by the Secretariat.

AIM training and Competency-Based Training and Assessment (CBTA)

6.2.2 The meeting noted that the AIM SG/9 was apprised of the first edition of ICAO Doc 9991 Manual on Aeronautical Information Services Training (Edition, 2023), which has been published on ICAO portal and noted that this manual aimed at individuals and organizations involved in the planning, design, delivery, or evaluation of aeronautical information services (AIS) training or converting established training programs to a competency-based approach. This manual describes also how the aeronautical information services providers (AISPs) can use the ICAO competency framework to establish an adapted competency model that is appropriate for regulatory, operational, technical, and organizational environments of an AIS.

6.2.3 Considering the importance of the training in AIS and to provide States and AISPs with guidance on how to identify the competencies necessary for their environment and how to design the training and assessment needed for various AIS training phases on the ICAO CBTA Model for AIS technical personnel, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/17: WEBINAR on AIM TRAINING MANUAL, FIRST EDITION, 2023

That, a Webinar on the new ICAO DOC 9991 – Training Manual and competency-based training and assessment (CBTA) methodology for AIS be organized in 2023.

NOTAM Template on GNSS interference

6.2.4 The meeting noted that GNSS/GPS Interference was published in the 10th MID Annual Safety Report (2021) as one of the emerging safety risks in the ICAO MID Region and that the RASG-MID released the guidance material on GNSS vulnerabilities to mitigate the safety and operational impact of GNSS service disruption. The guidance recommends pilots to report GNSS interference and ANSP to issue appropriate advisories and NOTAM.

6.2.5 The meeting recalled that the MIDANPIRG/19 meeting tasked AIM SG in coordination with IATA to develop a standard NOTAM template to be used for GNSS Interference and to be attached to the RSA-14.

6.2.6 The meeting noted that the AIM SG/9 meeting reviewed and updated the proposed GNSS RFI NOTAM template at **Appendix 6.2A** to facilitate operators in filtering and searching through the NOTAM on GNSS Interference, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 20/18: NOTAM TEMPLATE FOR GNSS INTERFERENCE

*That, the NOTAM template at **Appendix 6.2A** be used to disseminate information on GNSS Interference.*

NOTAM Template to Disseminate Information Related to Risks to Civil Aviation over or near Conflict Zones

6.2.7 The meeting recalled that the MID Region Safety Strategy is included in MID-RASP 2020-2022 Edition, which identified Safety Enhancement Initiatives (SEIs) mapped to the Strategy including their respective actions; and in order to address organizational challenges/issues, regional operational risks, and emerging risks, 16 SEIs and 51 actions have been included in the MID-RASP.

6.2.8 The meeting noted that Action 4 of the G2-SEI-06 related to the Impact of security on safety requested the AIM SG to develop a standard NOTAM text template to be used to share threats information emanating from conflict zones within the State's airspace.

6.2.9 The meeting noted that the AIM SG/9 meeting reviewed and updated the proposed NOTAM template to be used to disseminate Conflict Zone Information template at **Appendix 6.2B**.

6.2.10 In line with the above and to support the regional effort for exchange and promulgation of information regarding the nature and extent of threats arising from the conflict and its consequences for civil aviation, the meeting agreed to the following Conclusion:

**MIDANPIRG CONCLUSION 20/19: NOTAM TEMPLATE TO DISSEMINATE
INFORMATION RELATED TO RISKS TO
CIVIL AVIATION OVER OR NEAR
CONFLICT ZONES**

*That, the NOTAM template at **Appendix 6.2B** be used to disseminate information related to risks to civil aviation over or near conflict zones including the nature and extent of threats arising from the conflict and its consequences for civil aviation.*

CCO/CDO Publication and Charting Template

6.2.11 The meeting recalled that the MIDANPIRG/19 meeting through Decision 19/11 established the CCO/CDO Ad Hoc Working Group to develop guidance related to the publication of CCO/CDO information (text and Charts) in the AIP, in coordination with the relevant MIDANPIRG and RASG MID subsidiary bodies.

6.2.12 In this respect, the meeting was apprised of the outcomes of the CCO/CDO Ad Hoc Working Group as reviewed and updated by the AIM SG/9 meeting.

6.2.13 Recognizing the need for a harmonized AIP content related to CCO/CDO to ensure that identified good practices are shared and that Flight Crew / Flight Planners know where CCO/CDO-related text may be found in an AIP, the meeting agreed to the following Conclusion:

**MIDANPIRG CONCLUSION 20/20: CCO/CDO PUBLICATION, CHARTING &
DATABASE CODING**

*That, the AIP CCO/CDO material, structure and content along with the Database coding and Charting at **Appendix 6.2C** are recommended for the dissemination of information on CCO/CDO.*

MID AIM Forum

6.2.14 The meeting recalled that under the MID RPTF Work Stream #4 the MID AIM Forum was established to allow for collaborative engagement on aeronautical information matters pertaining to the COVID restrictions and recovery. The MID RPFT work Stream #4 has since completed its mandate and been frozen.

6.2.15 In view of the experience gained under MID RPTF and, considering that high quality Aeronautical Information is dependent on the cooperation and collaboration of data originators and data publishers to meet the data users' needs and recognizing the need for collaborative discussion and engagement on aeronautical information in MID Region, the meeting agreed to the following Decision:

MIDANPIRG DECISION 20/21: ESTABLISHMENT OF MID AIM FORUM

That, MID AIM Forum:

- a) *be established to improve collaboration aiming at improving the Quality of Aeronautical Information through identifying and addressing the availability, consistency and accuracy of published aeronautical information and sharing of best practices and challenges in the MID Region; and*
- b) *be composed of:*
 - *IATA, ICAO, IFAIMA and CANSO*
 - *MID States (CAA and ANSP)*
 - *Data users*
 - *Organizations, with interests in MID aeronautical information/data and who provide subject matter experts as may be required, such as, but not limited to ACI, EUROCONTROL / Group EAD, IFALPA, IFATCA and IFATSEA.*

Digital Datasets Planning and Implementation

6.2.16 The meeting recalled that MIDANPIRG/18, through Conclusion 18/17, tasked the Digital Datasets Ad-hoc Working Group (DDI Ad-hoc WG) with the development of a detailed Regional Implementation Plan for Digital Datasets.

6.2.17 The meeting noted that the AIM SG/9 meeting reviewed the progress Report of the Digital Datasets Implementation Ad-hoc Working Group (DDI Ad-hoc WG), in particular, the proposed harmonized deployment of the Digital AIS data sets in MID Region, in terms of scope, structure and coding rules (the “what”), for the digital data set provision services (the “how”) and, as much as possible, for the implementation dates (the “when”) and agreed through Draft Conclusion 9/6, that the DDI Ad-hoc WG complete the Regional Implementation Plan for Digital Datasets by 31 December 2022, circulate the plan to Member States for review and present it to MIDANPIRG/20 for endorsement.

6.2.18 The meeting noted also that the lack of guidance and best practices, in particular the Doc 8126, Part IV publication was delayed until summer 2023 and the relatively low level of worldwide implementation of Digital Data sets greatly impeded the progress towards finalising the draft MID Regional Implementation Plan for Digital Datasets.

6.2.19 To cope with the challenges and to provide the DDI Ad-hoc WG with additional time to finalize the MID Regional Implementation Plan for Digital Datasets to ensure reliable outcomes in terms of guidance and tools for DDS planning and implementation at the Regional and National levels, the meeting agreed to the following conclusion instead of the AIM SG/9 Draft Conclusion 9/6:

MIDANPIRG CONCLUSION 20/22: MID REGIONAL IMPLEMENTATION PLAN FOR DIGITAL DATASETS

That,

- a) *the DDI Ad-hoc WG complete the Regional Implementation Plan for Digital Datasets by 31 December 2023; and*
- b) *the Regional Implementation Plan for Digital Datasets be reviewed by the AIM SG before submission to MIDANPIRG for endorsement.*

Status of Implementation of Priority 1 DAIM Thread/Elements in the MID Region

6.2.20 The meeting noted that the AIM SG/9 meeting reviewed and updated the status of implementation of Priority 1 DAIM Thread/Elements in the MID region and urged States to expedite the transition from AIS to AIM and to achieve the regional targets included in the MID Region Air Navigation Strategy.

Data Driven Charting

6.2.21 The subject was addressed in WP/47 presented by UAE. The meeting noted that the GCAA UAE has developed a Database Driven Charting Implementation Plan (Intermediate and Long Term) to migrate legacy charts progressively. The meeting noted also that UAE has already completed the migration of the En-route Charts and has started migrating SID and STAR charts into Database Driven Charts.

6.2.22 In this regard the meeting noted the challenges faced particularly regarding interoperability issues caused by different AIXM systems and business rules implementation.

6.2.23 Considering the above and in the light of the experience gained by UAE in addressing the challenges of the migration to Database Driven charting, the meeting tasked the Digital Dataset implementation Ad-Hoc Working Group to include Database Driven Chart production encoding guidelines in the Regional Implementation Plan for Digital Datasets to ensure regional harmonization and interoperability.

REPORT ON AGENDA ITEM 6: MIDANPIRG WORK PROGRAMME**6.3 PBN**

6.3.1 The subject was addressed in WP/48 presented by the Secretariat.

PBN Manual 5TH Edition

6.3.2 The meeting noted that PBN SG/7 meeting was apprised of the main changes in the PBN Manual Doc 9613 Edition 5 that is released as unedited version and posted on ICAO-NET. The meeting noted that the revised edition introduced a number of clarifications and changes based on the experience of PBN implementation since Edition 4 was published in 2013. Along with many clarifications on subjects such as the use of RF legs and holding capabilities, significant changes were introduced into the Advanced RNP navigation specification – such as the removal of RNP scalability and the exclusion of the final approach segment – and the introduction of RNP AR Departures (DP) into a new combined RNP AR Chapter.

6.3.3 Given the marked changes being introduced in the PBN Manual 5th Edition and to provide insights on key changes to this edition, the meeting agreed to the following Conclusion:

**MIDANPIRG CONCLUSION 20/23: WEBINAR ON THE UPDATES TO THE PBN
MANUAL – 5TH EDITION**

That, ICAO MID organize a Webinar on the new edition of PBN Manual Doc 9613 (ED5) in 2023.

PBN Route Spacing and CNS Requirements

6.3.4 The meeting noted that PBN SG/7 meeting was apprised with information concerning methodologies used to determine spacing between PBN ATS routes and instrument flight procedures with a focus on RNAV 5 and RNAV 1 to accommodate their strategic de-confliction to achieve the efficiency and safety objectives whilst ensuring a manageable workload for controllers along with Communications and ATS surveillance requirements.

6.3.5 The meeting acknowledged that airspace design (ASD), including flight procedure design plays a key role in the safety of air operations and is also a key enabler for the implementation of the performance-based navigation (PBN). Therefore, to provide a thorough understanding of airspace design requirements; focusing on PBN based solutions to ensure an efficient, flexible and dynamic airspace structure that meets Stakeholders requirements in terms of safety, flight efficiency and capacity in a cost-effective manner, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 20/24: PBN AIRSPACE DESIGN WORKSHOP

That:

- a) *ICAO MID in collaboration with the MID FPP, organize a PBN Airspace Design Workshop in 2023-2024, to provide necessary knowledge about PBN based solutions for airspace design to ensure an efficient, flexible, and dynamic airspace structure that meets Stakeholders requirements in terms of safety, flight efficiency and capacity in a cost-effective manner; and*
- b) *States and International Organizations are strongly encouraged to participate actively in this Workshop.*

MID Region PBN Implementation Plan

6.3.6 The meeting recalled that MIDANPIRG/19 through DECISION 19/12 established the MID region PBN Implementation Plan Ad hoc Working Group (PBN IP Ad-Hoc WG) to review the MID Region PBN Implementation Plan (MID Doc 007) and develop an updated version for review by the PBN SG/7 and ATM SG/8 meetings and for subsequent endorsement by the MIDANPIRG/20 meeting, to keep pace with the developments, including the GANP 7th Edition and the MID Region Air Navigation Strategy (MID Doc 002).

6.3.7 The meeting noted that the PBN SG/7 and ATM SG/8 meetings reviewed and updated the MID Region PBN plan as revised by the PBN Implementation Planning Ad-Hoc Working Group (PBN IP Ad-Hoc WG), in particular the implementation phases and targets of each PBN navigation specification, the removal of redundant and obsolete parts as is the case for to remove the remote continental airspace as an area of operations in MID Region and the replacement of Chapter 6 related to PBN Charting by new chapter on National PBN Implementation Strategy & Plan in order to assist States to achieve the ICAO objectives set out in Resolution 37-11, Chapter 6 of the MID region PBN Implementation Plan provides step-by-step guidance to States on how to establish their own national plan in a standard consistent way in relation to Assembly Resolutions, ICAO SARPs, GANP, GASP, Regional plans and other related documents.

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

**MIDANPIRG CONCLUSION 20/25: REVISED VERSION OF THE MID REGION
PBN IMPLEMENTATION PLAN (DOC 007)**

*That, the revised version of MID Region PBN Implementation Plan (Doc 007) at
Appendix 6.3A is endorsed.*

Implementation status of the Regional Transition Plan for RNP APCH Chart Identification from RNAV to RNP

6.3.9 The meeting recalled the target date to complete the transition of the RNP APCH Chart Identification from RNAV to RNP and noted the implementation status of the regional transition plan for RNP APCH chart identification from RNAV to RNP in MID Region.

6.3.10 In this respect, the meeting appreciated the efforts made by MID States for the successful implementation of the MID Plan of the Transition from RNAV to RNP Charting Depiction reaching 99 per cent of new PBN charting.

6.3.11 In addition, the meeting agreed to include the State not complying with Chart naming Convention (A4 STD 11.6) in the list of Air Navigation Deficiencies.

Status of PBN Implementation in the MID Region

6.3.12 The meeting noted that the PBN SG/7 meeting reviewed and updated the status of implementation of priority 1 APTA Thread/Elements in the MID region and urged States to expedite implementation of PBN to achieve the regional targets included in the MID Region Air Navigation Strategy.

6.3.13 The meeting recognized that some challenges continue to represent the main impediments to the advancement of PBN implementation in the Region, including:

- PBN Resources: Limited/scarcie funding for Regulator/ANSP;
- Lack of training and qualified human resources;

- Lack of airspace and procedure design training;
- Lack of operational approval expertise to obtain proper operational approval and to oversee operators for PBN operations;
- Lack of regulatory expertise to oversee the process leading to procedure publication; and
- Lack of PBN awareness and education to decision makers within States to create the political will to invest.

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

MIDANPIRG CONCLUSION 20/26: PBN CAPACITY-BUILDING AND ASSISTANCE ACTIVITIES

That, States are encouraged to inform the ICAO MID Office under the MEP framework of their needs in terms of PBN capacity-building and required assistance activities, including PBN National Workshops to provide specific guidance related to PBN planning, implementation, including improvement of practices in PBN Design, operational approval, and continuous oversight.

MID FPP Activities

6.3.14 The subject was addressed in WP/49 presented by the Secretariat. The meeting noted the MID FPP activity report as resulted from the SC/1 to SC/3 Meetings. The meeting noted also the MID FPP activities accomplished in the Year 2022 and planned for Year 2023.

6.3.15 The meeting was appraised of the MID FPP training program for 2023 developed in coordination and leveraging the collaboration with the regional APAC and Africa FPPs and profiting from the support provided by France DGAC and ENAC. The meeting noted the agreed Work Plan Y2023 and beyond, which might be extended to respond to the needs of the member States focusing on the requests for airspace and procedure design projects and on customized PANS OPS and PBN training courses.

6.3.16 Furthermore, the meeting encouraged States to approach the MID FPP for the implementation of projects specifically covering (1) Instrument Flight Procedures (IFP) review & maintenance, (2) PBN Operational Approval and (3) Design validation and Regulatory support for IFPs approval.

6.3.17 The meeting noted the result of the process of nomination and selection of the pool of Experts who will provide technical support for the implementation of the MID FPP Work Plan and achievement of its objectives. Moreover, the meeting noted with appreciation that nineteen (19) experts' have been nominated from Egypt (4), Iran (4), Kuwait (2), Oman (1), Sudan (3), UAE (3) and United ATS (2) covering all essential areas for PBN, namely Procedure Designer, Instructor, Airspace Planner and OPS Approval Inspector.

MID FPP Sustainability

6.3.18 The subject was addressed in WP/50 presented by the Secretariat. The meeting noted that the Programme financial sustainability is guaranteed through the following stream of revenues: (1) Annual contribution paid by the Active States, (2) Services fees paid by beneficiaries and (3) Cash and/or in-kind contribution provided by Donors.

6.3.19 In order to ensure the sustainability of the MID FPP, the meeting stressed the particular importance of maximum number of States to join the MID FPP to achieving a larger business base of

financial stability necessary for its normal operations and, as a “win-win” effect for Active States/Organizations, it also assure all advantages in respect of the Programme services.

6.3.20 Moreover, the meeting noted that the Director General Civil Aviation (DGCA) MID/6 agreed through *Conclusion 6/3*, that the annual contribution of the Active States (also including Donors) shall be US\$ 20,000, from which 50% may be used against the services provided by the MID FPP, in line with the approved Work Plan.

6.3.21 In order to encourage States/Organizations to actively join the Programme and to ensure the Programme sustainability, the meeting supported the recommendations of MID FPP SC, in particular:

- (1) Foster the interest and commitment of the national Air Navigation Service Provider (ANSP) to financially support the MID FPP on behalf of/delegated by the State Civil Aviation Authority which should remain the signatory entity of ProDoc.
- (2) Encourage major/national Airlines interested in MID FPP services’ benefits to financially contribute.
- (3) Encourage Donors from Industry e.g., leading airframe manufacturers, data-houses, prominent Civil Aviation Administration, other commercial organizations to annually contribute up to the level of an Active State.
- (4) Encourage voluntary contributions by States to ensure MID FPP operations and services provisions to help other States in the region lacking resources & capabilities.
- (5) Promote the MID FPP Work Plan and its achievements at different regional ICAO meetings, Workshops, Seminars, State visits, etc.

PANS OPS Office Establishment Plan in Oman

6.3.22 The subject was addressed in WP/51 presented by Oman. The meeting noted that Oman is in the planning process for the establishment of Flight Procedure Design Office as an entity responsible for provision of IFPDS in Oman. The meeting also noted the detailed action plan with timelines, and milestones of the project.

REPORT ON AGENDA ITEM 6: MIDANPIRG WORK PROGRAMME**6.4 AGA-AOP**

6.4.1 The subject was addressed in PPT/42. The meeting noted the progress of the Airport Collaborative Decision Making (ACDM) Thread as per the applicability Area defined in the MID eANP. The meeting encouraged States to regularly provide their Needs for Capacity Building and Implementation Support in relation with Aerodromes Planning and Design, and communicate, as deemed necessary to the Aerodromes Safety Planning and Implementation Group their express of interest to update their list of international Airports currently included in the AOP Table (I-1) of the MID ANP Vol I.

REPORT ON AGENDA ITEM 6: MIDANPIRG WORK PROGRAMME**6.5 ATM/SAR*****MID ATS Route Network Table***

6.5.1 The subject was addressed in WP/53 presented by the Secretariat. The meeting recalled that MIDANPIRG/19 meeting noted that a comprehensive review of the ANP Vol II, Table ATM II-MID-1: MID Region ATS Route Network was ongoing for the consolidation of States' inputs for the revised version, considering the numerous changes to the ATS route network in the Region, including, inter-alia, the impact of COVID-19 crisis and projects of airspace re-organization in some States. The meeting noted also that the ICAO MID Office received requests from Bahrain, Egypt, Qatar and UAE for the inclusion of new established ATS routes in the MID ANP Vol II, including some of the contingency routes.

6.5.2 The meeting was apprised that the MID Office issued State Letter (Ref.: AN 6/5A – 22/117, Dated 6 June 2022) to indicate the amendment of the ICAO MID Air Navigation Plan (Doc. 9708). MID eANP - Volume II has been processed according to the procedure approved by the Council on 18 June 2014 and it is now considered approved.

6.5.3 The meeting noted that ICAO MID Office found that the majority of the received data from States are qualified to be considered as one of the following categories:

- a) States inputs which are not subject to any further objection by others to be incorporated in **Appendix 6.5A** and to follow standard PfA process; or
- b) State requests or inputs that are subject to the disagreement of the others should be drafted as a separate PfA by relevant State(s) such as T800 which was objected by UAE; or
- c) States inputs that need further technical discussion in **Appendix 6.5B** should be referred to the RDWG meeting.

6.5.4 The meeting was apprised of the outcome of the ATM SG/8 meeting on the subject. The meeting reviewed the proposal for amendment to the MID ANP VOL II, Table ATM II-MID-I, at **Appendix 6.5A**. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

**MIDANPIRG CONCLUSION 20/27: PROPOSAL FOR AMENDMENT TO THE MID
EANP VOLUME II, TABLE ATM II-MID-I:
MID REGION ATS ROUTE NETWORK**

*That, the ICAO MID Office process the Proposal for Amendment to the MID ANP Vol II, Table ATM II-MID-I, at **Appendix 6.5A**, in accordance with standard PfA procedure.*

6.5.5 The meeting encouraged States and stakeholders to use the MID RDWG/Route Catalogue as the main platform to address further ATS Route network improvements and urged States with the support of ICAO MID Office to take action to overcome/eliminate the remaining challenges.

Free Route Airspace (FRA)

6.5.6 The subject was addressed in WP/66, presented by the UAE. The meeting recalled the benefits obtained by the FRA implementation, mainly related to efficient and sustainable flight operations; the meeting noted with appreciation the implementation plan within Emirates FIR above FL355, and encouraged States to consider the UAE experience in planning the implementation of FRA.

6.5.7 Additionally, IATA presented WP/54 and invited the meeting to note the maximized benefits of FRA implementation on a regional basis, in addition to the need to share experience and lessons learned from previous implementations, to suitability meet the needs of both airspace users and service providers.

6.5.8 The meeting agreed that this subject should be addressed to the ATM SG meeting for further discussion and to evaluate the need to establish a regional body for further implementations, if required.

MID SSR Code Management Plan (CMP)

6.5.9 The subject was addressed in WP/55 presented by the Secretariat. The meeting recalled that the management of the MID SSR CMP was exercised by the ICAO MID Regional Office. In performing this objective, the Secretariat developed a dashboard for monitoring allocated SSR codes to the MID States taking into account the followings procedures:

- a) for temporary allocation of reserved SSR Code, the State is required to request officially from ICAO MID Office to provide temporary SSR Code.
- b) the temporary reserved SSR code will be assigned for the requesting State for the duration of Six months from the date of allocation. After this period, the allocated SSR code will be released unless the relevant state request officially to extent duration of usage for another cycle or certain duration. At any case, this request shall be confirmed by ICAO MID Office.
- c) ICAO MID Office maintain up to date the dashboard and reports to ATM SG meetings.

6.5.10 The meeting reviewed to the proposal for amendment to the MID eANP VOL II, Table ATM II-MID-2: MID SSR CODE ALLOCATION LIST, at **Appendix 6.5C**. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

***MIDANPIRG CONCLUSION 20/28: PROPOSAL FOR AMENDMENT TO THE MID
EANP VOLUME II, TABLE ATM II-MID-
2: MID REGION SSR CMP***

*That, the ICAO MID Office process the Proposal for Amendment to the MID eANP Vol II, Table ATM II-MID-2, at **Appendix 6.5C**, in accordance with standard PfA procedure.*

MID ATFM Implementation

6.5.11 The subject was addressed in WP/56, presented by the Secretariat. The meeting recalled the MIDANPIRG Conclusion 19/16, related to the ATFM implementation.

6.5.12 The meeting noted with appreciation the successful organization of the MID ATFM Implementation Workshop during the period 6 – 7 February 2023 hosted by Qatar Civil Aviation Authority (QCAA) in Doha, Qatar; to foster the ATFM implementation in the MID Region. The Workshop provided an opportunity to support the MID States in taking the proper actions required for implementing Phase IA of the MID ATFM Implementation Plan within the agreed timelines. Additionally, the Workshop was considered as a venue for States and international Organizations to share their experience and challenges among the ATFM TF members.

6.5.13 The meeting noted that the MID ATFM TF/7 meeting was conducted during the period 8 – 9 February 2023, back-to-back after the Workshop. The meeting reviewed the outcomes of the Workshop and agreed on the following actions to foster the ATFM implementation:

- The timeline of Phase IA implementation according to the MID ATFM Plan is agreed to be 31 December 2023, States were encouraged to use the information presented in the Workshop to support the implementation of Phase 1A, and report progress or challenges to the next TF meeting.
- Based on the Presentations received from the States, it was highlighted that the results of the last conducted ATFM implementation survey (on 2018) are not representing the latest developments by the States, the ATFM TF was encouraged to develop and circulate a new survey, including the activities of Phase IA of the MID ATFM Implementation Plan, to the MID States to enable the TF to monitor the actual level of implementation and provide the necessary support, as required.

6.5.14 The meeting reiterated that the FWC2022 event provided a good opportunity for collaborative decision-making and information sharing, which would be very beneficial for the future ATFM implementation in the Region. The meeting noted the implementation of MID Doc 014 by QCAA, to support Air Traffic Management during the FWC2022 event in the most safe and efficient manner. The ATFM implementation during the FWC2022 was considered as a live and successful example of the ATFM implementation of MID Doc 014, developed by the MID ATFM TF.

6.5.15 Additionally, the meeting noted with appreciation the offer received from QCAA related to the provision of support to the States in ATFM, including support in documentation (regulation and operations manual) and initial training and setup of ATFM unit and OJT training, based on the experience gained during the FWC2022. Furthermore, the meeting noted the offer received from UAE for benchmarking of the different tools implemented within Sheikh Zayed Air Navigation Centre (SZC), to support ATC workload, thus, enhance airspace capacity.

6.5.16 The meeting encouraged the States to participate in the upcoming ATFM implementation Survey to be presented to the ATM SG/9 planned in November 2023.

6.5.17 The subject was addressed in WP/57 and WP/59, presented by Oman. The meeting noted the ATFM implementation plan within Muscat FIR and the challenges faced. The meeting encouraged Oman to use the MID Doc 014 including the initiation of consultation process with the adjacent States and airspace users, to support the implementation plan. Additionally, the meeting noted with appreciation the experience shared by Oman regarding their adopted methodology of sector Capacity and invited the States to benefit from this experience.

6.5.18 UAE reported that it was subject to unprecedented regional flow restrictions for many years, which had an immense impact on the air traffic operations within Emirates FIR and caused compliance complications. Thus, air operators were subject to vast ground delays, airlines operational losses, great environmental impact of CO₂ emissions and passengers experience and dissatisfaction. Therefore, UAE stressed on the following:

- I. ATFM aims to utilise the maximum capacity and balance demand, it does not increase capacity.
- II. States / ANSPs to be urged to prioritize Capacity enhancements projects in terms of systems, airspace restructure, ATC sectorization and manpower management prior to implementing ATFM measures.
- III. ATFM development projects in the MID Region should be subject to the guidance and support of the MID ATFM Task Force and the agreed regional concept of operations in ICAO MID Doc 014.
- IV. ATFM implementation projects should be subject to prior consultation with the adjacent States to ensure capability readiness and ability to comply with the requirements”.

FWC2022

6.5.19 The subject was addressed in WP/60, presented by the FWC2022 TF Chairman and the Secretariat. The meeting recalled the history and the purpose of the establishment of the FWC2022 TF. Additionally, the discussion during the MIDANPIRG/19 related to the need to develop Post Implementation Review and Recommendations to be used as reference for similar future events.

6.5.20 The meeting was appraised with the completion of the FWC2022 Action Plan and checklist within the agreed timeline, which enabled the safe and efficient management of Air Traffic Management during the FWC2022 Tournament. The meeting noted with appreciation the high level of satisfaction reported by the Airspace users represented by IATA, on the level of planning, coordination and information sharing.

6.5.21 The meeting highlighted that the FWC2022 event was an opportunity to evaluate the ATS route structure, the level of services provided within the whole Region and the coordination mechanisms between States, ANSPs and Airspace Users. The introduction of improvements and upgrade of the provided services will enhance the capacity and support traffic growth for years ahead in a safe manner. However, the lack of a centralized information sharing and traffic management unit will continue to be a challenge for the MID Region.

6.5.22 The meeting reviewed the “FWC2022 Post Assessment Review” including the views from all Stakeholders, to identify the challenges and lessons learned. The Review also includes a list of recommendations that might be used for future similar events, as at **Appendix 6.5D**.

6.5.23 The meeting encouraged the ATFM TF to consider the “FWC2022 Post Assessment Review” and list of recommendations, in further developments of the ICAO MID Doc 014.

6.5.24 The subject was addressed in WP/61, presented by Oman. The meeting noted with appreciation the measures implemented within Muscat FIR to support the airspace management and traffic movements during the FWC2022 event.

6.5.25 Based on all the above, the meeting agreed on the following Decision:

MIDANPIRG DECISION 20/29: DISSOLUTION OF THE FWC2022 TASK FORCE

That, the FWC2022 Task Force is dissolved.

6.5.26 The meeting commended the efforts made by the FWC2022 TF members, which led to the success of planning, coordination and information sharing, which supported the traffic management during the FWC2022 event.

COP28 and impact on Air Traffic in the UAE FIR

6.5.27 The subject was addressed in WP/62, presented by UAE. The meeting was apprised with the preparations and expectations for the COP28 event planned in UAE next year.

6.5.28 The meeting encouraged the MID States and Operators to support the preparations and operations during the COP28.

ATM Contingency Plan

6.5.29 The subject was addressed in WP/63 and IP/24, presented by the Secretariat. The meeting noted the progress achieved for drafting MID Doc. 003 Version 2.0 at **Appendix 6.5E**.

6.5.30 The meeting was apprised of the outcome of the ATM SG/8 meeting on the subject. The meeting received updates regarding the progress of Khartoum FIR CCT activated on 15 March 2023 due to unavailability of ANS within Khartoum FIR, the accommodation of traffic to circumnavigate Khartoum FIR through Cairo, Jeddah and Asmara FIRs; and development of contingency plan. Based on that, the Secretariat and IATA requested to include new experiences and lessons learnt in the new version of ICAO MID Doc 003. Accordingly, the meeting agreed to the following MIDANPIRG Decision to replace and supersede the MIDANPIRG Decision 19/18:

MIDANPIRG DECISION 20/30: MID ATM CONTINGENCY PLANNING AD-HOC ACTION GROUP

That,

- a) *the MID ATM Contingency Planning Ad-hoc Action Group to continue working on a comprehensive review of the MID Region ATM Contingency Plan (MID Doc 003), taking into considerations the lessons learnt from recent events specifically contingency of Khartoum FIR;*
- b) *the MID ATM Contingency Planning Ad-hoc Action Group be composed of:*
 - the Chairpersons of the ATM SG;
 - Abdulla Al Qadhi (Bahrain);
 - Ahmad Abu Ghaleb (Saudi Arabia);
 - Sharron Caunt (IATA);
 - Faisal Al Assosi (Kuwait);
 - Ehab Raslan (Egypt);
 - Saleh Al Nesf (Qatar);
 - Nasser Salem Al Mazroe (Oman);
 - Saqr Marashdah (UAE);
 - Meisam Shaker Arani (Iran);
 - Javier Vanegas (CANSO);
 - Travis Fiebelkorn (FAA); and
 - ICAO MID Office (Secretariat).
- c) *present the revised version of the MID Region ATM Contingency Plan (MID Doc 003) to the ATM SG/9 for review and enhancement, before presentation to the MIDANPIRG/21 meeting for endorsement.*

6.5.31 The meeting noted the “Diversionary Measures” implemented during the Khartoum FIR CCT and commended the efforts made by the MID States to support Sudan, mainly Egypt for the Aeronautical Information publication on behalf of Sudan.

6.5.32 The meeting encouraged all the MID States to review and further enhance their ATM Contingency Plan, and to share it with the adjacent States, ANSPs and the ICAO MID Office.

6.5.33 The subject was addressed in WP/64, presented by Oman. The meeting was apprised with the development of Muscat FIR Contingency Plan.

Call sign Confusion

6.5.34 The subject was addressed in WP/69, presented by IATA. The meeting recalled the MIDANPIRG Conclusion 15/2 related to Call Sign Similarity Provisions and guidelines the follow up ICAO MID State Letter, (Ref.: AN 6/34-16/173, dated 26 June 2016) requesting States to implement the conclusion and report similarity/confusion cases to ICAO and IATA. As mitigation measures to the possible to eliminate the risks associated with the call sign confusion.

6.5.35 The meeting noted with concern the reduced level of implementation reported by IATA, and urged IATA to provide details to the ATM SG/9 planned in November 2023, to be further investigated and provide support.

Green ATM accreditation programme - Supporting operational measures for greener ATM

6.5.36 The subject was addressed in WP/41, presented by CANSO. The meeting noted the CANSO GreenATM programme launched in the new strategic direction in 2021. The CANSO vision centres around three key focus areas: creating a blueprint for future skies, delivering a sustainable future for aviation and raising the bar by connecting the ATM industry. On delivering a sustainable future for aviation, CANSO developed the environmental accreditation programme for ANSPs called the Green ATM Programme.

6.5.37 CANSO invited the Middle East Region to participate in the CANSO GreenATM programme and indicated the availability to further present the benefits and details of the programme.

CMC/FUA Implementation

6.5.38 The subject was addressed in WP/65 and WP/67, presented by the Secretariat and Iran, respectively; The meeting recalled the purpose of establishment of the CMC/FUA Action Group and the history of its meetings.

6.5.39 The meeting reiterated the challenges related to the CMC implementation within the MID Region, including inter alia, the following points:

- State aircraft operations under Due Regard in particular over the high seas;
- CMC/FUA implementation;
- Drones-Airspace management applications;
- GNSS/GPS interference; and
- NMAC reports between Civil and Military aircraft.

6.5.40 The meeting noted that the Action Group met and reviewed the ICAO Guidance material Doc 10088: Manual on Civil – Military Cooperation in Air Traffic Management) and agreed that the manual will fully meet the needs and requirements of the MID States to develop their national CMC/FUA plan. The meeting noted that the first workshop related to the implementation of Doc 10088 has been successfully conducted by ICAO from 15 to 17 May 2022, Tehran, Iran.

6.5.41 A side meeting was held to address the concerns raised by Iran concerning the occurrences related to unknown aircraft over the high seas. The meeting agreed that a template to be developed to record the cases for further analyses by the States concerned and appropriate actions.

6.5.42 Based on the above, the meeting encouraged States to take appropriate action to improve their national Civil – Military cooperation and the implementation of flexible use of Airspace, based on the guidance in ICAO Doc 10088.

6.5.43 The meeting invited ICAO to organize a workshop to raise awareness among all stakeholders regarding the CMC implementation, including operations of due regard aircraft over high seas.

6.5.44 Based on the above, the meeting agreed on the following Conclusion:

MIDANPIRG DECISION 20/31: CONTINUATION OF THE CMC/FUA ACTION GROUP

That, ICAO to organize a workshop to raise awareness among all stakeholders regarding the CMC implementation, including operations of due regard aircraft over high seas, and support State to develop the national CMC plan.

6.5.45 The meeting encouraged the States to develop their national Civil – Military Cooperation plan and foster the coordination between States, in particular related to the operation of due regards / military flights over high seas.

Outcomes of the HLAC Action Group

6.5.46 The subject was addressed in WP/68, presented by the Secretariat. The meeting recalled MIDANPIRG Decision 19/20 related to the establishment of the High Level Airspace Concept Action Group (HLAC AG), to develop a revised version of the MID Doc 004.

6.5.47 The meeting noted with appreciation the development of the revised version of the MID Doc 004, which was reviewed by the ATM SG/9 meeting, at **Appendix 6.5F**.

6.5.48 Accordingly, the meeting agreed on the following Conclusion and Decision:

MIDANPIRG CONCLUSION 20/32: MID HIGH LEVEL AIRSPACE CONCEPT V2.0

*That, the MID High Level Airspace Concept Version 2.0 at **Appendix 6.5F** is endorsed and be published as the MID High Level Airspace Concept V2.0.*

MIDANPIRG DECISION 20/33: DISSOLUTION OF THE HIGH-LEVEL AIRSPACE CONCEPT ACTION GROUP (HLAC AG)

That, the High Level Airspace Concept Action Group (HLAC AG) Action Group is dissolved.

SAR Implementation

6.5.49 The subject was addressed in WP/70, presented by the Secretariat. The meeting recalled the relevant SARPs and guidance material related to SAR, and the MID Doc 010.

6.5.50 The meeting highlighted the main findings related to SAR implementation within the MID Region and the status of SAR bi-lateral agreements signed at **Appendix 6.5G**.

6.5.51 The meeting reiterated the need to explore means to support MID States in eliminating SAR findings and deficiencies by, in particular, organizing a SAR implementation Seminar.

6.5.52 Based on the above, the meeting agreed on the following Conclusion:

MIDANPIRG CONCLUSION 20/34: SAR WORKSHOP

That, the ICAO MID Office organize a SAR Workshop in 2024, to address the challenges related to SAR in the MID Region.

REPORT ON AGENDA ITEM 6: MIDANPIRG WORK PROGRAMME**6.6 CNS***Spectrum Management*

6.6.1 The subject was addressed in WP/71 presented by the Secretariat. The meeting was apprised on the outcome of the ACAO/ICAO Frequency Management Workshop held in Casablanca, Morocco, 6-10 September 2023.

6.6.2 In order to increase the amount of available spectrum that can be used for Aeronautical services (VHF COM), the meeting agreed to task the Frequency Management Working Group (FM WG) to further review and amend, as deem necessary, the current MID allotment plan at **Appendix 6.6A** (Appendix B-4. Regional frequency allotment plans – ICAO Doc. 9718, Vol. II refers). Accordingly, the meeting agreed to the following MIDANPIRG Decision:

MIDANPIRG DECISION 20/35: REVIEW OF THE MID REGION ALLOTMENT PLAN

That, in order to increase the amount of spectrum that can be used for Aeronautical Services, the FM WG should adopt the revised planning Principle for Aeronautical Frequency Bands of 117.975-137 MHz and review and update, as deem necessary, the current MID allotment plan by Q1 2024.

6.6.3 The meeting agreed that the expected growth in air traffic will increase the demands on frequencies, therefore, the meeting supported a recommendation emanated from the ACAO/ICAO Frequency Management workshop to conduct a simulation on VHF COM frequency assignment in the MID Region. The primary purpose of this simulation is to determine, if a congestion in the use of frequencies can be foreseen that would require the implementation of 8.33 kHz channel spacing in any parts of the MID Region.

6.6.4 The meeting requested States to provide their Spectrum needs up to 2030 using **Appendix 6.6B**. Accordingly, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 20/36: OPTIMIZATION OF FREQUENCY ASSIGNMENT IN THE MID REGION

That, in order to optimize the frequency assignment planning and mitigate VHF frequency congestion at regional level, States are urged to:

- a) coordinate with ICAO MID Office before assigning frequencies for aeronautical services (VHF COM, VHF NAV);*
- b) perform an update/review of the data in the VHF-COM/NAV module; and*
- c) Submit Frequency Requirements for the Period 2023 – 2030 using the Guidance Doc. at **Appendix 6.6B** by 1 August 2023.*

6.6.5 The meeting was informed that in case not all frequency requirements until 2030 can be satisfied using 25 kHz channels, material for the introduction of 8.33 kHz channel will need to be developed or other viable solution in the MID Region or parts thereof. Based on other Regions' experience, the introduction of 8.33 kHz channel separation would require a retrofit of airborne/ground equipment.

6.6.6 The meeting was apprised of the latest enhancements and functionalities brought to the Frequency Finder tool (FF Tool), moreover, the meeting urged States to make extensive usage of the FF Tool for frequency coordination and to provide feedback on its usage, suggestions, bugs and recommendations to ICAO MID Office.

6.6.7 The meeting recalled that the ICAO Assembly 41, through Resolution A41-8, urged States, international organizations and other civil aviation stakeholders, to support firmly the ICAO frequency spectrum strategy and the ICAO position at WRCs in regional and other international activities conducted in preparation for WRCs.

6.6.8 The meeting urged States to actively participate in the WRC23 preparatory Workshop that will be conducted back-to back with the FSMP WG/17 meeting in Cairo, Egypt, 28 August to 7 September 2023. Furthermore, the meeting requested States to communicate the ICAO WRC-23 position to national Telecommunication Authorities.

6.6.9 The meeting was informed that ICAO WRC23 Position was approved by ICAO Council is available at the link: <https://www.icao.int/safety/fsmp/documents/itu-wrc23>. Draft updates to the ICAO Position, as contained in **Appendix 6.6C** were developed by the FSMP and will be reviewed and approval by ICAO Council in June 2023. The final position might include small adjustments.

Communication Matters

6.6.10 The subject was addressed in WP/72 presented by the Secretariat.

6.6.11 The meeting recalled that MIDANPIRG/15, through Conclusion 15/30, urged States to refrain from establishing new AFTN and CIDIN connections at the international level, gradually phase out the current connections based on AFTN or CIDIN standards, and expedite their AMHS implementation. In this regard, the meeting was informed that all CIDIN intra-regional link has been migrated to AMHS. However, inter-regional connections with Cyprus are still CIDIN link.

6.6.12 The meeting noted the progress made toward the completion of the Regional OPMET Center (ROC) plan. it was noted that 36 out of 38 actions has been completed, the remaining actions are related to the migration of inter-regional communication link to AMHS and evaluation of bandwidth increase.

6.6.13 The meeting agreed on the need to rationalize AFTN/AMHS Network in the MID Region, based on operational requirements and traffic volume. Moreover, it was agreed that States need to review the inter-regional connections established on bilaterally basis. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/37: INTER-REGIONAL COMMUNICATION LINKS

That, in order to enhance the AFS Network efficiency and performance, States are urged to:

- a) migrate inter-regional communication links to AMHS; and*
- b) rationalize the inter-regional connections established on bilateral basis, taking into consideration the regional requirements set in the MID ANP Vol II and operational needs.*

6.6.14 The meeting noted with concerns the issue of inconsistencies between the data held in the AMC and what it is implemented on AMHS switches, which cause addressing and routing problems

within the global network. Therefore, States were requested to ensure updating their systems data at the end of each AIRAC cycle.

6.6.15 The meeting recalled that MIDANPIRG/18, through Conclusion 18/34, urged States to update their focal points details, Systems capabilities, and connections on AMC. Thus, the meeting urged States (Libya, Lebanon, Syria, Kuwait, Sudan, and Yemen) to register users on the AMC and make the necessary update.

6.6.16 The meeting agreed on the need to guarantee the confidentiality and integrity of data contained in the AMC database, thus, the meeting reviewed and endorsed the AMC Accreditation procedure developed for the users from the MID Region as at **Appendix 6.6D**. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/38: ACCREDITATION PROCEDURE FOR MID EXTERNAL COM OPERATORS

*That, Accreditation Procedure for MID External COM Operators at **Appendix 6.6D** is endorsed.*

6.6.17 The meeting was informed about the occurrence of operational problems in the AFS Network (messages loop, non delivery, ...etc), it was agreed that routing tables need to be updated using the centralised tool on AMC (Routing function) to mitigate messages looping and non delivery, therefore, the meeting agreed to the following MIDANPIRG Decision:

MIDANPIRG DECISION 20/39: UPDATE OF THE AMC ROUTING TABLES

That,

- a) *AMC Routing Table Action Group be established to review and update AMC Routing Directory by 1 November 2023;*
- b) *be composed of:*
 - *the MIDAMC Chairman*
 - *the MIDAMC Team Leader (Jordan)*
 - *Ali Darwish.(Bahrain)*
 - *Ali Jaber.(Saudi Arabia)*

6.6.18 The meeting requested ICAO MID Office to organize AMHS/AMC Workshop/Training for new AMC users, it was highlighted that new designated users need to be trained to ensure the efficient use of the web application, thus, it was agreed that the training be conducted back-to-back with the MIDAMC STG/9 in Feb,2024. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/40: AMHS/AMC WORKSHOP

That, in order to provide knowledge and hands-on experience on the use of AMS Web application for new AMC Users AMHS/AMC Workshop be organised for AMC users in 2024.

6.6.19 The meeting was informed that the ICAO EUR/NAT AFS to SWIM Transition Task Force (AST TF) is working to implement an AMHS gateway between the AMHS community and ARINC. The first implementation step is to validate the addresses within ARINC community that are used for exchanging messages with the existing AFTN network worldwide. Therefore, the meeting

urged the States concerned (Egypt, Libya, and Sudan) to validate the ARINC Addressee by 1 August 2023 and agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/41: VALIDATION ARINC ADDRESSEE

That, in order to facilitate the implementation of AMHS/ARINC gateway, States Concerned are urged to validate the ARINC Users addressee by 1 August 2023.

6.6.20 The meeting was apprised of the SWAMWAY Study Group activities related to the development of a core technical specification for the AMHS/SWIM Gateway. Furthermore, it was noted that the AFTN addressee will be used for naming and addressing, hence, the AMC will be used for addressee translation on the long term.

6.6.21 The meeting received update on the establishment of the MID IP Network project through joining the NEWPENS project. The meeting recalled that eight (8) States (Bahrain, Egypt, Jordan, Lebanon, Kuwait, Oman, Saudi Arabia and UAE) confirmed their interest to join the EUROCONTROL IP Network Project (New PENS) pending technical and financial proposals.

6.6.22 The meeting was informed that EUROCONTROL accepted to extend the New PENS project to the MID States, official notification letter and next steps will be communicated to the ICAO MID Office soon.

AIDC/OLDI Implementation

6.6.23 The subject was addressed in WP/73 and WP/74 presented by the Secretariat and Oman, respectively.

6.6.24 The meeting noted with concern the low implementation level of the AIDC/OLDI in the MID Region (26%). However, the meeting was informed that several AIDC/OLDI connections are being established among MID States and will be operational during the period of 2023-2024.

6.6.25 The meeting was apprised of the outcome of the AIDC/OLDI Workshop that was conducted successfully jointly with ACAO and supported by EUROCONTROL in 14-16 February 2023, Cairo, Egypt.

6.6.26 The meeting reviewed the proposed revised ICAO MID Doc 006- MID Region Guidance for the implementation of AIDC/OLDI as at **Appendix 6.6E**. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/42: MID REGION GUIDANCE FOR THE IMPLEMENTATION OF AIDC/OLDI (ICAO MID Doc 006)

*That, the revised version of the MID Region Guidance for the Implementation of AIDC/OLDI as at **Appendix 6.6E** is endorsed and be published by ICAO MID.*

6.6.27 The meeting recalled that the MSG/6 meeting agreed, through Conclusion 6/16, to include a requirement for AIDC/OLDI implementation (priority 1 interconnections) in the MID eANP Volume II Part IV-ATM, under Specific Regional Requirements. It was highlighted that the lack of implementation of priority 1 interconnection will result in additional ANS deficiency to the MID Air Navigation Deficiency Database (MANDD). Therefore, it was agreed that deficiencies related to the lack of implementation of Priority 1 AIDC/OLDI connections will be added by December 2023.

6.6.28 The meeting noted the request from Egypt to change priority of AIDC/OLDI connections with Cyprus and Greece. Moreover, Egypt requested ICAO MID Office to coordinate with the ICAO EUR/NAT Office to facilitate the establishment of interconnection with Cyprus and Athens. The meeting agreed that the AIDC/OLDI applicability area be updated as at **Appendix 6.6F**.

6.6.29 The meeting requested ICAO MID Office to send a reminder to States quarterly to update the deficiencies states and CAPs on MANDD.

6.6.30 The meeting recalled that States interfacing with adjacent Regions may require to support and implement dual capabilities (AIDC and OLDI) and the selected protocol would be agreed upon bilaterally. Therefore, the meeting tasked ICAO MID Office to coordinate with ICAO AFI Office to explore the possibility of agreement on a common inter-regional protocol and provide feedback to the CNS SG/13 and ATM SG/9 for further discussion.

6.6.31 The meeting noted with appreciation Oman's efforts to implement AIDC/OLDI. it was highlighted that Oman aims to reduce ATC workload, read-back/hear-back errors and gross navigational errors caused by manual ATC coordination, and to grasp the benefits of Automated data exchange (ADE) and to meet the global and regional obligations, CAA Oman is giving proper attention to implement ADE system in Oman.

6.6.32 The meeting was apprised of the AIDC implementation plans in Oman to connect Muscat ACC with Mumbai and Karachi ACCs. AIDC connection between Muscat and Mumbai ACCs were tested three times in Sep 2019, Mar 2021 and Feb 2023 but were not successful due to message processing problems.

6.6.33 The meeting recalled the SL dated 29 December 2022 regarding the PfA on the initial implementation of the flight and flow — information for a collaborative environment (FF-ICE) services (Planning Service) that permits an operator to submit a Preliminary Flight plan prior to filing an ATS Flight plan (Filed Flight Plan) for evaluation by the service provider. Therefore, the meeting tasked ATM SG, AIM SG and CNS SG to address FICE B2/1- Planning service, requirements and implementation.

ANS Cybersecurity

6.6.34 The meeting recalled the ICAO Assembly, through resolution A41-19, called upon States and industry stakeholders to take several actions to address cyber threats to civil aviation.

6.6.35 The meeting was apprised of the outcome of the first meeting of the Air Navigation Cybersecurity Working Group (ACS WG). It was noted that the ACS WG/1 meeting conducted gap analysis between ICAO Cybersecurity Action plan and the current implementation level in the MID region.

6.6.36 The meeting reviewed the endorsed the proposed list of actions for 2023-2024 as at **Appendix 6.6G**. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/43: MID REGION ANS CYBERSECURITY ACTION PLAN

That, in order to assist States achieving the objectives of ICAO Cyber Security Strategy seven pillars in ANS area in the MID Region:

- a) the MID Region ANS Cybersecurity actions plan at **Appendix 6.6G** is endorsed;*

- b) urge States to implement identified actions in a timely manner; and
- c) ACS WG to develop a survey to establish how States have implemented the identified actions.

6.6.37 The meeting noted that the MID Region ANS Cybersecurity actions plan is a living document that will be reviewed and updated regularly, based on the global development and Regional implementation Status. Furthermore, the meeting tasked the ACS WG/2 to develop a survey to establish how States have implemented the identified actions.

6.6.38 The meeting discussed the qualification and training needs for ANS Cybersecurity inspector. The meeting requested ICAO to organize capacity building activities on ANS Cybersecurity in 2024-2025. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/44: ANS CYBERSECURITY CAPACITY BUILDING ACTIVITIES

That, to assist States building capacity on ANS cybersecurity & resilience, capacity building activities on ANS Cybersecurity be organized in 2024.

6.6.39 The meeting urged States to participate actively in the Cybersecurity and Resilience symposium that will be organized in 6-8 November 2023, Doha, Qatar.

6.6.40 The meeting was apprised of the outcome of the ANS Cyber Resilience Tabletop Exercise (TTX) was successfully conducted 13-15 November 2022. The meeting supported the recommendations emanated from the TTX.

6.6.41 In accordance with the MID Region ANS Cyber Security action plan, States should share experience on cyber threats and incidents. In this regard, the meeting recalled that UAE developed and hosted ATM data cybersecurity portal (ADCS Portal). In order to enhance the functions and make benefits of the ATM Data cybersecurity portal, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/45: ENHANCEMENT ATM DATA CYBERSECURITY (ADCS) PORTAL

That, States be urged to:

- a) review and update, as deem necessary, ANS Cyber Security focal point(s);
- b) provide feedback to the ADCS to Admin by **1 October 2023** for further enhancements; and
- c) use the ADCS effectively, share their experience related to cybersecurity, through the ADCS Portal.

Navigation Matters

6.6.42 The meeting recalled that the ASBU element “Navigation Minimal Operating Networks” (NAVS B0/4) has been classified as priority 1 in the revised MID Region Air Navigation Strategy (MID Doc 002). This element aims to rationalize the conventional Navigational aids network through the increased deployment of the satellite-based navigation system.

6.6.43 The meeting recalled that MIDANPIRG/18 meeting, through Decision 18/42,

established NAV. MON Plan Ad-hoc Action Group to develop a template for Navigation Minimal Operating Networks (Nav. MON) plan in line with ICAO SARPs and Regional requirements.

6.6.44 The meeting noted the progress made by the NAV MON AG, and that four (4) States (Egypt, Jordan, Oman and UAE) have volunteered to populate their data in the proposed plan template and provide feedback to the CNS SG/13 meeting.

6.6.45 Additionally, the meeting tasked the ATM, CNS and PBN Sub-groups to review and improve the Draft NAV MON plan template to be presented for MIDANPIRG/21 for further review and endorsement. Accordingly, the meeting agreed to the following MIDANPIRG Decision:

MIDANPIRG DECISION 20/46: NAV MON Plan Template

That, in order to develop the NAV MON Plan template, the ATM SG, CNS SG and PBN SG be tasked to review and update, as deem necessary, the NAV MON Plan Template to be presented to MIDANPIRG/21 for further review and endorsement.

6.6.46 The meeting noted that the majority of 2022 GNSS RFI incidents reported in Egypt, Iraq, Iran and Turkey. The meeting recalled the coordination meeting held between ICAO MID, ICAO EUR/NAT, IATA MENA, IATA EUR, Iraq and Turkey regarding the frequent GNSS interference reported in Ankara and Baghdad FIRs. It was agreed to conduct a follow-up meeting with States concerned (Egypt, Iraq, Iran and Turkey).

6.6.47 The meeting noted the possible means to monitor GNSS signal and provide timely warning to Airspace users, in order to reduce the impact of the GNSS interference on Aviation operation. Therefore, the meeting requested States who have implemented GNSS monitoring system, to share their experience on GNSS interference monitoring with the CNS SG/13 meeting.

6.6.48 The meeting agreed to collaborate with ACAO to explore the possibility of initiating a Regional GNSS monitoring project and requested that the ICAO MID CNS RO present a Working Paper including project proposal to the coming ACAO ANC Meeting. Accordingly, the meeting agreed to the following MIDANPIRG Decision:

MIDANPIRG DECISION 20/47: GNSS RFI MITIGATION

That, the ICAO MID Office is requested to:

- a) follow-up with Egypt and Iraq on actions taken to mitigate the likelihood and impact of GNSS RFI within Cairo and Baghdad FIRs; and*
- b) collaborate with ACAO to assess the feasibility of establishing a Regional GNSS RFI monitoring System and report the outcome to the CNS SG/13 and MIDANPIRG/21 meetings.*

6.6.49 The meeting noted the request to organise a Workshop/Webinar on the Analysis of CNS facilities Building restricted areas (BRA). In this regard, States were encouraged to share their experience on the issue. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 20/48: ANALYSIS OF CNS FACILITIES BRA WEBINAR

That, in order to assist States in identifying the impact of physical presence of buildings on CNS signals in space, a Webinar on the Analysis of CNS facilities building restricted area be organized in 2024.

Radio Altimeter & 5G

6.6.50 The meeting recalled that MIDANPIRG/19, through Decision 19/23, established a Radio Altimeter (RADALT) Action Group (AG) to develop guidance material to protect aircraft operations from potential Radio Altimeter interference.

6.6.51 The meeting reviewed and endorsed the Guidance material on safeguarding measures to protect Radio Altimeter from potential harmful interference from Cellular 5G Communications as at **Appendix 6.6H**. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

**MIDANPIRG CONCLUSION 20/49: GUIDANCE MATERIAL ON PROTECTING
RADALT (ICAO MID Doc 015)**

*That, the Guidance Material developed by the RADALT AG at **Appendix 6.6H** is endorsed and be published by the ICAO MID Office (ICAO MID Doc 015).*

Surveillance Matters

6.6.52 The meeting was apprised of the outcome of the ICAO Emerging Surveillance Technologies Symposium, (5-7 September 2023, Tunis). The meeting supported meeting supported the recommendations emanated from the Symposium:

- a. States are encouraged to take measures to mitigate RFI on surveillance systems:
 - Use of multi constellation/multi frequency GNSS
 - Employing multiple surveillance sensors in critical areas
 - Use of monitoring and prediction tools/applications
- b. Cost-benefit analysis and operational needs as well as the level of vulnerability of specific systems in some airspaces should be considered when planning for new surveillance systems or removing conventional SUR systems (e.g. SSR and PSR)
- c. The implementation of new surveillance systems should be done in coordination with airspace users and other relevant stakeholders, taking into consideration fleet capabilities.
- d. States should give high importance to human factors and training when planning/implementing new surveillance technologies (ATSEPs, ATCOs, pilots, etc.)
- e. States are urged to develop their RFI monitoring/reporting mechanisms at the national level, in coordination with the relevant ICAO Regional Offices and the Organizations (ITU-BR, EASA, IATA, EUROCONTROL). Necessary coordination may be needed at the State level with relevant entities (Telecommunication Regulatory authorities, Military, Airlines, ANSP, CAA, etc.)
- f. States are encouraged to promote coordination with their neighboring States for the establishment of SUR data exchange and AIDC/OLDI implementation.
- g. States are urged to develop their contingency plans/procedures and back-up systems, to ensure continuous surveillance services/safe operations in the event of RFI or any malfunction of the SUR systems.
- h. ICAO Regional Offices and States to monitor the progress of the initiatives related to the GNSS RFI monitoring (using e.g. ADS-B).

- i. States that are planning to implement SB ADS-B are encouraged to consider the issue of suitable Aircraft antenna configuration.
- j. States are encouraged to consider Cyber-security at the appropriate level according to the assessment of the existing infrastructure supporting the systems.
- k. States' CAAs were encouraged to engage in the emerging surveillance initiatives from early stages of planning, implementation and post-implementation.
- l. States are encouraged to conduct feasibility study for the virtual tower deployment using the presented methodology and site selection process.

6.6.53 The meeting noted that Radars in States may have some coverage limitations, existence of non-radar covered area (gap area) due to terrains or Radar blind range. It was highlighted that States need to plan for better redundancy, specially in case of outage for maintenance or failure.

6.6.54 The meeting noted that Bahrain, Qatar and UAE have shared Radar data. consequently, the meeting highlighted the need to define type of services to be used, study states' liability and many other aspects need to be considered.

6.6.55 The meeting was apprised of the 1090 MHz activity results from both SSR Mode A/C and Mode S type interrogators, however SSR Mode A/C operation is less spectrum efficient than Mode S SSR. Therefore, managing interrogations in heavily surveilled airspace is very important, SSRs sharing surveillance data via networking thereby eliminating redundant surveillance coverage in overlapping geographic regions.

6.6.56 The meeting agreed that sharing Radar data among MID States will improve redundancy, enhance surveillance coverage and reduce 1090 RF congestions. Therefore, the meeting agreed to the following Conclusion:

MIDANPIRG CONCLUSION 20/50: RADAR DATA SHARING IN THE MID REGION

That, the Radar Data Sharing Action Group (RDS AG) be:

- a) *established to assess the feasibility of Radar data sharing among MID States, identify challenge(s) and possible solution(s) and implementation by 1 January 2024; and*
- b) *composed of:*
 - *Ibrahim Faraj (Jordan);*
 - *Seyed Mirseed (Iran);*
 - *Loay Beshawri (Saudi Arabia);*
 - *Yousif Al Awadi (UAE);*
 - *Jehad Faqir (IATA); and*
 - *ICAO MID RO/CNS.*

6.6.57 The meeting recalled that MIDANPIRG/19 meeting, through Decision 19/26, tasked the CNS SG in coordination with the ATM SG to update the MID Region Surveillance Plan (MID Doc 013) with the outcome of the ADS-B Webinar and MID States' experience in ADS-B implementation.

6.6.58 The meeting reviewed the revised MID Region Surveillance Plan including as at **Appendix 6.6I**. Accordingly, the meeting agreed to the following Conclusion:

**MIDANPIRG CONCLUSION 20/51: MID REGION SURVEILLANCE PLAN
(ICAO MID Doc 013)**

*That, the revised version of the MID Region Surveillance plan as at **Appendix 6.6I**, is endorsed.*

6.6.59 The meeting discussed the ADS-B implementation issue in the MID Region, the meeting noted following lessons learned/ best practices for planning for ADS-B Mandate issuance, that States should:

- inform airspace users about ADS-B implementation plan and publish mandates early to give operators enough lead time;
- establish procedures for managing Waiver and Exemptions. Requests for temporary waivers and exemptions should be based on operational impact and hazard analyses. Waiver/ exemptions could be granted for limited time span;
- for planning purpose, find the ADS-B equipage rate based on Flight plan data collected and analysed; MIDRMA would provide data regarding ADS-B equipage as well;
- continuously monitor operator compliance progress, conduct monthly statistics; and
- plan for non ADS-B OUT compliant operations (ex. State aircraft).

6.6.60 The meeting tasked the CNS SG/13 meeting to address in detail the requirements and process for ADS-B implementation including the issuance of the ADS-B mandate, furthermore, the meeting encouraged MID States that have issued ADS-B mandate to share their experience and best practices.

REPORT ON AGENDA ITEM 6: MIDANPRIG WORK PROGRAMME
6.7 MET

6.7.1 The subject was addressed in WP/79 presented by the Secretariat. The meeting was presented with two Draft Conclusions related to the World Area Forecast System (WAFS) upgrades that were formulated by the Tenth Meeting of the MET Sub-Group (MET SG/10) held virtually from 17 to 19 May 2022.

6.7.2 Specifically, MIDANPIRG/20 noted that the horizontal resolution of the WAFS hazard data sets for Icing, Turbulence and Cumulonimbus was increased from 1.25 degrees to 0.25 degrees. These improved WAFS data sets were introduced in accordance to ICAO Annex 3 Amendment 79 (applicable 5 November 2020) and available on SADIS. The existing WAFS hazard data sets with horizontal resolution of 1.25 degrees are no longer listed in ICAO Annex 3, but will continue to be published on SADIS until November 2023. Therefore, SADIS users were encouraged to migrate their services from the legacy 1.25-degree hazard data sets to the new 0.25-degree version as soon as possible.

6.7.3 MIDANPIRG/20 also noted planned upgrades to the WAFS in November 2023 that includes an upgrade in the horizontal, vertical and temporal resolution of all WAFS data sets. Furthermore, an upgrade to the WAFS SIGWX forecasts in 2024 between World Area Forecast Centres (WAFS) will be produced for 3-hourly intervals out to 2 days and better suited for the needs of short haul and ultra-long haul operations.

6.7.4 Lastly, MIDANPIRG/20 noted that in order to manage the significant increase in volume of data, the data delivery mechanism will be upgraded and be System Wide Information Management (SWIM)-compliant using Application Programmer Interface (API).

6.7.5 Given the aforementioned, MIDANPIRG/20 agreed to the following Conclusions:

MIDANPIRG CONCLUSION 20/52: 0.25-DEGREE WAFS HAZARD DATA

That, the SADIS users integrate the new 0.25-degree WAFS hazard data into systems and software prior to November 2023, if they have not already done so.

MIDANPIRG CONCLUSION 20/53: ANNEX 3 AMENDMENT 81 WAFS AND SADIS UPGRADES

That, the SADIS users be invited to:

- a) familiarize themselves with the proposed WAFS and SADIS changes planned for November 2023 and 2024;*
- b) discuss the upcoming changes with their technical departments about how their organization could adapt to these technological changes; and*
- c) get involved in trying out the new Beta SADIS API's once they become available in late 2022 or 2023.*

6.7.6 MIDANPIRG/20 noted the status of ICAO Meteorological Information Exchange Model (IWXXM) implementation in the MID Region. States were encouraged to provide the latest updates in this regard to the ICAO MID Regional Office. In addition, States that have not yet implemented IWXXM were encouraged to reference the guidance material available and/or contact Regional OPMET Centre (ROC) Jeddah for assistance, particular for testing the exchange of OPMET data in IWXXM format.

6.7.7 MIDANPIRG/20 noted that the new Meteorological Watch Office (MWO) Qatar has been established to provide meteorological services for the Doha Flight Information Region (FIR) in accordance to ICAO Provisions. Consequently, updates to the *MID Region SIGMET Guide* (MID Doc 009) were necessary in order to include the WMO Headers for SIGMET and special air-reports. In addition, headers for the exchange of SIGMET in IWXXM format for all MID States were included as provided at **Appendix 6.7A**.

6.7.8 Given the above, MIDANPIRG/20 endorsed the following Conclusion:

MIDANPIRG CONCLUSION 20/54: MID REGION SIGMET GUIDE

*That, the updated MID Region SIGMET Guide (MID Doc 009) as provided at **Appendix 6.7A** be endorsed and posted on the ICAO MID Website.*

REPORT ON AGENDA ITEM 6: MIDANPIRG WORK PROGRAMME
6.8 Air Navigation Deficiencies

6.8.1 The subject was addressed in WP/80 presented by the Secretariat. The meeting urged States to use the MID Air Navigation Deficiency Database (MANDDD) for the submission of requests for addition, update, and elimination of Air Navigation Deficiencies, including the submission of a specific Corrective Action Plan (CAP) for each deficiency. The meeting reiterated that a deficiency would be eliminated only when a State submit a formal Letter to the ICAO MID Office containing the evidence(s) that mitigation measures have been implemented for the elimination of this deficiency.

6.8.2 The meeting noted with concern that the majority of deficiencies listed in the MANDDD have no specific Corrective Action Plan (CAP). The meeting urged States to implement the provision of MIDANPIRG Conclusion 15/35 related to elimination of Air Navigation Deficiencies, in particular, the submission of a specific Corrective Action Plan (CAP) for each deficiency.

6.8.3 The meeting reviewed and updated the list of deficiencies in the AIM, AOP, ATM, CNS, SAR and MET fields as reflected in the MID Air Navigation Deficiency Database (MANDDD) at: <https://mandd.icao.int>. The meeting noted that the total number of air navigation deficiencies recorded in MANDDD is 97 deficiencies compared to 105 deficiencies in MIDANPIRG/19.

6.8.4 A quantitative analysis of the MID States' Air Navigation Deficiencies is shown in the Tables and Graphs presented at **Appendices 6.8A and 6.8B**.

6.8.5 The meeting reviewed the current status of deficiencies:

- In the AOP field: the total number of AOP deficiencies is nine (9) priority "A". Seven (7) deficiencies related to aerodrome certification; one (1) related to runway physical characteristics; and one (1) related to apron lighting. The lack of implementation of aerodromes' certification represents 78% of these deficiencies.
- In the AIM field: according to the information provided by Libya, Oman and UAE, the meeting agreed to remove the deficiencies reported against Libya, Oman and UAE respectively related to lack of AIRAC adherence, implementation of QMS, terrain and obstacle data sets (two deficiencies); the total number of AIM deficiencies is forty-eight (48); forty-two (42) priority "A" and six (6) priority "B". Twenty-two (22) deficiencies related to eTOD (based on the agreement to include new deficiencies related to the non-provision of TOD for Area 2a/TOFP and OLS); five (5) related to QMS; five (5) related to AIXM; six (6) related to WAC; three (3) related to pre-flight information services; two (2) related to AIP and aeronautical charts; three (3) related to AIRAC adherence; and two (2) related to WGS-84.
- In the ATM field: As reported by MIDRMA and agreed by the meeting the deficiency against Syria related lack of submission of TDS to MIDRMA as well as deficiency against UAE related to the lack of contingency agreement with adjacent FIRs are removed; the total number of deficiencies is sixteen (16); nine (9) priority "A" and seven (7) priority "B". Eight (8) related to the uncompleted signature of contingency agreements; seven (7) related to the non-implementation of planned regional ATS Routes; and one (1) related to unsatisfactory reporting of large Height deviation (LHD) to the MIDRMA.

-
- In the CNS field: according to the information provided by Oman, the meeting agreed to remove the deficiency reported against Oman related to ATS Direct speech circuits; the total number of CNS deficiencies is four (4); two (2) priority “A” and two (2) priority “B”. Two (2) deficiencies are related to ATS Direct speech circuits, one (1) related to Inter-Regional Communication link with ICAO EUR/NAT Region and one (1) for HF service.
 - In the MET field: according to the information provided by Iraq and Oman, the meeting agreed to remove the deficiencies reported against Iraq and Oman respectively related to lack of provision METAR at ORBM and implementation of QMS; the total number of MET deficiencies is eleven (11) priority “A” deficiencies. four (4) related to QMS; and seven (7) related to METAR, TAF, SIGMET.
 - In the SAR field: according to the information provided by Iraq, the meeting agreed to remove the deficiencies reported against Iraq related to non-compliance with the carriage of ELT; the total number of deficiencies is nine (9) priority “A”. Five (5) related to the lack of implementation of SAR provisions; and four (4) related to non-compliance with the carriage of Emergency Locator Transmitter (ELT) requirements.

6.8.6 The meeting recalled the discussion through the different MIDANPIRG sub-groups meeting and the papers presented to the MIDANPIRG/20, summarized in the following items:

- as reported by MIDRMA, new deficiencies were proposed to be added against Egypt for the high percentage of extended period of expired MMR for Egyptian register aircraft; also Lebanon and Kuwait related to failure of submission of TDS data to the MIDRMA; therefore, the total number of deficiencies in the ATM field would be nineteen (19).
- As reported by CNS SG/12, new deficiencies were proposed to be added against Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan and UAE for not implementing the Priority 1 AIDC/OLDI connection; therefore, the total number of deficiencies in the CNS field would be sixteen (16).
- As reported by MET SG/10, new deficiencies were proposed to be added against Iraq and Jordan related to SADIS service as well as Libya and Sudan related to METAR and TAF services; the total number of MET deficiencies would be fifteen (15) priority “A” deficiencies. five (5) related to QMS, eight (8) related to METAR, TAF, SIGMET and WAFS and two (2) related to SADIS.

6.8.7 The meeting agreed to allow for corrective period up to 31 December 2023, then the items in the para 6.8.6 will be included in the MANDD (total number of deficiencies would be 116).

6.8.8 The meeting agreed to follow up on deficiencies filed in MANDD and the ICAO MID Office will send quarterly reminder to the States’ Focal Points to update the status of deficiencies and submit the related Corrective Action Plans (CAP).

REPORT ON AGENDA ITEM 6: MIDANPIRG WORK PROGRAMME**6.9 States' Coordination Meetings**

6.9.1 Several coordination meetings were conducted between States and Organizations, to discuss common subjects and pending issues, including the following list:

Coordination meetings
BAHRAIN – IRAN – OMAN – QATAR – UAE
OMAN – YEMEN
OMAN – SYRIA
IRAQ – OMAN
FAA – OMAN
OMAN – UAE
OMAN – SAUDI ARABIA
SAUDI ARABIA – UAE
FAA – JORDAN
BOEING – FAA
FAA – IATA
MIDANPIRG Enhancement Programme: Chairman of MIDANPIRG – EGYPT – SYRIA – ICAO
SAUDI ARABIA – UAE – AIRGO

6.9.2 The States appreciated these arrangements to discuss collaboration opportunities, which will further enhance the implementation of Regional Programmes.

REPORT ON AGENDA ITEM 7: FUTURE WORK PROGRAMME AND DATES AND VENUE OF MIDANPIRG/21 AND RASG-MID/11

7.1 The meeting received with appreciation an offer by UAE to host the MIDANPIRG/21 and RASG-MID/11 meetings. Additionally, the meeting appreciated the offer by Qatar to host the MIDANPIRG/22 and RASG-MID/12 meetings.

7.2 Accordingly, considering the Regional and Global relevant events, the meeting agreed that the next MIDANPIRG/21 and RASG-MID/11 meetings will be convened in UAE in Q2 of 2024.

7.3 The exact dates of the meetings will be coordinated between the ICAO MID Office and Chairpersons of both Groups and communicated with States in the due course.

7.4 The meeting agreed to maintain the current arrangement for the conduct of MIDANPIRG and RASG meetings; and tasked the Secretariat to conduct a Survey and analyse the feedback in order to measure efficiency of the current arrangements. The results of the survey will be presented by the Secretariat to MIDANPIRG/21 and RASG-MID/11 meetings.

7.5 Concerning the Fifth MID Region Safety Summit, the meeting recalled that the RASG-MID/19 meeting noted with appreciation that Saudi Arabia has generously offered to host the Fifth MID Region Safety Summit during the Second Half of 2023. However, due to operational needs, the Summit was postponed to 2024. Accordingly, Saudi Arabia will coordinate with the ICAO MID Office on the way forward for hosting the Summit.

REPORT ON AGENDA ITEM 8: ANY OTHER BUSINESS

8.1 IP/25 was submitted by the Saudi Arabia, highlighting the Civil Aviation Environmental Sustainability Plan (CAESP) which details the Environmental Sustainability framework, roadmap, capacity, capability priorities and associated regulation and guidelines for the aviation sector of Saudi Arabia.

APPENDICES

APPENDIX 2.1A

FOLLOW-UP ACTION PLAN ON THE DGCA-MID/6 CONCLUSIONS

CONCLUSIONS AND DECISIONS	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	STATUS/ REMARKS
CONC. 6/1: CO-ORGANISING OF REVENUE GENERATION ACTIVITIES That, in order to supplement the ICAO MID's work programmes not funded by the Regular Budget, States and International Organizations are strongly encouraged to coordinate with the ICAO MID Office the organization of joint Revenue Generation Activities.	ICAO, States & ORGs	Joint Revenue Generation Activities (MID RCM)		Ongoing MID Regional Cooperation Plan 2023-2025 endorsed by MID RCM/8 meeting
CONC. 6/2: WORKSHOP ON ENTERPRISE RISK MANAGEMENT AND BUSINESS CONTINUITY That, in order to raise the Civil Aviation Authorities' level of preparedness and readiness to achieve the highest levels of response during emergencies, crises and disasters, UAE coordinate with ACAO and ICAO MID Office the organization of a Workshop on Enterprise Risk Management and Business Continuity in 2023.	UAE	Workshop on Enterprise Risk Management and Business Continuity	Dec 2023	Ongoing
CONC. 6/3: MID FPP FUNDING MECHANISM That, considering that the MID FPP business model is based on cost-recovery mechanisms (non-profit): a) the charges applied by the MID FPP are in accordance with applicable ICAO policies and as agreed by the MID FPP Steering Committee; b) the main sources of income of the MID FPP are: the annual financial contributions by the Active States; the revenues generated from the services provided by the MID FPP and the resource mobilization (financial and/or in-kind contributions by Donor States/Organizations/ Industry; c) the MID FPP charging scheme is in accordance with Appendix 5A and might be revised by the MID FPP Steering Committee, when necessary;	DGCA-MID/6	Funding Mechanism	Nov. 2022	Completed (More updates in WP/50)

CONCLUSIONS AND DECISIONS	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	STATUS/ REMARKS
d) the Active States pay an annual financial contribution of USD 20,000; e) up-to 50% of the Active States' and Donors' contributions be used against services provided by the MID FPP (with no additional cost), in line with the approved Work Plan; and f) the annual contributions be paid not later than 1 December of each year based on the invoices issued by ICAO TCB; g) ICAO ensure that the year of contribution is clearly indicated on the invoices related to the MID FPP Project; h) the MID FPP Member States comply with the payment instructions contained in the invoices sent by ICAO HQ (Project code, fund number, invoice number, Bank information, etc i) in case a MID FPP Active State does not pay the annual contribution in a timely manner, the MID FPP Steering Committee might consider taking penalty measures against this State (benefiting of services/discounts, review of the Membership, etc); j) the bills related to the MID FPP expenses be certified by the MID FPP Steering Committee Chairman on behalf of the Steering Committee; and k) the MID FPP funding mechanism be revised by the MID FPP Steering Committee, when necessary.				
CONC. 6/4: MIDANPIRG ENHANCEMENT PROGRAMME That: a) the MIDANPIRG Enhancement Programme (MEP) is established to improve the level of implementation of the MID Air Navigation Plan (ANP) provisions and eliminate the reported	DGCA-MID/6	MEP	Nov. 2022	Actioned

2.1A-3

CONCLUSIONS AND DECISIONS	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	STATUS/ REMARKS
Air Navigation deficiencies, through the collaboration of States and stakeholders for the provision of necessary assistance to the States in need; b) States provide the ICAO MID Office with the contact details of their nominated MEP Focal Point; and c) States and stakeholders support the achievement of the MEP objectives.	States States and stakeholders	MEP Focal Points Achievement of MEP objectives	15 Feb. 2023	SL Ref.: ME 5- 23/010 dated 12 Jan. 23 (More updates in PPT/11)
CONC. 6/5: CHARGES FOR AIRPORTS AND AIR NAVIGATION SERVICES That: a) ICAO organizes workshop on ICAO's policies on charges and taxes for States in the MID Region; b) States are encouraged to utilize relevant ICAO guidance on charges for airports and air navigation services; c) States are urged to enhance the implementation of ICAO's policies on charges for airports and air navigation services; and d) States are encouraged to support the work of ICAO in the area of airports and air navigation services economics, including active response to ICAO surveys and participation in relevant ICAO workshops and meetings.	ICAO States	workshop on ICAO's policies on charges and taxes	Dec. 2024	Ongoing
CONC. 6/6: MID REGION AIR TRANSPORT STRATEGIC PLAN 2025 - 2040 That, in order to support the sustainable development of air transport in the MID Region, in line with the Strategic Objectives of ICAO and at the same time supporting the achievement of the United Nations Sustainable Development Goals (UN SDGs): a) States and International Organizations designate Focal Points to support the ICAO MID Office in the drafting of the MID Region Air Transport Strategic Plan 2025 - 2040;	ICAO	Focal Points	Jan. 2023	Actioned State Letter File Ref.: ME 5 – 22/301 dated 8 Dec. 2022

CONCLUSIONS AND DECISIONS	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	STATUS/ REMARKS
b) ICAO MID and ACI are designated as the Rapporteurs of the Drafting Group; c) ACI proposals be considered by the Drafting Group during the development of the MID Region Air Transport Strategic Plan 2025-2040; and d) the Draft MID Region Air Transport Strategic Plan 2025 -2040 be presented to the DGCA-MID/7 meeting for endorsement.	ICAO MID and ACI Drafting Group Drafting Group	Reports of the Drafting Group Draft MID Region Air Transport Strategic Plan 2025-2040 MID Region Air Transport Strategic Plan 2025-2040	 Q4-2024	 First meeting of the Drafting Group was held on 28 March 2023 Second meeting of the Drafting Group was held on 2 May 2023
CONC. 6/7: CONTINUOUS COLLABORATION APPROACH TO MANAGING AND ENHANCING SAFETY IN MID REGION That: a) the Continuous Collaboration Approach to Managing and Enhancing Safety in MID Region at Appendix 9A , is endorsed; and b) States and Stakeholders are invited to support the implementation of the Continuous Collaboration Approach to Managing and Enhancing Safety in MID Region.	 DGCA-MID/6 States and Stakeholders	 Continuous Collaboration Approach to Managing and Enhancing Safety	 Nov. 2022	 Ongoing (Updates in PPT/7)

APPENDIX 2.1B



Continuous Collaboration Approach to Managing and Enhancing Safety in MID Region

First Edition, November 2022

Continuous Collaboration Approach to Managing and Enhancing Safety in MID Region

Introduction

- 1) ICAO Assembly Resolution 41-6, including the endorsement of 2023-2025 (fourth) edition of the Global Aviation Safety Plan (GASP);
- 2) The GASP 2023-2025 Edition presents the global strategy for the continuous improvement of aviation safety and provides a framework in which regional and national aviation safety plans Regional Aviation Safety Plan (RASP) and National Aviation Safety Plan (NASP) are developed and implemented;
- 3) ICAO Assembly Resolution 41-24, concerning Aviation's contribution towards the United Nations (UN) 2030 Agenda for Sustainable Development;
- 4) Aviation Safety activities and deliverables contained in the ICAO Strategic objectives and Business Plan supporting targets of the 11 out of 17 UN SDGs; and
- 5) The endorsement by 41 Assembly of the new Policy on ICAO Implementation Support Provided to States by ICAO, which strengthens ICAO's implementation support activities to meet the needs of States.

Middle East Regional Aviation Safety Plan (MID-RASP) 2023-2025 Edition

- 1) The Middle East Regional Aviation Safety Plan (MID-RASP) 2023-2025 Edition presents the strategic direction for the management of aviation safety in the MID Region, to strengthen Member States Safety Oversight Systems, and risk-based approach to managing safety and support effective implementation of States' Safety Programmes (SSP) and Safety Management System (SMS) including the development of NASPs;
- 2) The MID-RASP 2023-2025 Edition provides strategic approach to managing safety at the regional level with the focus on MID Region strategic safety priorities: Organizational challenges/issues, operational safety risks, and emerging risks.
- 3) The MID-RASP 2023-2025 Edition identifies MID Region Safety Performance Monitoring (SPM) with specific safety targets in line with GASP and the RASG-MID would continuously monitor the implementation of the Safety Enhancement Initiatives (SEIs) and measure safety performance of regional civil aviation, to ensure the intended targets are achieved using the MID Region SPM.
- 4) The drastic reduction in traffic volumes due to COVID-19 and the new safety risks identified by its impacts, the MID-RASP supports on maintaining collectively the pre-pandemic high aviation safety level throughout the recovery phase and improving safety post-recovery.
- 5) The MID-RASP provides strategy for improving safety within a specified timeframe, through defined SEIs in a coordinated, cooperative and collaborative approach among States, international organizations, and industry to achieve Safety Targets.
- 6) Fostering effective risk management capabilities in the MID Region, State and industry level to cope with the systemic and operational safety risks and wide-ranging effects of the crisis and constitute an important enabler for building back a more resilient aviation system

Challenges affecting achievement MID-RASP Objectives, Goals and Targets

- 1) Unstable Security/Political Situation
- 2) Financial Constraint (financial resources)
- 3) Insufficient qualified and experienced technical staff
- 4) Development of NASP and SSP implementation
- 5) Lack of sharing of safety information

Way Forward

States, International/Regional Organizations and Industry to work together in a collaborative and coordinated manner towards to:

- i. Supporting the provision of sustainable resources including financial and in-kind support to achieve effective aviation Safety Oversight and implementation of Safety Management including the development of NASPs;
- ii. Supporting the availability of needed resources for the implementation of MID-RASP including SEIs and safety actions, in coordination with ICAO MID Regional Office, which aims to enhance aviation safety in the MID Region.
- iii. Reinforcing efficient and effective cooperation and collaboration with all stakeholders, avoiding duplication and optimizing the allocation of resources;
- iv. Coordinating the prioritization of Member States needs with ICAO MID Regional Office to ensure the availability of resources to support States, particularly States facing challenges in order to resolve identified safety issues and deficiencies;
- v. Contributing to the ICAO Implementation Support and MID Region NCLB Strategy and ultimately the United Nations Sustainable Development Goals; and
- vi. Acting upon the recommendations agreed during the recommendations of the HLCC-2021 under the Safety Stream

APPENDIX 3.1A

FOLLOW-UP ACTION PLAN ON PIRG/RASG MID CONCLUSIONS AND DECISIONS

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 1	HLCC RECOMMENDATIONS That, States: a) be encouraged to support and implement the HLCC recommendations; and b) actively participate and support the RASG-MID and its subsidiary groups meetings/activities.	To address the challenges caused by COVID-19	Implement the HLCC recommendations	States		Ongoing
C. 2	NATIONAL OLS IMPLEMENTATION FOCAL POINT That, States be urged too nominate a National OLS implementation Focal Point to coordinate the OLS implementation activities at the National level.	to proactively prepare the States for the upcoming change impacting the OLS design and subsequent effect on Aerodrome/Aircrafts Operations	List of States OLS Focal Points	States	Q3 2023	Ongoing

APPENDIX 3.1B

FOLLOW-UP ACTION PLAN ON RASG-MID/9 CONCLUSIONS AND DECISIONS

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 9/1	SHARING OF THE NASP That States, be urged to develop and implement their NASP in line with the GASP and MID-RASP and share the latest version of their NASPs with ICAO HQ and ICAO MID Office for posting on the GASP public website.	Compliance with Assembly Resolution A40-1	State Letter	ICAO States	May 2022	Completed SL Ref.:AN6/37-22/7 dated 11 March 2022 Reminder: 6/6/2022 Seven States developed and shared their NASPs with ICAO MID office: Kuwait, Iraq, Lebanon, Oman, Saudi Arabia, Sudan, and UAE.
C. 9/2	10TH ASR That, the Tenth MID Annual Safety Report is endorsed and be posted on the ICAO MID Website.	Sharing the final 10 th MID-ASR for the period 2016-2020 with identified safety priorities	MID-ASR 10 th Edition published on the ICAO website	RASG-MID/9	Feb 2022	Completed
C. 9/3	SHARING OF SAFETY DATA ANALYSIS That, in order to present an improved version of the 11 th MID-ASR to the MID-ASRG/4 meeting, States be, a) urged to provide the ICAO MID Office by 30 March 2022 with the number of accidents, serious incidents and incidents, safety data analysis/information, and their associated safety recommendations in Appendix 4.3A for the past 5 years (2017 – 2021) and using the template in Appendix 4.3B . b) encouraged to share the low probability high consequence (LPHC) events.	Collection of safety data for a Harmonized database	safety data analysis for development of ASR	States	May 2022	Completed SL Ref.: ME 4 & ME 4/1.6 dated 22 March 2022 Reminders: 20 April & 30 May 2022 <i>(Replies: Egypt, Iran, Iraq, Jordan, Kuwait, Oman and UAE)</i>

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 9/4	SMIT HANDBOOK That, the SMIT Handbook including the MID Region SSP assessment tool at Appendix 4.4B is endorsed.	Support States with the development and Implementation of SSP	Development of SSP	RASG-MID/9	Feb 2022	Completed
C. 9/5	DEVELOPMENT OF NATIONAL AVIATION SAFETY PLAN (NASP) IN MID STATES That, States a) be encouraged to request assistance from the ICAO MID Regional Office related to the development of their NASPs including the conduct of assistance missions and/or customized NASP Workshop for each State; and b) share their experiences related to the development of their NASPs during the Regional NASP Workshop to be organized by the ICAO MID Regional Office in 2022.	Compliance with Assembly Resolution A40-1	State Letter	ICAO	May 2022	Completed SL Ref.: FS 1/3-22/033 dated 17 March 2022 1. Regional NASP workshop conducted during SEIG/4 meeting in Cairo. 2. Two iPacks deployment to Iraq and Sudan resulted in the development of NASPs. 3. Another NASP workshop planned to be held back-to-back with SEIG/5 meeting in Doha.
C. 9/6	RSA ON APRON MANAGEMENT That, the RSA on Apron Management at Appendix 4.5A is endorsed and be posted by the ICAO MID Office on the RASG-MID web page.	Share best practices on Apron Management	Regional Safety Advisory on Apron Management	UAE and Egypt supported by ICAO	November 2021	Completed

3.1B-3

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 9/7	QUESTIONNAIRE ON ESTABLISHING A PLATFORM FOR SHARING SAFETY RECOMMENDATIONS That, the questionnaire on establishing a platform for sharing safety information among MENA ARCM member States at Appendix 4.6A be used for the conduct of the survey on the subject.	Collection of safety recommendations for sharing safety information	State Letter	ICAO States	June 2022	Completed SL Ref.: ME 4- 22/113 dated 6 June 2022 <i>(Replies: Djibouti, Iran, Jordan, Morocco, Oman, Palestine, S. Arabia, Sudan and UAE)</i>
D. 9/8	TERMS OF REFERENCE OF THE AIIG That, the Terms of Reference of the AIIG at Appendix 4.6B are endorsed.	TORs	RASG-MID/9	ICAO	Feb 2022	Completed
D. 9/9	FOURTH EDITION OF RASG-MID PROCEDURAL HANDBOOK That, the Fourth Edition of the RASG-MID Procedural Handbook at Appendix 4.8A is endorsed.	Compliance with new ToRs approved by the President of the Council	New Edition of the RASG-MID Procedural Handbook	RASG-MID/9	Feb 2022	Completed

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
D. 9/10	CIVIL HELICOPTER OPERATIONS WORKING GROUP That, a Civil Helicopter Operations Working Group composed of the following States, is established under ASRG to support the civil helicopter operations activities in the MID Region: - Bahrain - Egypt - Iran - Jordan - Oman - Saudi Arabia - Sudan	Support States with the development of regulations	State Letter	ICAO States	1 June 2022	On-going SL Ref.: ME4 - 22/086 dated 17 May 2022 Reminders: 29 May & 7 June 2022 <i>(Replies: Bahrain, Egypt, Iran, Jordan, Oman and Saudi Arabia)</i>

APPENDIX 3.1C

FOLLOW-UP ACTION PLAN ON MIDANPIRG/19 CONCLUSIONS & DECISIONS

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 19/1	MID RVSM SMR 2021 That, the MID RVSM Safety Monitoring Report (SMR) 2021 at Appendix 3.3A , is endorsed.	To develop the MID SMR 2021	SMR 2021	MIDRMA	2021	Completed
C. 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.	Develop SMR 2022	State Letter Provide TDS and LHDs SMR 2022	ICAO States MIDRMA	2022	Actioned (WP/23, refers)

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C.19/3	MID RAS UPGRADE PROJECT That, the MID RMA Team and Board Chairman take necessary actions for the upgrade of the MID RAS Software, in accordance with the Business Case at Appendix 3.3B .	The need for new functionalities and reduce workload	Upgrade of MID RAS Software	MID RMA team and developer	2022	Ongoing Final delivery planned Nov 2023
C. 19/4	REPORTING OF GNSS RFI TO ITU That, States are invited to report frequent GNSS radio frequency interferences to ITU Radio-communication Bureau (ITU-BR), describing GNSS RFI impact either in their State or reported by their registered aircraft.	Resolving GNSS RFI that can significantly impact aviation operation	Report to ITU	States encountered frequent unresolved intentional GNSS RFI	Whenever frequent GNSS RFI occur	Actioned SL Ref.: AN 7/30.21 & ME 3-22/064 dated 12 April 2022
C. 19/5	WEB- BASED MID AIR NAVIGATION REPORT (2021) That, the Web-based MID Air Navigation Report (2021) is endorsed.	To publish the status of ASBU implementation in the MID Region for 2021	MID AN Report 2021 is endorsed and posted	ICAO	Feb 2022	Completed https://www.icao.int/MIDANReport/Pages/ANReport2021-Main.aspx
C. 19/6	WEB-BASED MID REGION AIR NAVIGATION REPORT (2022) That, in order to prevent the Non-RVSM approved aircraft from operating within the MID RVSM airspace: That, a) States be urged to provide the ICAO MID Office with: i) relevant data necessary for the development of the MID Region Air Navigation Report (2022) (Status of ASBU Implementation), by 1 December 2022 ;	Monitoring and Reporting of ASBU implementation in the MID Region	State Letter Data for AN Report 2022 Air Navigation Report (2022)	ICAO States	Dec. 2022	Completed https://www.icao.int/MIDANReport/Pages/ANReport2022-Main.aspx

3.1C-3

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	ii) the data necessary for the measurement of the KPIs (01, 02, 13 and 14) for the period June & July 2022, by the 1 October 2022 ; and b) the MID Air Navigation Report (2022) be presented to the MIDANPIRG/20 for endorsement.					
C. 19/7	UPDATED GUIDANCE FOR AIM PLANNING AND IMPLEMENTATION IN THE MID REGION (MID DOC 008) That, the revised version of MID Doc 008 is endorsed.	To update the MID AIM plan	Revised MID AIM plan	AIM SG	2022	Completed
C. 19/8	MID REGION AIM DATABASE (MIDAD) That, a) the ICAO MID Office and AIM SG continue to monitor the States' status of EAD migration and other related issues and provide regular updates to MIDANPIRG and DGCAMID meetings; b) the activities of the MIDAD TF will not be resumed until the finalization of Phase A of the MIDAD Project (at least 7 States complete their migration to EAD); c) States are encouraged to develop their business case/cost-benefit analysis related to the transition from AIS to AIM, in accordance with the GANP 6th edition, MID Air Navigation Strategy and MID Region AIM Roadmap; d) States considering the migration to EAD as one of the options to support the transition from AIS to AIM/SWIM to engage directly with Eurocontrol (EAD) for the completion of the cost-benefit analysis; and e) States that have not yet established an automated AIM system are strongly encouraged to migrate to EAD.	To establish MIDAD	At least 7 States to migrate to EAD	MID States		Actioned (to be closed)

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
C. 19/9	AIM CAPACITY-BUILDING ACTIVITIES IN 2022-2023 That, the following AIM-related workshops and webinars, be organized in 2022-2023: a) transition from AIS to AIM Workshop (pending the issuance of the revised global roadmap); b) Workshop on Building Effective Safety Oversight of Aeronautical Information Services (AIS) and Aeronautical Information Management (AIM); and c) Webinar(s) on the provision of Terrain and Obstacle (TOD) and AIP Datasets.	To build capacity on AIM	Workshops/ Webinar	ICAO MID	2022-2023	Actioned/Ongoing ICAO MID Webinar on the provision of Terrain and Obstacle (TOD) and AIP Datasets successfully held on 19 May 2022. The Workshop on Building Effective Safety Oversight of Aeronautical Information Services (AIS) and Aeronautical Information Management (AIM) planned for 2023 in coordination with FAA. The transition from AIS to AIM Workshop is pending the issuance of the revised global roadmap.
C. 19/10	CONDUCT OF A WORKSHOP ON CCO/CDO IMPLEMENTATION IN 2022 That, a) a Workshop on CCO/CDO implementation be organized in 2022, in collaboration with MID FPP, to provide necessary knowledge about the ICAO provisions on the subject and share experience and best practices on CCO/CDO implementation by States/Airspace users; and b) States and International Organizations are strongly encouraged to participate actively in this Workshop.	Foster the CCO/CDO implementation in the Region	Workshop	ICAO MID and MID FPP	2022	Completed The ICAO MID Workshop on the Continuous Climb Operations (CCO) / Continuous Descent Operations (CDO) Implementation was successfully conducted in Abu Dhabi, UAE, 13 – 14 June 2022)

3.1C-5

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
D. 19/11	ESTABLISHMENT OF CCO/CDO AD HOC WORKING GROUP That, a CCO/CDO Ad Hoc Working Group: a) be established to develop guidance related to the publication of CCO/CDO information (text and Charts) in the AIP, in coordination with the relevant MIDANPIRG and RASG MID subsidiary bodies. b) be composed of: - Chairpersons of the PBN SG*, AIM SG and ATM SG - Mrs. Sheila Brizo, (QCAA Qatar) - Mrs. Lindi-Lee Kirkman (IATA) - Mr. Muhammad Al Juhani (Saudi Arabia) - Secretariat c) present their outcome during the AIM SG/8 and PBN SG/7 meeting. * the rapporteur of the group is the Chairman of the PBN SGs.	To develop guidance related to the publication of CCO/CDO information (text and Charts) in the AIP	Guidance material	CCO/CDO Ad Hoc WG	2022	Actioned (to be closed) AG established and developed guidance related to the publication of CCO/CDO information (text and Charts) in the AIP (WP/46 refers)
D. 19/12	ESTABLISHMENT OF THE MID REGION PBN IMPLEMENTATION PLAN Ad HOC WORKING GROUP (PBN IP Ad-Hoc WG) That, the PBN Implementation Plan Ad Hoc Working Group: a) be established to review the MID Region PBN Implementation Plan (MID Doc 007) and develop a revised version for review by the PBN SG/7 meeting and to the MIDANPIRG/20 meeting for subsequent endorsement, to keep pace with the developments, including the GANP 6th Edition and the MID Region Air Navigation Strategy (MID Doc 002, Edition February 2021); and b) be composed of:	To review the MID Region PBN Implementation Plan (MID Doc 007) and develop a revised version	Revised MID Region PBN Implementation Plan	PBN Implementation Plan Ad Hoc WG	2022	Actioned (to be closed) AG established and updated the MID Region PBN Implementation Plan (MID Doc 007) (WP/48 refers)

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	– Chairpersons of the PBN SG* and ATM SG – Mr. Saqr Al Marashda (GCAA UAE) – Mr. Hamed Al Zubaidi (GCAA UAE) – Mr. Ahmed Al Shehhi (GCAA UAE) – Mr. Muhammad Al Juhani (Saudi Arabia) – Secretariat * the rapporteur of the group is the Chairman of the PBN SG.					
C. 19/13	PROPOSAL FOR AMENDMENT TO THE MID eANP VOLUME II, TABLE ATM II-MID-I: MID REGION ATS ROUTE NETWORK That, the ICAO MID Office process the proposal for amendment to the MID eANP VOL II, Table ATM II-MID-I, at Appendix 5.7A, in accordance with standard procedure.	To update MID eANP Volume II, Table ATM II-MID-I, based on new PfAs and States comments	Revised eANP Volume II, Table ATM II-MID-I	ICAO	2022	Actioned (to be closed) (WP/53, refers)
C. 19/14	MID ATFM PLAN (V2.0) That, the MID Doc 014 renamed as MID Region Air Traffic Flow Management Plan (V2.0), is endorsed and be published on the ICAO MID website.	Develop Regional multi-Nodal ATFM implementation reference	ATFM CONOPS 2.0	ATFM TF	2022	Completed
C. 19/15	TERMS OF REFERENCE OF THE ATFM TF That, the Terms of Reference of the ATFM TF be updated as at Appendix 5.7B.	To update the ATFM TF ToR	Updated ToR	ATFM TF	2022	Completed
C. 19/16	ATFM IMPLEMENTATION That, a) States be urged to take necessary measures to establish ATFM service in accordance with the MID Region ATFM Plan taking into consideration the available relevant guidance materials, and the willingness of ICAO and International organization to	Foster the ATFM implementation in the Region	Workshop Survey	ATFM TF	2023	Ongoing Workshop conducted; Survey planned. (WP/58, refers)

3.1C-7

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	provide support as appropriate; and b) ATFM TF be tasked to: i. assess the available opportunities for the exchange of information and propose a way forward to the ATM SG; ii. develop a checklist for ATFM service implementation assessment and monitoring (regulation, declared capacity, organizational ATFM structure, procedure for information sharing, etc).					
D. 19/17	TERMS OF REFERENCE OF THE FWC 2022 TF That, the Terms of Reference of the FWC 2022 TF be updated, as at Appendix 5.	To update the FWC2022 TF ToR	Updated ToR	FWC2022 TF	2022	Completed
D. 19/18	MID ATM CONTINGENCY PLANNING AD-HOC ACTION GROUP That, a) the MID ATM Contingency Planning Ad-hoc Action Group be established to carry out a comprehensive review of the MID Region ATM Contingency Plan (MID Doc 003), taking into considerations the lessons learnt from recent events; and b) the MID ATM Contingency Planning Ad-hoc Action Group: i. be composed of: - the Chairpersons of the ATM SG; - Abdulla Al Qadhi (Bahrain); - Ahmad Abu Ghaleb (Saudi Arabia); - Sharron Caunt (IATA); - Faisal Al Assosi (Kuwait); - Ehab Raslan (Egypt); - Saleh Al Nesf (Qatar); - Nasser Salem Al Mazroe (Oman);	Revised version of the MID Region ATM Contingency plan	Draft MID ATM Contingency plan	ATM SG/8	2023	Actioned AG established and drafting the amendment. <i>(WP/64 refers)</i> <i>(IP/24 refers)</i>

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	- Saqr Marashdah (UAE), and - ICAO MID Office (Secretariat). ii. present the revised version of the MID Region ATM Contingency Plan (MID Doc 003) to the ATM SG/8 for review and enhancement, before presentation to the MIDANPIRG/20 meeting for endorsement.					
D. 19/19	MID CMC/FUA ACTION GROUP That, a) the MID CMC/FUA Action Group develop region specific complementary procedures for ICAO Doc. 10088, in order to ensure that the regional requirements related to Civil Military Cooperation and implementation of FUA Concept are addressed, including State aircraft operations under Due Regard in particular over the high seas, are covered; b) the outcome of the MID CMC/FUA AG, be presented to ATM SG/8 meeting, for review.	Develop guidance material for CIV/MIL Cooperation, FUA and due regard over high seas	Guidance material	ATM SG/8	Dec 2019	Ongoing An Action Group composed of experts from Bahrain, Egypt, Iraq, Jordan, Oman, Qatar, Saudi Arabia, UAE and ICAO was established (WP/65 refers)
D. 19/20	HIGH LEVEL AIRSPACE CONCEPT ACTION GROUP (HLAC AG) That, the High Level Airspace Concept Action Group (HLAC AG), composed of the ATM Focal Points from Bahrain, Egypt, Jordan, Oman, Saudi Arabia, UAE, IATA and ICAO MID, be established to review and prepare a revised version of the MID Region High Level Airspace Concept (MID Doc 004), by 30 September 2022, for presentation to the ATM SG/8 meeting and endorsement by the MIDANPIRG/20 meeting.	Revised version of the MID Region High level Airspace Concept	Draft Revised version of the MID Region High level Airspace Concept	ATM SG/8	2022	Ongoing AG established and started drafting the amendment. (WP/68 refers)
C. 19/21	REDUCED CHANNEL SPACING FOR VHF NAV That, the ICAO MID Office, process a proposal for amendment to the MID ANP Volume II, CNS Specific Requirements to implement reduced channel spacing for Radio Navigation Aids.	To implement reduced channel spacing for VHFNAV	Amended MID ANP Vol II	ICAO MID	2023	Ongoing
D. 19/22	TORS OF THE FREQUENCY MANAGEMENT WORKING GROUP				2022	Completed

3.1C-9

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	That, the Terms of Reference of the Frequency Management WG be updated as at Appendix 5.8A .	To update the FM WG ToR	New TORs	FM WG		
D. 19/23	RADALT ACTION GROUP That, the Radio Altimeter (RADALT) Action Group be: a) established to develop guidance material to protect the aircraft operations from potential Radio Altimeter interference associated with the deployment of cellular broadband/5G ground infrastructure near the bands used by RADALT; and b) composed of: - Ridha Dridi, (Saudi Arabia, Rapporteur); - Khaled Alhazmi (Saudi Arabia) - Fares A. Alzahrani (Saudi Arabia) - Abdullaziz Hussain (Saudi Arabia) - Mohammed Kamal (Egypt); - Nevin Askar (Jordan); - Talal Al Jasmi (UAE); - Jehad Faqir (IATA); - Hecham Bennani (ACAO); - Gerlof E Osinga (Boeing) - ICAO MID RO/CNS	To develop guidance material on protecting Radio Altimeter from potential impact of 5G operation	Guidance Material	RADALT Action Group	May 2023	Completed SL Ref.: AN 7/5.6 & ME3-22/045 dated 11 April 2022
D. 19/24	5G SAFEGUARDING MEASURES That, the CNS SG coordinate with the RASG-MID relevant subsidiary bodies the 5G Safeguarding measures around the aerodromes to protect RADALT from any interference.	To coordinate with RASG-MID regarding the safety impact of 5G operation	5G added to the ASR	CNS SG	2023	Completed
C. 19/25	STATISTICS ON ADS-B EQUIPAGE LEVEL That the MIDRMA Board explore the possibility to extend the	To evaluate the	Statistical report	MID RMA	2023	Ongoing

No.	CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
	functions and responsibilities of the MIDRMA to include the collection and sharing of information on the level of ADS-B equipage of the registered fleet and all flights operating from/to or through the MID RVSM airspace.	percentage of ADS-B equipage level in the Region to extend the function of MIDRMA				
D. 19/26	MID REGION SURVEILLANCE PLAN That, the CNS SG, in coordination with the ATM SG update the MID Region Surveillance Plan (MID Doc 013) considering the outcome of the ADS-B Webinar and MID States' experience in ADS-B implementation.	To update the Surveillance plan	Updated Surveillance plan	CNS SG & ATM SG	2023	Completed (To be closed)
D. 19/27	NEW EDITION OF THE MIDANPIRG PROCEDURAL HANDBOOK That, the new Edition of the MIDANPIRG Procedural Handbook is endorsed and be posted by the ICAO MID Office on the website. using the template at Appendix 5.2K .	To update MIDANPIRG Procedural handbook	New edition of MIDANPIRG Handbook	MIDANPIRG	2022	Completed (To be closed)



MID RVSM SAFETY MONITORING REPORT 2022 (SMR 2022)

Prepared by

Middle East Regional Monitoring Agency (MIDRMA)



MID RVSM SAFETY MONITORING REPORT 2022 (SMR 2022)

Prepared by the Middle East Regional Monitoring Agency (MIDRMA)

SUMMARY

The aim of the MID RVSM Safety Monitoring Report 2022 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.

In addition, the MID RVSM SMR 2022 includes the MMR for all MIDRMA Member States and an assessment made of the non-RVSM approved aircraft that have been observed to operate within the ICAO Middle East RVSM airspace under MIDRMA supervision.

1. Executive Summary

1.1 The Middle East Regional Monitoring Agency (MIDRMA) issues the MID RVSM Safety Monitoring Report (SMR) on an annual basis, with endorsement from the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG). The report aims to present evidence that all safety objectives outlined in the MID RVSM Safety Policy, in accordance with ICAO Doc 9574 (2nd Edition), continue to be met in operational services. However, for the SMR in 2022, MIDRMA faced difficulties in receiving usable Traffic Data Samples (TDS) from some member states, which prevented their inclusion due to corrupted Traffic Data Samples (TDS).

1.2 The results calculated for the MID RVSM SMR 2022 provide evidence that, based on the data and methods used, Safety Objectives 1 and 3 have been met. However, the MID RVSM airspace failed to meet Safety Objective No. 2 due to an isolated event that resulted in a high operational error period, causing the overall risk value to exceed the ICAO TLS.

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 the technical height risk is estimated 7.23×10^{-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 5×10^{-9} fatal accidents per flight hour.

The value computed for the overall risk is estimated 1.204×10^{-7} this is above 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 Estimated Annual Flying Hours = (2,161,356) Average Aircraft Speed = 441.36 kts			
Risk Type	Risk Estimation	ICAO TLS	Remarks
Technical Risk	7.23×10^{-11}	2.5×10^{-9}	Below ICAO TLS
Overall Risk	1.204×10^{-7}	5×10^{-9}	Above ICAO TLS

Conclusions:

- The estimated risk of collision associated with aircraft height- keeping performance is 7.23×10^{-11} and meets the ICAO TLS of 2.5×10^{-9} fatal accidents per flight hour (RVSM Safety Objective1).
- 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 1.204×10^{-7} this value is above the ICAO overall TLS of 5×10^{-9} fatal accidents per flight hour (RVSM Safety Objective 2).
- Although safety objective No 2 was not met for SMR 2022 due to an isolated event by none-RVSM approved aircraft which resulted long operational error period , based on currently-available information (Except for Tripoli, Kuwait and Beirut FIRs), 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.

1.3 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:

- 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 a number of assumptions that must be verified to ensure the reliability of the risk assessment. Verifying these assumptions deals primarily with monitoring of aircraft performance issues.

- 2- 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 compliant with RVSM technical requirements using a common compliance method. Monitoring group analysis is necessary to verify that the Minimum Aviation System Performance Standards (MASPS) for that group are valid. Aircraft that are made compliant with RVSM technical requirements 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 human factors and the assessment of this parameter relies on adequate reporting of Large Height Deviation (LHD) Reports and the correct interpretation of events for input for CRM analysis.
- 4- RVSM Safety Objective 3 requires the RMA to monitor long-term trends and to identify potential future safety issues. This involves comparing the level of incidents that pose a risk for the current reporting period and highlighting any issues that should be carried forward as recommendations for future reports.

2 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*

FIRs/UIRs of the Middle East RVSM Airspace

*Note: Beirut and Tripoli FIRs excluded from the RVSM safety analysis due to lack of data. And Kuwait FIR was excluded due corrupted TDS.

2.1 The data sampling periods covered by SMR 2022 are displayed in the table below:

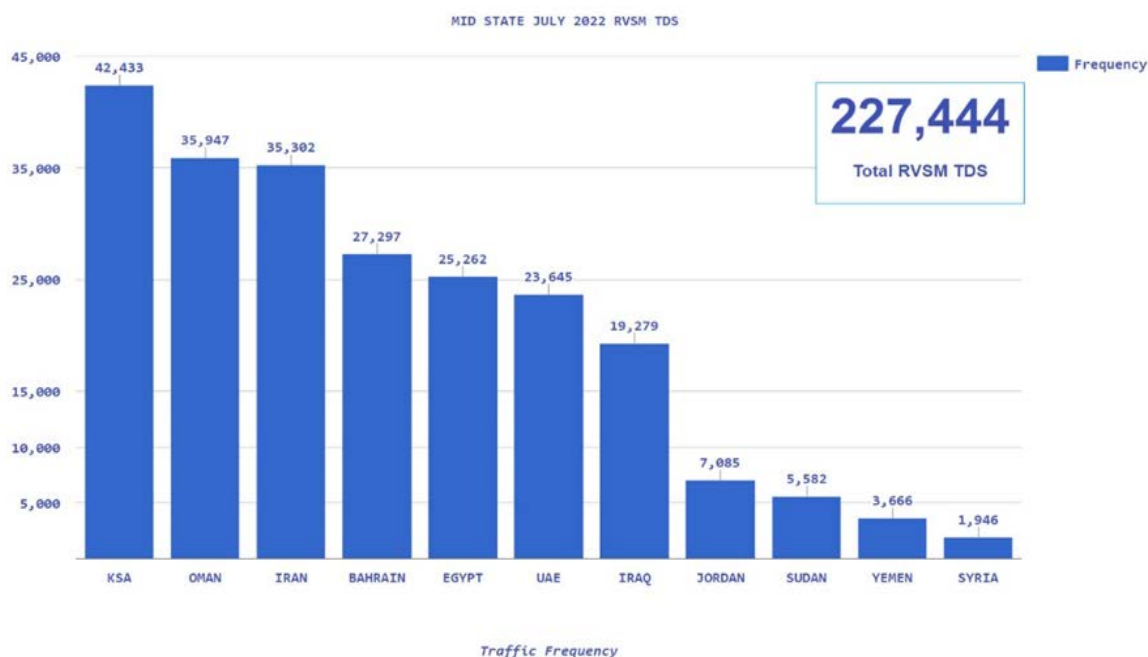
Report Elements	Time Period
Traffic Data Sample	01/06/2022 - 30/06/2022
Operational & Technical Errors	01/01/2022 - 31/12/2022

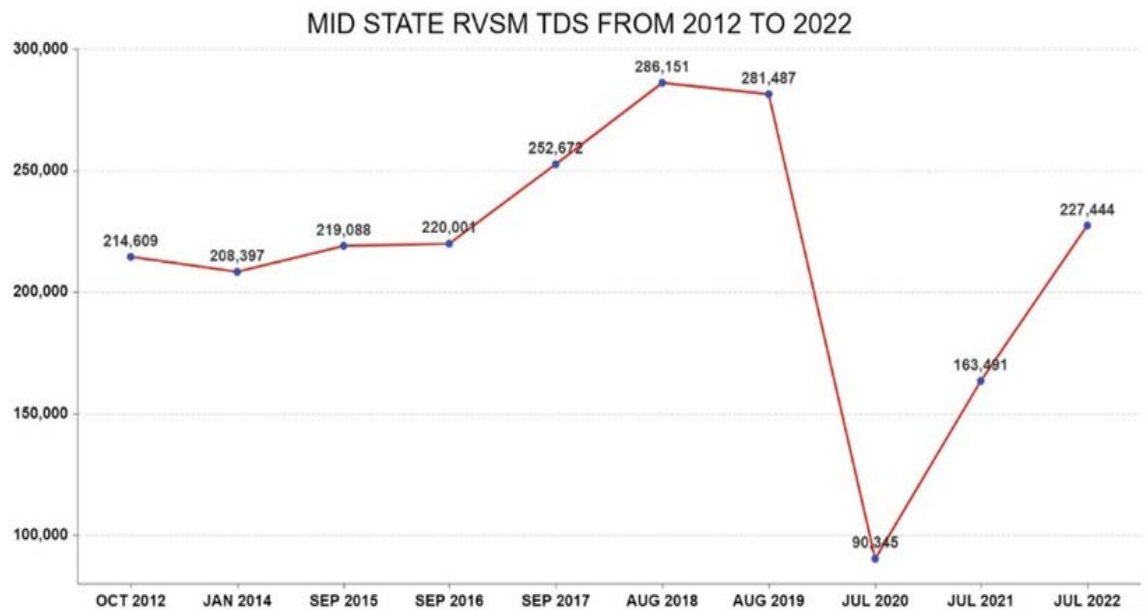
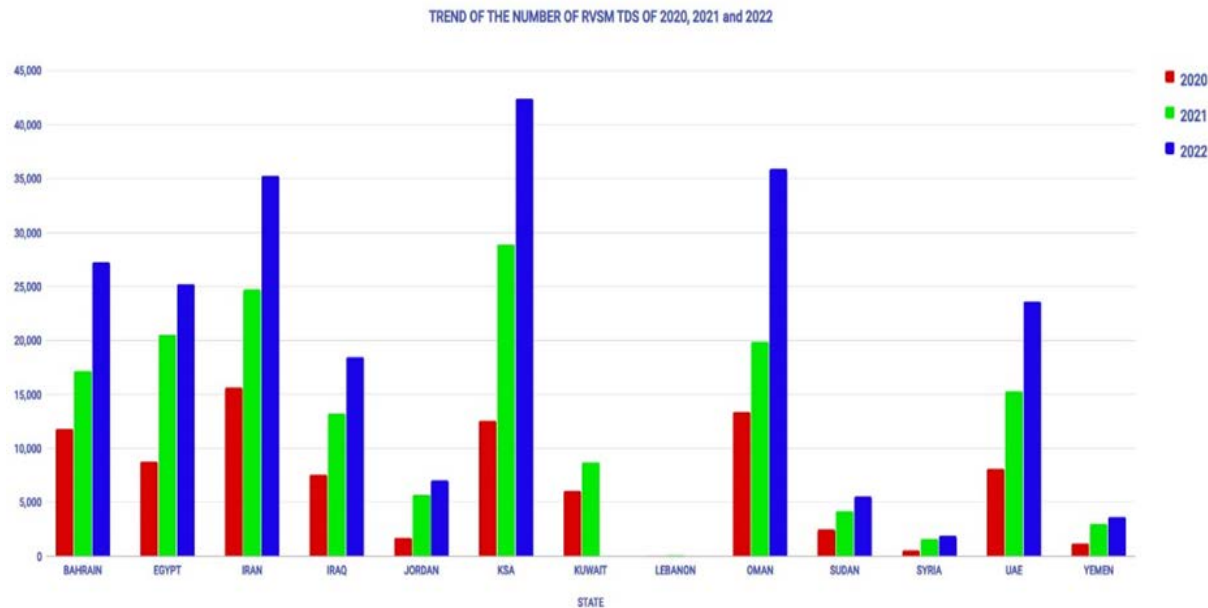
2.1.1 The descriptions of the traffic data collected from each MIDRMA Member State are depicted in table below:

MID States	No. of Flights	Received Dates	Status
Bahrain FIR	27297	01/08/2022	Accepted (Corrected TDS)
Cairo FIR	25262	30/07/2022	Accepted
Amman FIR	7085	06/07/2022	Accepted
Muscat FIR	35947	27/07/2022	Accepted
Tehran FIR	35302	05/08/2022	Accepted
Khartoum FIR	5582	31/07/2022	Accepted (Corrected TDS)
Emirates FIR	23645	26/07/2022	Accepted
Damascus FIR	1946	22/07/2022	Accepted
Sana'a FIR	3666	28/07/2022	Accepted
Baghdad FIR	19279	05/07/2022	Accepted (Corrected TDS)
Kuwait FIR	-	13/08/2022	Rejected (Corrupted TDS)
Jeddah FIR	42433	28/07/2022	Accepted (Corrected TDS)
Beirut FIR	-		No Data Submitted
Tripoli FIR	-		No Data Submitted
Total	227,444		

Table 1: Details of the MID States RVSM Traffic Data Sample (TDS) for June 2022.

2.1.2 The graph below shows the description of the traffic data processed for each MIDRMA member state by the new upgraded version of the MID Risk Analysis Software (MIDRAS AI). A total of **227,444** flights were processed for the 11 Flight Information Regions (FIRs). These flights were carefully evaluated and processed to ensure accurate results based on the submitted data.





-7-

#	MID FIRs	No of TDS July 2021	No of TDS June 2022	TDS Difference 2021 vs 2022	% of TDS Difference 2021 vs 2022
1	Bahrain FIR	17207	27297	10090	↑58.6 %
2	Cairo FIR	20568	25262	4694	↑22.8 %
3	Amman FIR	5750	7085	1335	↑23.2 %
4	Muscat FIR	19931	35947	16016	↑80.4 %
5	Tehran FIR	24768	35302	10534	↑42.5%
6	Khartoum FIR	4209	5582	1373	↑32.6 %
7	Emirates FIR	15331	23645	8314	↑54.2 %
8	Damascus FIR	1634	1946	312	↑19.1%
9	Sana'a FIR	3032	3666	634	↑20.9 %
10	Jeddah FIR	28943	42433	13490	↑46.6 %
11	Beirut FIR	85	NO TDS	-	-
12	Baghdad FIR	13283	19279	5996	↑45.1 %
13	Kuwait FIR	8750	Corrupted TDS	-	-
14	Tripoli FIR	NO TDS	NO TDS	-	-
	Total	163,491	227,444	72788	↑44.5 %

SMR 2021 vs SMR 2022 TDS Comparison Table

#	Waypoints	FIRs	Frequency
1	TASMI	BAGHDAD/KUWAIT	8466
2	DAVUS	BAHRAIN/KUWAIT	6977
3	SIDAD	BAGHDAD/KUWAIT	6500
4	NINVA	BAGHDAD/ANKARA	6159
5	RATVO	BAGHDAD/ANKARA	5980
6	TUMAK	BAHRAIN/EMIRATES	5340
7	ULADA	BAHRAIN/JEDDAH	5005
8	RASKI	MUSCAT/MUMBAI	4761
9	ALPOB	BAHRAIN/EMIRATES	4631
10	ULINA	CAIRO/AMMAN	4465
11	GABKO	TEHRAN/EMIRATES	4156
12	SODEX	EMIRATES/MUSCAT	4147
13	BONAM	TEHRAN/ANKARA	3992
14	MENSA	EMIRATES/MUSCAT	3949
15	KITOT	CAIRO/JEDDAH	3801
16	PASOV	EMIRATES/MUSCAT	3619
17	DEESA	AMMAN/JEDDAH	3567
18	NALPO	BAHRAIN/EMIRATES	3514
19	LONOS	BAHRAIN/KUWAIT	3452
20	DAROR	BAHRAIN/JEDDAH	3341

Top 20 Busiest Points in the MID RVSM Airspace

2.1.3 It is truly unfortunate that, despite issuing the RVSM SMR for the region for many years, MIDRMA still faces many difficulties and challenges in receiving TDS from some member states in the required format. The requirement to collect TDS is repeated every year in the same format and with no changes, but the TDS received often contains many errors and, in some cases, are completely corrupted and cannot be used for safety analysis.

2.1.4 MIDRMA was forced to reject the TDS from Kuwait, which was corrupted with many errors and missing flights and could not be processed in MIDRAS. Meanwhile, the TDS from Iraq and Sudan were temporarily rejected to correct all errors. The meeting should note that despite several reminders being sent to the focal point to comply with the MIDANPIRG Conclusion 19/2 and the ICAO State Letter issued to submit the requested TDS, no TDS was received from Lebanon.

2.1.5 Compiling the TDS and verifying its validity and suitability for use is a laborious task that requires a great deal of effort, time, and precision to produce reliable outcomes. As a result, MIDRMA requires all member states to double-check their data before sending it to avoid rejection and delay work on the SMR.

2.2 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.

The result shows the risk of collision due to technical height-keeping performance is estimated to be 7.23×10^{-11} 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	Year 2022	
2.012×10^{-13}	9.185×10^{-13}	3.509×10^{-12}	7.23×10^{-11}	

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

From June 2022 TDS, the following were calculated:

Average Aircraft Diameter (λ_{xy}): 0.028065 NM **170.53 ft**

Average Aircraft Wingspan (λ_y): 0.025946 NM **157.65 ft**

Average Aircraft Height (λ_z): 0.0080463 NM **48.89 ft**

Number of Flights involved: **227,444**

Flying Time: **177,093 hours**

Flying Distance: **80,635,248 NM**

Average Speed: **440.01 Kts**

Average Passing Frequency: **1.01647E-001**

2.2.1 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. $P_z(1000)$ – the probability of vertical overlap due to technical height-keeping performance, between aircraft flying 1000 ft. separation in MID RVSM airspace is estimated **1.925×10^{-9}** 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.

2.2.2 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}): 4.57187E-002

Probability of Lateral Overlap ($P_y(0)$): 0.16872

2- Cairo FIR

Passing Frequency (n_{equiv}): 2.40516E-001

Probability of Lateral Overlap ($P_y(0)$): 0.16112

Baghdad FIR

Passing Frequency (n_{equiv}): 1.66367E-002

Probability of Lateral Overlap ($P_y(0)$): 0.17745

3- Tehran FIR

-10-

Passing Frequency (n_equiv): 4.57844E-002
Probability of Lateral Overlap (Py(0)): 0.16025

4- Amman FIR

Passing Frequency (n_equiv): 3.68688E-002
Probability of Lateral Overlap (Py(0)): 0.14975

5- Muscat FIR

Passing Frequency (n_equiv): 3.05063E-001
Probability of Lateral Overlap (Py(0)): 0.16736

6- Jeddah FIR

Passing Frequency (n_equiv): 2.79243E-002
Probability of Lateral Overlap (Py(0)): 0.15313

7- Khartoum FIR

Passing Frequency (n_equiv): 8.41044E-002
Probability of Lateral Overlap (Py(0)): 0.18605

8- Damascus FIR

Passing Frequency (n_equiv): 2.40182E-001
Probability of Lateral Overlap (Py(0)): 0.12036

9- Emirates FIR

Passing Frequency (n_equiv): 2.54162E-002
Probability of Lateral Overlap (Py(0)): 0.16413

10- Sana'a FIR

Passing Frequency (n_equiv): 2.92994E-001
Probability of Lateral Overlap (Py(0)): 0.18113

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

Average Passing Frequency: **1.01647E-001**

2.2.3 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 **1.925 x 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 x 10⁻⁸**.

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 01st May 2023 is available in **para 2.4.7**.

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

2.2.4 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).

2.2.5 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 update all parameters and data used in the MID Risk Analysis Software (MIDRAS AI).

Note: New Upgraded MIDRAS AI is fully operational and used by the MIDRMA for the risk analysis.

- 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.

2.3 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 1.204×10^{-7} 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	Year 2022	
8.345×10^{-10}	5.206×10^{-10}	4.073×10^{-10}	1.204×10^{-7} (Above ICAO TLS)	

2.3.1 Conclusions regarding the overall vertical risk:

- a. The overall risk of collision due to all causes, including technical risk and all risks due to operational errors and in-flight contingencies in the MID RVSM was calculated and failed to meet Safety Objective No. 2 due to an isolated event that resulted in a high operational error period, causing the overall risk value to exceed the ICAO TLS.

Note: The calculated overall risk exceeded the ICAO TLS due to only ONE LHD report.

2.3.2 Recommendations Applicable to Safety Objective 2:

- a. The MIDRMA should continue to encourage states to provide Large Height Deviation Reports (LHD) of all categories, not only those related to handover issues.
- b. As some member states have failed to respond to their related LHD reports, the MIDRMA will follow-up through the upgraded LHD online reporting system to monitor and alert member states about reports that require investigation. The system will also notify states of their deadline to respond to the concerned reporting ATCU.
- c. The MIDRMA, in coordination with the Member States, will ensure that incidents and violations that have a direct impact on the implementation of RVSM within the MID Region are continuously reported through the MIDRMA LHD online reporting system in a timely manner. This will facilitate operational safety assessment analysis.

2.3.3 Large Height Deviation Reports (LHDs) 2022

2.3.3.1 The level of collision risk resulting from errors in ATC instructions, emergency and operational procedures in the MID RVSM airspace needs to be assessed, in addition to that resulting from technical height-keeping deviations. The primary source of reporting Large Height Deviation is the ATC units providing air traffic control services in the airspace where RVSM is applied. All MIDRMA Member States are required to submit Large Height Deviation Reports which occurred in their FIRs on a monthly basis (preferably as soon as they occur), even if none were reported during the month of reporting.

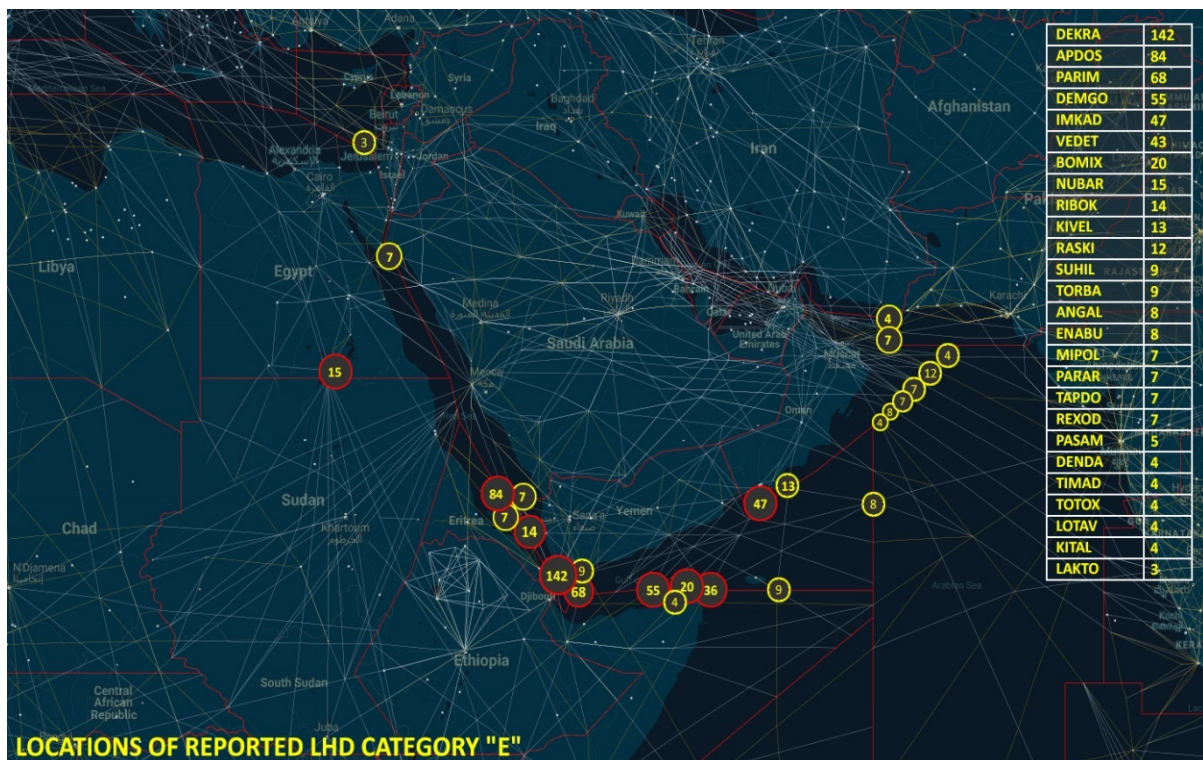
2.3.3.2 The vertical risk estimation due to atypical errors has been demonstrated to be the major contributor to the overall vertical-risk estimation for the ICAO MID RVSM airspace. The MIDRMA noticed good improvement from some member states that did not previously submit LHD reports equivalent to their high volume of traffic, while some other members remain the same and have not shown much improvement despite continuous monthly reminders sent to all member states.

2.3.3.3 The estimation of total risk (Safety Objective 2) combines the results from Safety Objective 1 with the estimation of risk due to all other factors. This second component, often termed operational risk, is dependent on many factors, including airspace configuration, traffic densities, ATC procedures, individual controller/pilot actions, and specific sector operational characteristics. The operational risk is estimated by evaluating the magnitude and duration of events extracted from operational incident reports which are transformed into Large Height Deviation reports.

2.3.3.4 The table below presents a summary of the operational risk associated with Large Height Deviation (LHD) reports by LHD categories. These reports are used to calculate the overall vertical collision risk for the MID RVSM airspace.

LHD Cat. Code	Large Height Deviation (LHD) Categories	No. of LHDs	LHD Duration (Sec.)
A	Flight crew fails to climb or descend the aircraft as cleared	3	35
B	Flight crew climbing or descending without ATC clearance	2	60
C	Incorrect operation or interpretation of airborne equipment	1	40
D	ATC system loop error	-	-
E	ATC transfer of control coordination errors due to human factors	14	660
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	1	30
I	Turbulence or other weather related cause	-	-
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	1	3420
M	Other	1	40
Total		21	4285

Summary of Operational Risk associated with Large Height Deviation Reports



2.3.3.5 The MIDRMA has continued to monitor the LHD reports at the eastern boundaries of Muscat FIR, which are filed by Mumbai and Muscat ACCs. The MIDRMA would like to draw the meeting's attention to the fact that the Muscat/Mumbai RVSM safety protocol has been open since 2017, and it is time to make a decision to close it provided the risk is eliminated or reduced to its bare minimum. However, the MIDRMA cannot see that the risk has been reduced without confirmation of installing OLDI/AIDC in both ACCs, tables 1 and 2 below reflects the LHD reports filed by both ACC related to each other during this SMR reporting cycle.

Table 1: LHD Reports Filed by Muscat Related to Mumbai

#	ID	Date of Occ	Reported By	Related to	Location	Nature of the occurrence:	Category
1	10527	6/2/2022	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
2	10528	18/02/2022	Muscat	Mumbai	KITAL	ACFT Entered FIR Without Coordination	E
3	10529	27/02/2022	Muscat	Mumbai	RASLI	ACFT Entered FIR Without Coordination	E
4	10589	1/3/2022	Muscat	Mumbai	LOTAV	Revised FL Not Coordinated	E
5	10590	7/3/2022	Muscat	Mumbai	TOTOX	Revised FL Not Coordinated	E
6	10591	7/3/2022	Muscat	Mumbai	TOTOX	Revised Estimate Not Coordinated	E
7	10592	27/03/2022	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
8	10837	1/7/2022	Muscat	Mumbai	TOTOX	ACFT Entered FIR Without Coordination	E
9	10838	3/7/2022	Muscat	Mumbai	KITAL	ACFT Entered FIR Without Coordination	E
10	10839	7/7/2022	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
11	10840	17/07/2022	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E
12	10841	20/07/2022	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
13	10842	20/07/2022	Muscat	Mumbai	LOTAV	ACFT Entered FIR Without Coordination	E
14	10843	27/07/2022	Muscat	Mumbai	PARAR	Revised Estimate Not Coordinated	E
15	10844	28/07/2022	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
16	10845	30/07/2022	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
17	10907	8/8/2022	Muscat	Mumbai	LOTAV	Revised Estimate Not Coordinated	E
18	10908	12/8/2022	Muscat	Mumbai	LOTAV	ACFT Entered FIR Without Coordination	E
19	10909	15/08/2022	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
20	10910	16/08/2022	Muscat	Mumbai	REXOD	Revised FL Not Coordinated	E
21	10911	16/08/2022	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
22	10912	18/08/2022	Muscat	Mumbai	TOTOX	Revised FL Not Coordinated	E
23	10913	20/08/2022	Muscat	Mumbai	RASKI	Revised FL Not Coordinated	E
24	10914	25/08/2022	Muscat	Mumbai	KITAL	ACFT Entered FIR Without Coordination	E
25	10915	26/08/2022	Muscat	Mumbai	PARAR	ACFT Entered FIR Without Coordination	E
26	10916	28/08/2022	Muscat	Mumbai	PARAR	ACFT Entered FIR Without Coordination	E
27	11010	2/10/2022	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E
28	11011	4/10/2022	Muscat	Mumbai	KITAL	ACFT Entered FIR Without Coordination	E
29	11012	4/10/2022	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E
30	11013	8/10/2022	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
31	11014	10/10/2022	Muscat	Mumbai	REXOD	Revised Estimate Not Coordinated	E
32	11015	10/10/2022	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
33	11016	12/10/2022	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
34	11017	15/10/2022	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E
35	11018	17/10/2022	Muscat	Mumbai	REXOD	ACFT Entered FIR Without Coordination	E

36	11019	16/10/2022	Muscat	Mumbai	PARAR	Revised FL Not Coordinated	E
37	11020	17/10/2022	Muscat	Mumbai	REXOD	Revised FL Not Coordinated	E
38	11021	19/10/2022	Muscat	Mumbai	RASKI	ACFT Entered FIR Without Coordination	E

Table 2: LHD Reports Filed by Mumbai Related to Muscat

#	ID	Date of Occurrence	Reported By	Related to	Location	Nature of the occurrence:	
1	LHD001275	9/1/2022	Mumbai	Muscat	TOTOX	No or late estimate time revision	E
2	LHD001276	9/1/2022	Mumbai	Muscat	REXOD	No or late estimate time revision	E
3	LHD001277	9/1/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
4	LHD001278	31/01/2022	Mumbai	Muscat	TOTOX	No or late FL revision	E
5	LHD001300	27/02/2022	Mumbai	Muscat	KITAL	No or late FL revision	E
6	LHD001301	23/02/2022	Mumbai	Muscat	PARAR	No or late FL revision	E
7	LHD01355	3/3/2022	Mumbai	Muscat	LOTAV	No or late FL revision	E
8	LHD001356	5/3/2022	Mumbai	Muscat	KITAL	No transfer information	E
9	LHD001357	5/3/2022	Mumbai	Muscat	KITAL	No transfer information	E
10	LHD001358	9/3/2022	Mumbai	Muscat	PARAR	No transfer information	E
11	LHD001359	12/3/2022	Mumbai	Muscat	PARAR	No or late FL revision	E
12	LHD001360	13/03/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
13	LHD001361	19/03/2022	Mumbai	Muscat	LOTAV	No transfer information	E
14	LHD001363	27/02/2022	Mumbai	Muscat	RASKI	No transfer information	E
15	LHD001365	18/02/2022	Mumbai	Muscat	KITAL	No transfer information	E
16	LHD001367	6/2/2022	Mumbai	Muscat	PARAR	No or late FL revision	E
17	LHD001368	27/03/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
18	LHD001369	7/3/2022	Mumbai	Muscat	TOTOX	No or late estimate time revision	E
19	LHD001372	7/3/2022	Mumbai	Muscat	TOTOX	No or late FL revision	E
20	LHD001373	1/3/2022	Mumbai	Muscat	LOTAV	No or late FL revision	E
21	LHD001401	29/04/2022	Mumbai	Muscat	LOTAV	No or late FL revision	E
22	LHD001446	3/5/2022	Mumbai	Muscat	RASKI	No transfer information	E
23	LHD001447	8/5/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
24	LHD001450	27/05/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
25	LHD001451	30/05/2022	Mumbai	Muscat	REXOD	No transfer information	E
26	LHD001472	15/06/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
27	LHD001518	1/7/2022	Mumbai	Muscat	TOTOX	No transfer information	E
28	LHD001519	3/7/2022	Mumbai	Muscat	KITAL	No transfer information	E
29	LHD001520	7/7/2022	Mumbai	Muscat	PARAR	No transfer information	E
30	LHD001521	17/07/2022	Mumbai	Muscat	REXOD	No transfer information	E
31	LHD001522	20/07/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
32	LHD001523	20/07/2022	Mumbai	Muscat	LOTAV	No transfer information	E
33	LHD001524	27/07/2022	Mumbai	Muscat	PARAR	No or late estimate time revision	E
34	LHD001525	28/07/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
35	LHD001526	30/07/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
36	LHD001566	14/08/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
37	LHD001567	17/08/2022	Mumbai	Muscat	PARAR	No or late FL revision	E
38	LHD001570	28/08/2022	Mumbai	Muscat	REXOD	No or late FL revision	E

39	LHD001571	30/08/2022	Mumbai	Muscat	REXOD	No or late FL revision	E
40	LHD001572	30/08/2022	Mumbai	Muscat	TOTOX	No or late FL revision	E
41	LHD001574	21/07/2022	Mumbai	Muscat	KITAL	No or late FL revision	E
42	LHD001661	2/9/2022	Mumbai	Muscat	LOTAV	No or late FL revision	E
43	LHD001664	19/9/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
44	LHD001665	22/9/2022	Mumbai	Muscat	PARAR	No or late FL revision	E
45	LHD001666	24/9/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
46	LHD001667	27/9/2022	Mumbai	Muscat	PARAR	No or late FL revision	E
47	LHD001668	1/10/2022	Mumbai	Muscat	REXOD	No or late FL revision	E
48	LHD001669	7/10/2022	Mumbai	Muscat	KITAL	No or late FL revision	E
49	LHD001670	8/10/2022	Mumbai	Muscat	TOTOX	No transfer information	E
50	LHD001671	15/10/2022	Mumbai	Muscat	TOTOX	No or late FL revision	E
51	LHD001672	19/10/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
52	LHD001673	19/10/2022	Mumbai	Muscat	LOTAV	No or late FL revision	E
53	LHD001696	2/11/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
54	LHD001698	13/11/2022	Mumbai	Muscat	TOTOX	No or late FL revision	E
55	LHD001778	4/12/2022	Mumbai	Muscat	TOTOX	No or late FL revision	E
56	LHD001779	5/12/2022	Mumbai	Muscat	RASKI	No transfer information	E
57	LHD001780	15/12/2022	Mumbai	Muscat	RASKI	No or late FL revision	E
58	LHD001781	21/12/2022	Mumbai	Muscat	TOTOX	No or late FL revision	E
59	LHD001782	14/12/2022	Mumbai	Muscat	PARAR	No or late FL revision	E
60	LHD001783	25/12/2022	Mumbai	Muscat	PARAR	No or late FL revision	E
61	LHD001784	26/12/2022	Mumbai	Muscat	LOTAV	No or late FL revision	E

2.3.3.6 The latest updated received from Mumbai and Oman ATMUs concerning the OLDI/AIDC connections is still pending due to computability issues from both sides and units are working hard to rectify this issue.

2.3.3.7 The magnitude and duration of the submitted LHD reports have impacted the overall risk (Safety Objective 2). In particular, the LHD submitted by Sana'a ACC against Mogadishu was very high. This was due to a non-RVSM approved IL76 belonging to the China Airforce, which infringed the MID RVSM airspace within Sana'a FIR. The aircraft was transferred from Mogadishu ACC to Sana'a ACC without a flight plan and without prior coordination at FL310 for a period of 3420 seconds. This non-RVSM approved IL76 was spotted by Muscat ATC at the FIR boundary entry point and was immediately instructed to descend below the RVSM airspace.

2.3.2.7.1 The investigation carried out by Sana'a ACC showed that the main reasons which led to the incident are the followings:

- a. State/Military aircraft (type IL76) transferred by Mogadishu at an RVSM level;
- b. No FPL received by Sana'a ACC;
- c. No warning is available regarding the RVSM status of this IL76; and
- d. Sana'a ACC provides ATS procedurally (non-radar).

2.3.3.7.2 This incident was addressed to the last MIDRMA Board/18 meeting which was held in Doha, Qatar 19-20 September 2022 while reviewing the SMR 2022 initial results and agreed with the following mitigation measures:

- a. MIDRMA to open a safety protocol between Sana'a and Mogadishu, in coordination with the AFI RMA (ARMA), ICAO MID and ESAF Regional Offices.
- b. MIDRMA to provide necessary training and awareness to Yemen.
- c. States are urged to comply with the Minimum Monitoring Requirements (MMR).
- d. MIDRMA to improve the format and content of the Monthly Bulletin containing the List of Non-RVSM approved Aircraft; in particular by adding the information related to the State of Registry and Operators, as well as to add a warning on the types of aircraft with a high number of violations observed.
- e. The results of the investigation related to the IL76 incident should be shared and used as a lesson learned to avoid similar cases being repeated in the future.
- f. MIDRMA to identify the areas where possible intruders might operate within the MID RVSM Airspace (including ACFT types, FIRs, interface, etc.).

2.3.3.7.3 The ICAO MID and ICAO ESAF Offices organized a meeting in Cairo, Egypt (31 January – 2 February 2023) attended by the ATMUs of Djibouti, Ethiopia, Oman, Saudi Arabia, Somalia, and Yemen, as well as three (3) international organizations (IATA, ARMA, and MIDRMA). The objective of the meeting was to address the ATM issues in the interface area between the states in the MID Region and EASF Region, particularly the increased number of LHD reports submitted by Sana'a ACC. The meeting urged the concerned states to address and resolve the issue in coordination with the relevant regional offices and RMAs.

2.3.3.7.4 The MIDRMA presented all the archived LHD reports filed by Yemen and requested that all possible solutions be explored and agreed upon in order to reduce the number of these LHDs as soon as possible. This is because it has started to affect the overall ICAO TLS. The attendees agreed to continue arranging other meetings to discuss this issue with neighboring ACCs.

2.3.3.8 During MIDRMA Board 17 & 18, it was pointed out that there was a lack of response to the received LHD reports through the online system, despite the feature of direct response to the reporting unit being available to ensure that all responses are archived and referenced when needed. Unfortunately, the vast majority of Member States continue to ignore this feature and do not investigate or reply to the received LHD reports."

2.3.3.9 The table below reflects the LHD reports received from all MIDRMA member states from 01st January until 31st December 2022:

MID FIRs	No. of Reported LHDs	No. of Related LHDs
Bahrain	5	NIL
Baghdad	1	1
Amman	2	2
Tehran	2	8
Cairo	26	13
Damascus	NIL	1
Khartoum	9	17
Kuwait	NIL	4
Muscat	53	41
Jeddah/ Riyadh	11	102
Tripoli	NIL	NIL
Emirates	5	1
Sana'a	424	3

2.3.4 Assessment of Non-RVSM Approved Aircraft 2022

2.3.4.1 The MIDRMA conducts systematic reviews of the operator compliance with State RVSM approvals within the ICAO Middle East Region as part of the tasks and responsibilities of a Regional Monitoring Agency (RMA), as specified in ICAO Docs. 9937 and 9574. In order to protect the safety of the RVSM airspace, these checks are performed to detect aircraft that are not approved and using the RVSM airspace.

2.3.4.2 Although daily compliance monitoring of the entire ICAO Middle East airspace would be preferable, challenges in collecting traffic information make this impracticable. According to ICAO Doc 9937, the responsible RMA must monitor full airspace compliance for at least 30 days per year, while MIDRMA fulfills this responsibility on a monthly basis.

2.3.4.3 MIDRMA stipulates that there must be two sources of data to track operator adherence to state RVSM approval:

- a- List of operators, types and registration marks of aircraft operating in the RVSM airspace, and
- b- The latest worldwide RVSM approvals database.

2.3.4.4 The first requirement is met once a year in the form of the traffic data sample used for the MID RVSM risk analysis, as well as the monthly RVSM TDS received from Bahrain, IRAQ, and the UAE, though aircraft registrations are missing in much of the data from some Member States. As a result, this information cannot confirm the true state of non-compliant traffic in some FIR regions.

2.3.4.5 MIDRMA uses Bahrain, Baghdad, and Emirates FIRs RVSM traffic data as the primary source for checking non-RVSM approved aircraft in the MIDRMA area of responsibility because it is difficult to obtain traffic data from all Member States on a monthly basis. The MIDRMA would like to take this opportunity to thank Bahrain CAA, IRAQ CAA, and UAE General Civil Aviation Authority for sending their FIRs RVSM

traffic on a monthly basis for inspecting the noncompliant aircraft in the region. The data received from these Member States is consistently complete and in the proper format.

Note: Recently, Jeddah sent a trial RVSM TDS, which will improve MIDRMA's scrutiny of non-RVSM approved aircraft.

2.3.4.6 The second requirement in 2.6.3.3 is the combined approvals database containing the approval records provided by all RMAs (Worldwide Combined RVSM Approvals Database) is used to verify the RVSM approval status of the operations identified in the traffic movement data sample. The combined global RVSM database updated by all RMAs on a regular basis.

2.3.4.7 To ensure that traffic data only includes valid RVSM approvals, it is compared to the most recent global RVSM approval database. The processes that fit this description but didn't have valid RVSM approvals will be listed for further investigation and confirmation. Cross-checks with the MIDRMA's latest updated RVSM approvals, typos in traffic data, code sharing, and lease agreements between airline operators who will maintain aircraft under a duplicate RVSM approval in two countries at the same time are all part of the verification process. The appropriate Civil Aviation Airworthiness Authority will be contacted to clarify the discrepancy and request a response with their findings and the corrective measures being taken to resolve the issue once the verification process is finished and our findings are validated.

2.3.4.8 The primary systemic cause of the non-conformity of the missing approvals, according to the findings of MIDRMA's investigation, is the delay in notifying the appropriate RMA before the aircraft begin to operate within the RVSM airspace. These results highlight how crucial it is for states to promptly inform the concerned RMA of the operator approval status.

2.3.4.9 When the findings of MIDRMA have been checked and verified, official letters or emails will be sent to the following:

- a- MIDRMA Airworthiness Inspectors responsible for the non-RVSM approved aircraft found operating in ICAO MID RVSM airspace or outside the region if reported by other RMAs, and will be required to respond with the results of their investigations.
- b- All RMAs responsible for violating aircraft must conduct investigations into noncompliant aircraft operations in the MID RVSM airspace and report their findings.

2.3.4.10 This type of scrutiny, which is carried out using the monthly RVSM traffic data received from Bahrain, Iraq, and the UAE, assisted MIDRMA in tracking down violating aircraft and alerting relevant air traffic control units of those aircraft.

2.3.4.11 The tables below reflect the MIDRMA Bulletin of the Non-RVSM Approved aircraft observed operating within the ICAO MID RVSM airspace and in the RVSM airspace of other RMAs, the expectation from this analysis related to States exercising operational authority would act to address the approval issue well in advance and before allowing the approved aircraft to operate within the RVSM airspace to avoid undesirable actions against legitimate operators and also States that find such aircraft operating in their airspace will take appropriate action.

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	Khartoum, Jeddah	STTAH	B737	06-01-2022	SUDAN
3	EURRMA	5ALEX	BE200	09-07-2022	LIBYA
4	Baghdad, Damascus	YKATA	IL76	01-01-2020	SYRIA

NON-RVSM approved aircraft – Responsibility of other RMAs

#	Observed in FIR	ACFT Reg.	ICAO Type	First Observed on	Responsible RMA
1	Sana'a	21140	IL76	19-06-2022	CHINARMA
2	Bahrain, Emirates	40001A	C17	25-01-2020	AAMA
3	Emirates	60208A	C17	30-03-2020	AAMA
4	Emirates	5NBOD	GLF4	28-01-2022	AFIRMA
5	Cairo	5YFAN	CRJ2	15-07-2020	AFIRMA
6	Khartoum	5YWBH	C56X	14-07-2020	AFIRMA
7	Cairo	ETATF	B350	08-07-2020	AFIRMA
8	Sana'a	ZSCQP	CRJ9	07-07-2020	AFIRMA
9	Emirates	FAB2857	KC39	22-05-2022	CARSAM
10	Emirates	CNTMX	E35L	29-12-2021	EURRMA
11	Baghdad, Emirates	EW550TH	IL76	04-12-2021	EURRMA
12	Cairo	UR11316	AN12	22-07-2020	EURRMA
13	Cairo	URAZN	B753	01-02-2022	EURRMA
14	Cairo	URAZO	B753	01-02-2022	EURRMA
15	Cairo	URAZR	B77W	03-02-2022	EURRMA
16	Bahrain, Emirates, Baghdad	URFSA	IL76	09-05-2021	EURRMA
17	Bahrain, Baghdad	URFSC	IL76	28-09-2021	EURRMA
18	Bahrain, Emirates	URFSC	IL76	05-12-2021	EURRMA
19	Bahrain, Emirates	URFSD	IL76	29-09-2021	EURRMA
20	Emirates	URFSD	IL76	24-12-2021	EURRMA
21	Emirates	URSQO	B738	02-12-2021	EURRMA
22	Cairo	80002A	C17	23-07-2020	MAAR
23	Cairo, Muscat	CB8001	C17	29-07-2020	MAAR
24	Cairo, Muscat, Emirates	CB8004	C17	24-07-2020	MAAR
25	Bahrain	IN307	IL38	03-12-2020	MAAR
26	Muscat	K3604	E35L	17-07-2020	MAAR
27	Emirates	KJ3452	IL76	03-08-2020	MAAR
28	Emirates	KJ3454	IL76	16-03-2020	MAAR
29	Bahrain, Emirates	N312JE	CL60	25-08-2022	NAARMO
30	Bahrain, Emirates	N46HB	F9000	22-08-2022	NAARMO
31	Bahrain, Emirates	N88YH	CRJ2	17-08-2022	NAARMO
32	Cairo	N1112B	B350	16-07-2020	NAARMO
33	Emirates	N131GA	GLF5	14-03-2020	NAARMO
34	Emirates	N145DB	E35L	22-01-2022	NAARMO

35	Emirates	N181CK	GLEX	17-12-2020	NAARMO
36	Bahrain, Emirates, Baghdad	N298RB	GLF4	14-05-2021	NAARMO
37	Baghdad, Emirates	N298RB	GLF4	09-01-2022	NAARMO
38	Emirates	N302PJ	H25B	01-07-2021	NAARMO
39	Emirates	N405LL	H25B	29-05-2022	NAARMO
40	Emirates	N410F	FA8X	09-05-2022	NAARMO
41	Emirates	N411VP	EA50	01-05-2022	NAARMO
42	Bahrain, Emirates	N44UA	CL60	07-06-2020	NAARMO
43	Emirates	N5062	SF50	14-01-2020	NAARMO
44	Bahrain, Baghdad	N527EF	GLF4	11-04-2020	NAARMO
45	Bahrain	N558QA	C510	05-05-2022	NAARMO
46	Khartoum	N604DT	CL60	26-02-2022	NAARMO
47	Bahrain, Emirates	N605AS	PC12	11-04-2022	NAARMO
48	Bahrain, Emirates, Baghdad	N685MF	GLF4	08-12-2021	NAARMO
49	Emirates	N685SC	CL60	06-05-2022	NAARMO
50	Cairo	N71KM	C30J	26-02-2022	NAARMO
51	Cairo	N866G	ZZZZ	14-02-2022	NAARMO
52	Bahrain, Baghdad	N920SA	F2TH	18-02-2021	NAARMO
53	Emirates	N981DB	H25B	05-04-2022	NAARMO
54	Emirates	XAFEM	GA6C	03-02-2022	NAARMO

2.3.5 Minimum Monitoring Requirements 2022

2.3.5.1 All operators that operate or intend to operate in airspace where RVSM is applied are required to participate in the regional RVSM monitoring program. This monitoring program addresses requirements for monitoring the height-keeping performance of aircraft in order to meet regional safety objectives and addresses the requirements for monitoring established in ICAO Annexes 6 and 11 as well as Doc 9574 and 9937. In their application to the appropriate State authority for RVSM approval, operators must show a plan for meeting the applicable monitoring requirements. Initial monitoring should be completed as soon as possible but not later than 3 months after the issue of the temporary RVSM approval and thereafter as directed by the regional monitoring agency. A table detailing the minimum monitoring requirements is published by the MIDRMA in conjunction with ICAO and other Regional Monitoring agencies and it is available on the MIDRMA website.

2.3.5.2 Since the height monitoring mandated, the MIDRMA and MIDANPIRG agree that this requirement should be implemented in accordance with the RVSM Minimum Monitoring Requirements (MMRs), the MIDRMA continued to coordinate with all MIDRMA Member States to publish their minimum monitoring requirements through the MIDRMA's automated MMR system, which is published on the MIDRMA website to ensure the availability of these requirements at all times for the concerned MID Civil Aviation Authorities and airline operators.

2.3.5.3 The majority of current aircraft types are eligible for RVSM airworthiness approval under group approval provisions. These provisions permit the defining of aircraft-type groups consisting of aircraft types which are designed and assembled by one manufacturer and are of nominally identical design and build with respect to all details that could influence the accuracy of height-keeping performance. It is not normally necessary to monitor all airframes within a monitoring group providing an adequate sample is available and the performance of the group is within the satisfied parameters. The minimum monitoring requirements (MMR) document lists the aircraft types which are eligible for RVSM approval under the group provisions and the groups to which they

belong. It also indicates the level of monitoring that should be expected for each operator.

2.3.5.4 The total number of RVSM approved aircraft registered by the MIDRMA member states is **1921** aircraft, the MIDRMA continuously monitor the validity dates of height monitoring requirements for all these aircraft and keep all member states fully aware of the validity status through the Minimum Monitoring Requirement software available on the MIDRMA website.

Note: The online MMR software is linked with the MID RVSM approvals database and constantly updated with the member states approvals list.

2.3.5.5 The MIDRMA programmed the MMR software to send automatic reminders on a monthly basis for all member states to send their updated RVSM approval list, also the software sends a monthly summary MMR tables with the validity status for all the RVSM approved aircraft in the Middle East region. These reminders helped all MIDRMA focal points for airworthiness issues to react before the height monitoring expiry dates and instruct airline operators to conduct height monitoring when necessary.

2.3.5.6 MIDANPIRG Conclusion 17/3 concerning the procedures for the follow-up with States and the issuance of warning related to RVSM approved aircraft without valid height-keeping performance monitoring results. Accordingly, the MIDANPIRG agreed to the following conclusion:

MIDANPIRG CONCLUSION 17/3: PROCEDURE FOR THE FOLLOW-UP WITH STATES AND THE ISSUANCE OF WARNING RELATED TO RVSM APPROVED AIRCRAFT WITHOUT VALID HEIGHT-KEEPING PERFORMANCE MONITORING RESULTS

- a. The MIDRMA will notify the States concerned every 3 months about their aircraft noncompliance with ICAO RVSM Height Monitoring requirements;
- b. States should take remedial actions to rectify the situation and ensure that their relevant aircraft are complying with ICAO RVSM Height Monitoring requirements in a timely manner, and notify the MIDRMA about their corrective action plans;
- c. States should develop corrective action plans in coordination with the airlines concerned and MIDRMA, which includes a time frame to allow the concerned airline operator rectify this violation as early as possible, this period should not exceed 90 days to perform the height monitoring;
- d. If no height monitoring would be conducted during the 90 days, the concerned States must withdraw the RVSM approval of the aircraft concerned and inform the MIDRMA;
- e. The MIDRMA should issue a warning to all MID States and RMAs related to noncompliance aircraft registered in the MID Region;
- f. The MIDRMA in coordination with the ICAO MID Office will continue working closely with the States concerned to resolve the issue;
- g. Once the issue would be resolved, a notification should be issued by MIDRMA to all MID States and RMAs.

2.3.5.6.1 MIDRMA can't see the implementation of these procedures by some member states especially those with high percentage of their RVSM approved aircraft that are not compliant for long time of height monitoring according to ICAO Annex 6 part 1 requirements. It is therefore necessary to address this issue to the Member States shown in the MMR table below, which must explain to the meeting why their authorities didn't take any action to comply with this conclusion.

2.3.5.7 The updated Minimum Monitoring Requirements table reflected below.

MID STATES RVSM AIRCRAFT MINIMUM MONITORING REQUIREMENTS TABLE

Valid as of 01st May 2023

MID States	RVSM APPROVED A/C	HAVE RESULTS OR COVERED	NOT COVERED	NOT COVERED IN %	A/C MMR
Bahrain	64	49	15	23%	2
Egypt	152	132	20	13%	10
Iran	186	138	48	26%	24
Iraq	54	50	4	7%	4
Jordan	44	41	3	7%	2
KSA	294	243	51	17%	8
Kuwait	68	68	0	0%	0
Lebanon	31	31	0	0%	0
Libya	40	30	10	25%	8
Oman	76	76	0	0%	0
Qatar	284	284	0	0%	0
Sudan	16	16	0	0%	0
Syria	21	11	10	47%	8
UAE	585	506	79	13%	19
Yemen	6	4	2	33%	2
TOTAL	1921	1667	242	13%	87

2.3.6 RVSM Height Monitoring Activities Update

2.3.6.1 Syrian RVSM Approved Aircraft: Due to the increasing number and activities of RVSM-approved aircraft registered by the Syrian Civil Aviation Authority in the ICAO Middle East Region, MIDRMA submitted an official request on September 5th, 2021, to the FAA and the US Department of Treasury for an OFAC license to conduct RVSM height monitoring using the Enhanced GMU. The license is currently being processed and followed up by MIDRMA and the FAA, but there is uncertainty about whether or not it will be granted.

2.3.6.1.1 As we all know, height monitoring is a critical safety issue closely related to the analysis conducted in the annual SMR. The lack of height monitoring means the lack of 1000 ft vertical separation assurance. The Syrian Civil Aviation Authority (SCAA) has shown positive and responsible actions towards this matter and is ready to conduct the required monitoring for all their registered and approved aircraft as soon as possible. However, without an OFAC license, MIDRMA is restricted from performing height monitoring in accordance with the agreed purchase agreement for the EGMUs, which makes it impossible to accomplish this task.

2.3.6.2 Libya RVSM Approved Aircraft: The MIDRMA managed to conduct height monitoring for 14 aircraft registered by the Libyan CAA and was able to reduce the noncompliant percentage from 82% to 25%, there are 9 other aircraft that must be checked as soon as possible and work hard to prevent these aircraft from entering the airspace in case they fail to comply with RVSM height monitoring requirements as per ICAO Annex 6 Part 1.

2.3.6.3 Iran RVSM Approved Aircraft: The OFAC License granted to MIDRMA for inspecting the Iranian RVSM-approved aircraft expired on January 31, 2023, which prevented MIDRMA from using the EGMUs in Iran for any height monitoring after that date. Although a renewal request was submitted to the US Department of Treasury on September 5, 2021, it has failed to receive approval until now.

Note: In November 2022, MIDRMA successfully conducted RVSM height monitoring for all RVSM-approved aircraft registered by Iran CAO, and was able to score zero MMR for the first time since 2011.

2.3.6.3.1 The increasing number of non-compliant Iranian aircraft for height monitoring operating within the RVSM airspace alongside other approved and compliant aircraft due to the lack of the OFAC license allowing MIDRMA to carry out the RVSM height monitoring tasks is a cause for concern among aviation authorities. The RVSM airspace has been designed to accommodate aircraft that meet specific height monitoring requirements to ensure that vertical separation always exists. Non-compliant aircraft pose a significant risk to other aircraft flying within this airspace, as they may not maintain the required vertical separation, resulting in potential collisions.

2.3.6.4 Egypt RVSM Approved Aircraft: While there has been a slight improvement since November 2022 by Egypt CAA Airworthiness Authority in achieving the Minimum Monitoring Requirements for their RVSM approved aircraft as per ICAO Annex 6, the MIDRMA still has serious concerns about nearly 8 expired aircraft that have not undergone RVSM height monitoring for a long time. Immediate corrective measures are required to ensure that all Egyptian RVSM approved aircraft comply with the height monitoring requirements and maintain safe operations within the RVSM airspace

2.3.6.5 Sudan RVSM Approved Aircraft: The responsible Airworthiness Inspector coordinated with MIDRMA to conduct RVSM height monitoring by MID of November 2022 for all the remaining aircraft required to be monitored which will reflect Sudan CAA to be fully compliant for RVSM height monitoring.

2.4 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.

Conclusions:

It is clear that several safety-related issues need to be addressed to guarantee that RVSM operation does not increase the risk of en-route mid-air collisions over time. The report highlights serious and risk-bearing situations that must be urgently addressed to improve the overall safety of RVSM operations. One of the main issues identified is the infringement of the RVSM airspace by non-RVSM approved aircraft. It is crucial to take immediate action to prevent this from happening to ensure the continued safe operation of RVSM. In addition to addressing these issues, it is essential to raise awareness of RVSM requirements among all stakeholders involved in the implementation of RVSM in their airspace. This can be achieved through training and educational programs to ensure that all parties are aware of the importance of adhering to RVSM requirements to maintain a high level of safety in RVSM operations.

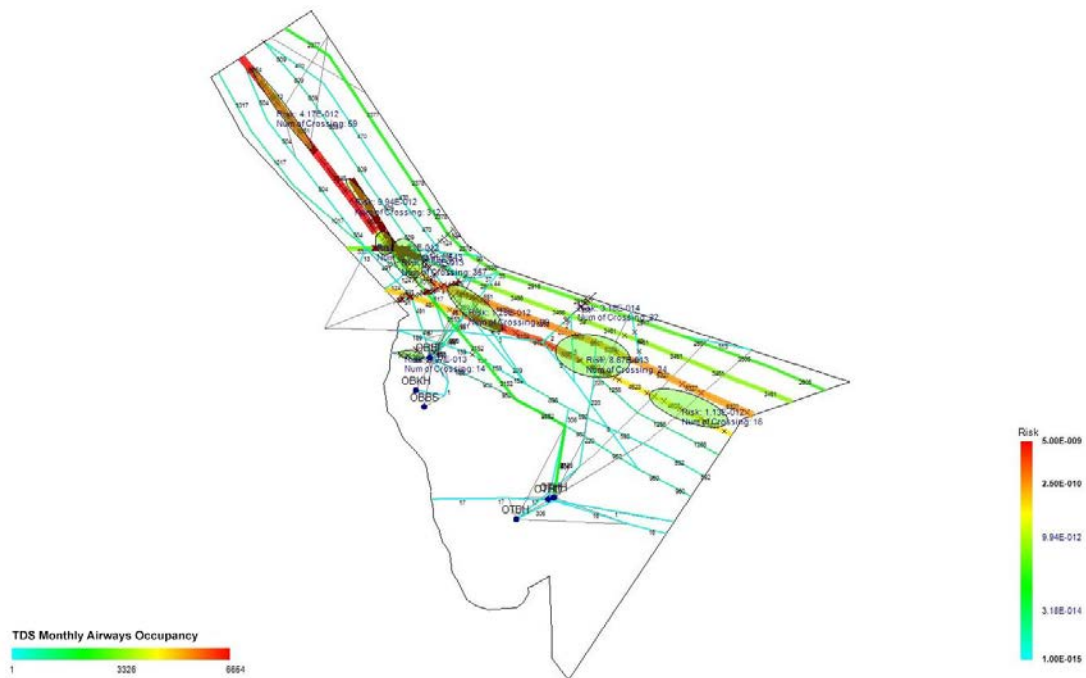
Note: The MIDRMA has developed a global RVSM database that can be accessed by all Member States' focal points, including those in ATC and Airworthiness, through a secured page on the MIDRMA website. Additionally, the MIDRMA RVSM bulletin, which lists non-RVSM approved aircraft, is also published on the same webpage.

Recommendations:

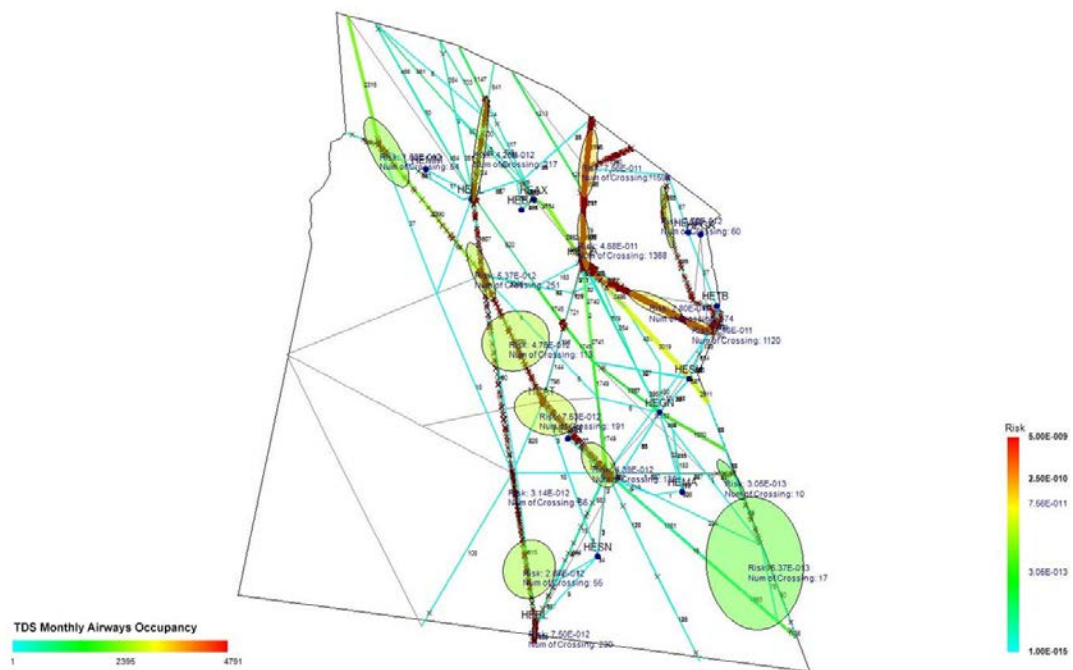
1. To address the safety-related issues identified in the SMR, improved procedures and practices must be recommended. These improvements should be designed to prevent or reduce the likelihood of serious or risk-bearing situations arising in the future.
2. Continuous assurance of RVSM operations should be established to ensure that the operation of RVSM does not adversely affect the risk of en-route mid-air collision over time. This should include regular monitoring and evaluation of RVSM operations to identify any new safety-related issues and ensure that all recommended improvements are implemented effectively.
3. To raise awareness of RVSM requirements among all concerned parties involved in the implementation of RVSM in their airspace, training and education programs should be developed and implemented. These programs should be designed to provide all relevant parties with the knowledge and skills necessary to comply with RVSM requirements and to ensure that RVSM operations are conducted safely and effectively.

Appendix B

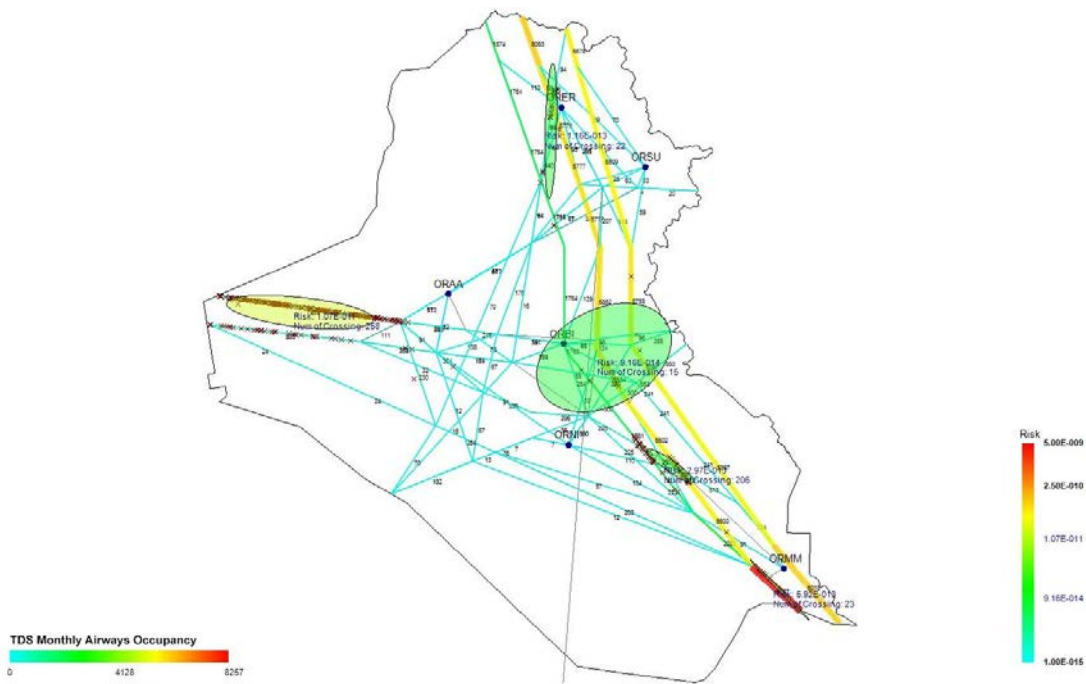
**MIDRMA Member States Hot Spots Generated from June 2022 TDS
(For information ONLY)**



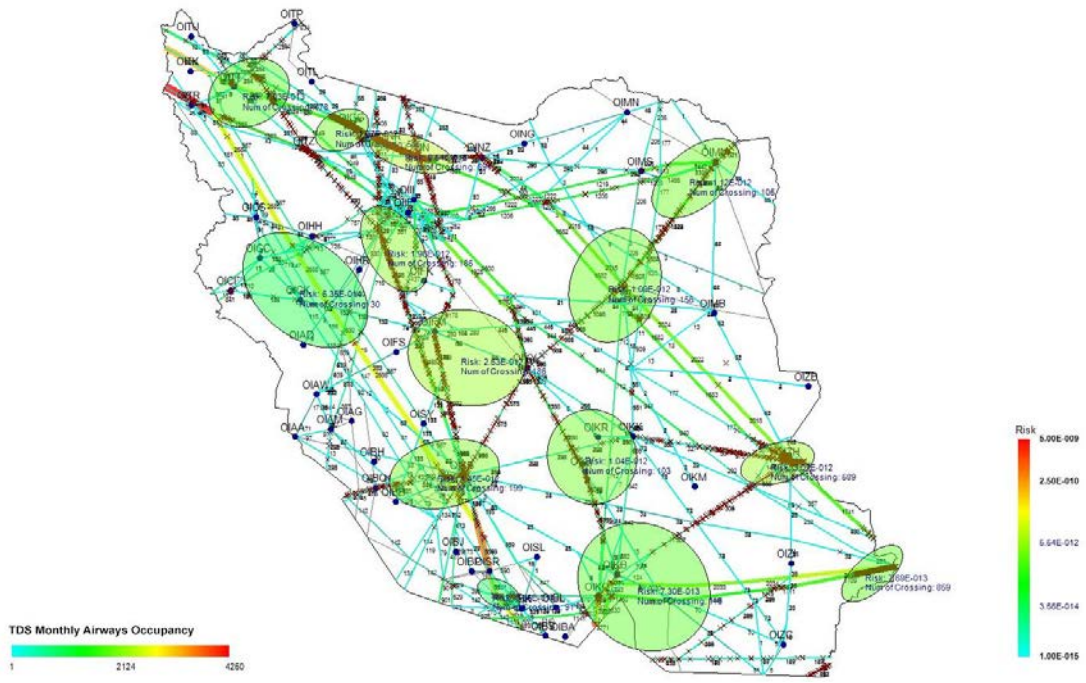
Bahrain FIR



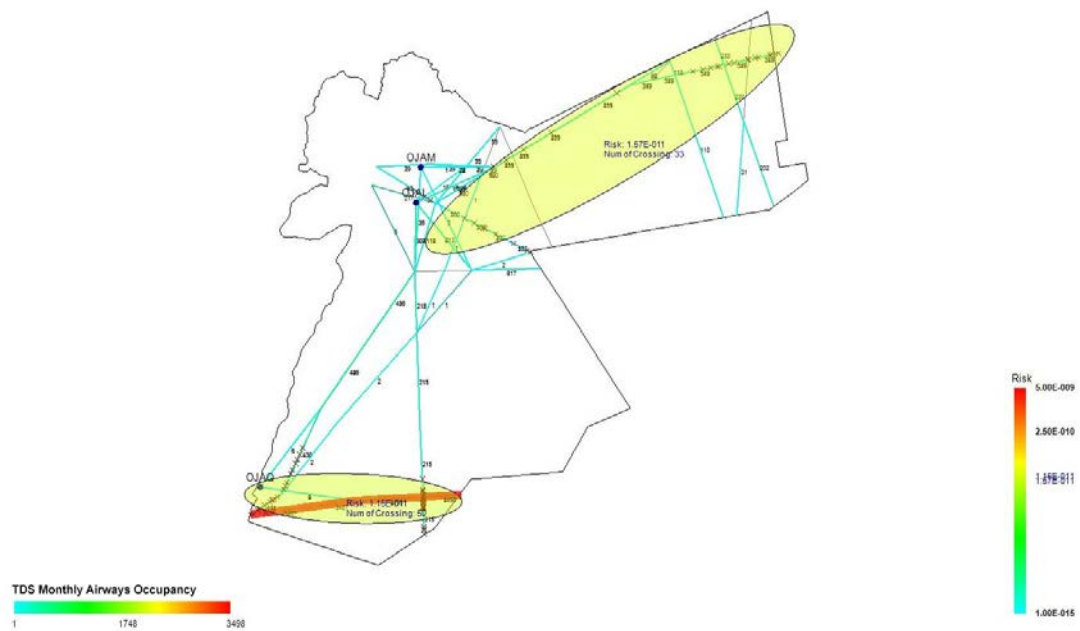
Cairo FIR



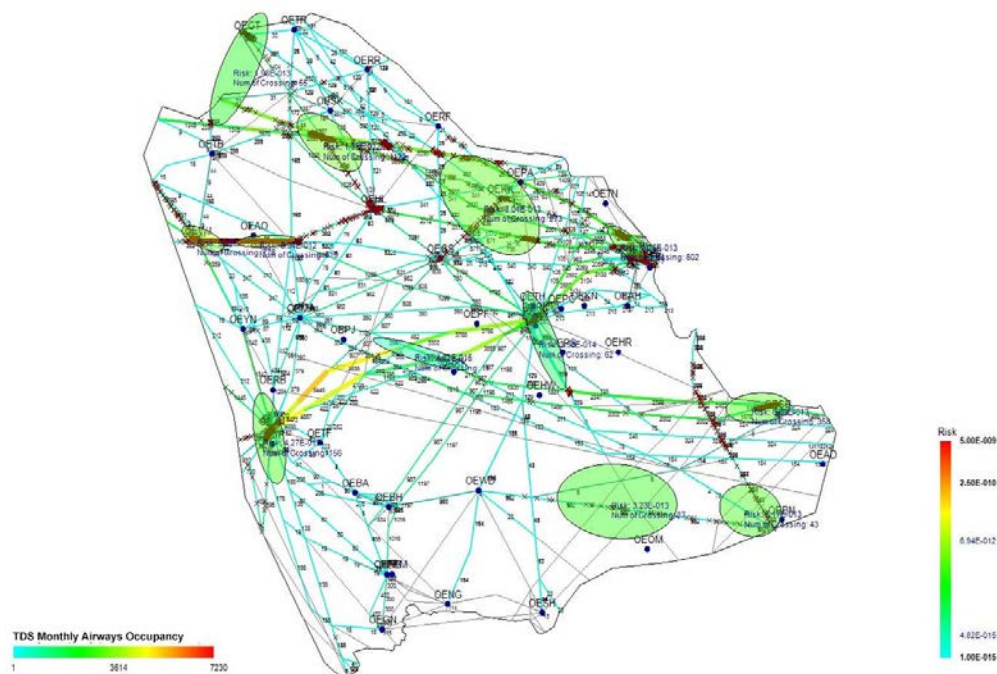
BAGHDAD FIR



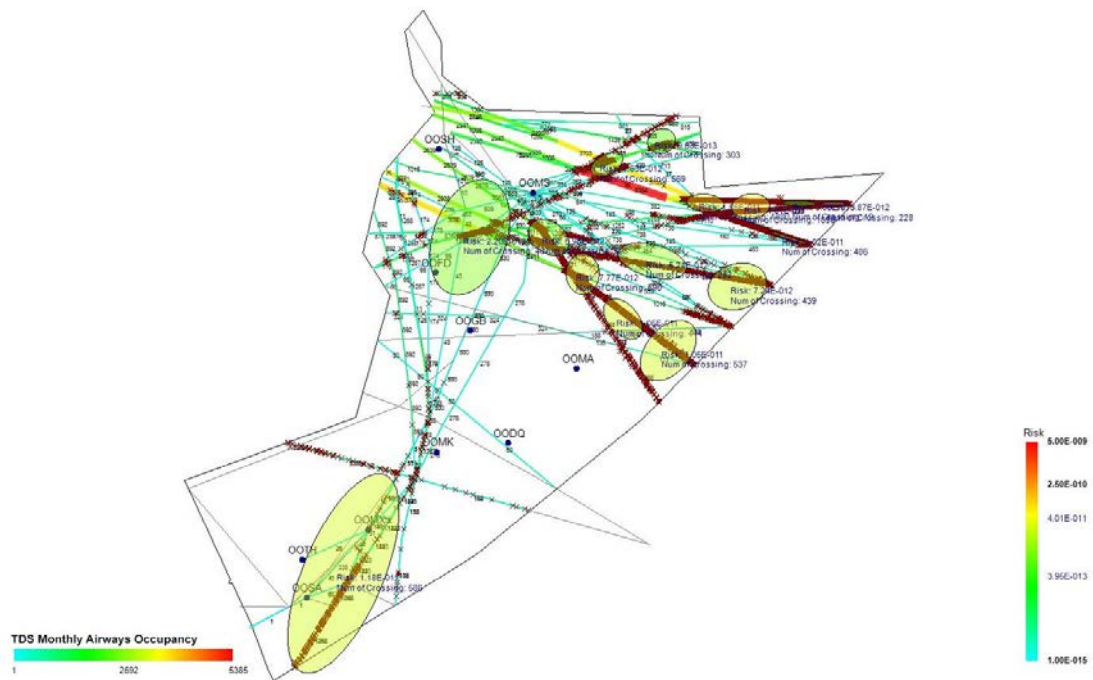
TEHRAN FIR



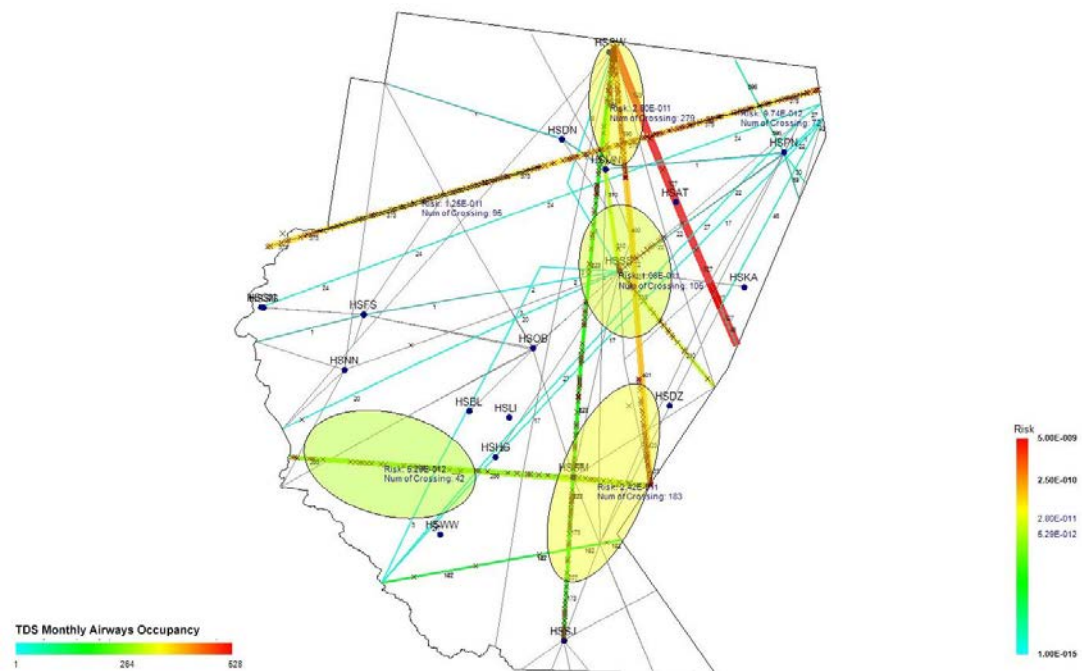
AMMAN FIR



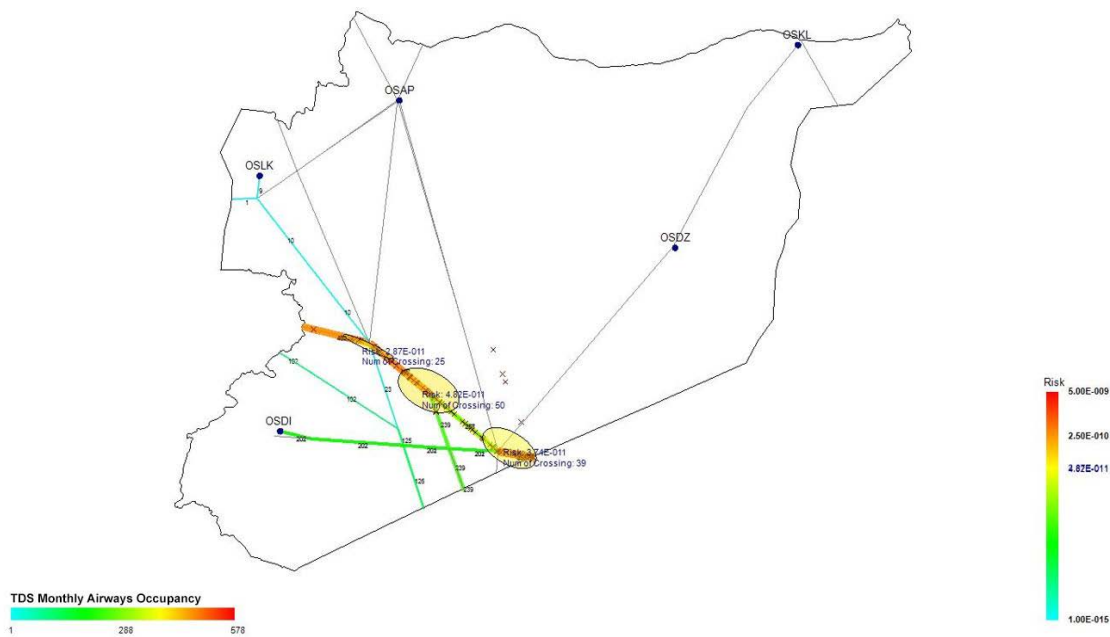
JEDDAH FIR



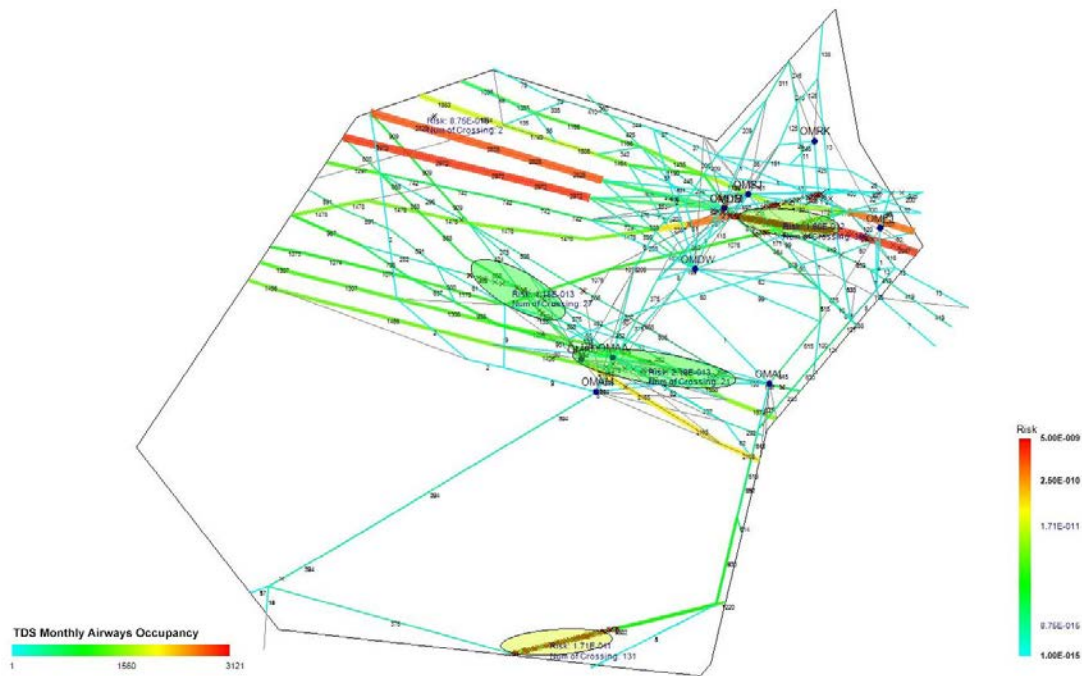
MUSCAT FIR



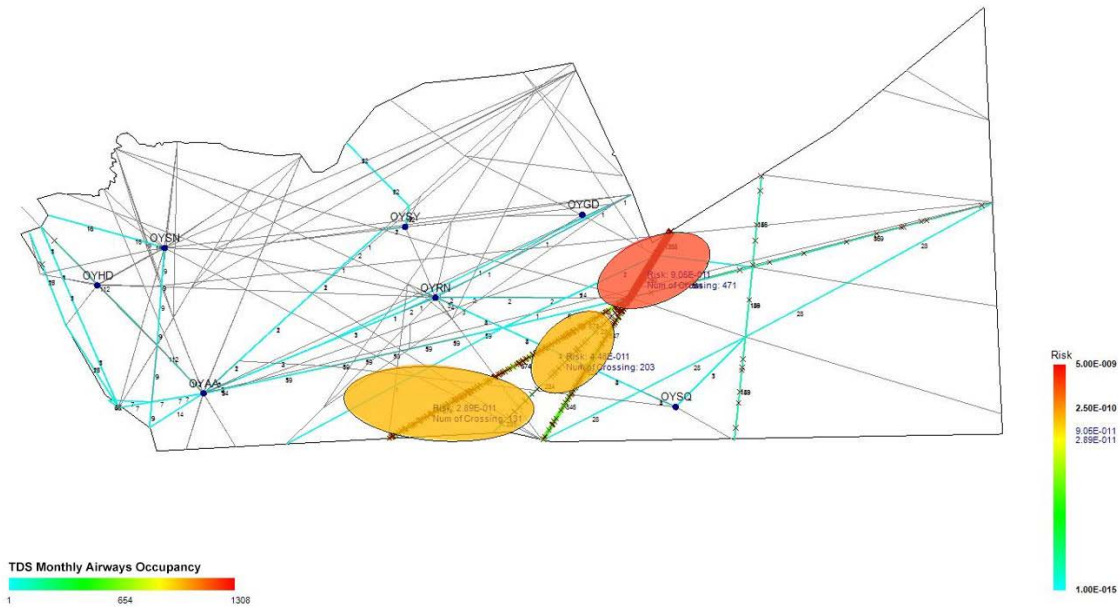
KHARTOUM FIR



DAMASCUS FIR



EMIRATES FIR



SANA'A FIR

- END -

APPENDIX 5.1A

LIST OF OCCURRENCE CATEGORIES TAXONOMY

Scope: State of Occurrence

The data to be collected be based on scheduled commercial operations involving aircraft having a Maximum Take-off Weight (MTOW) above 5700 kg.

Occurrence Category	ADREP/CICTT taxonomy	Remarks
Runway Excursion (RE)	Veer off or overrun off the runway surface.	
Abnormal Runway Contact (ARC)	Any landing or take-off involving abnormal runway or landing surface contact.	
Loss of Control-Inflight (LOC-I)	Loss of Control while, or deviation from intended flight path, in flight.	
Controlled Flight Into Terrain (CFIT)	Inflight collision or near collision with terrain, water, or obstacles without indication of loss of control.	
MID Air Collision (MAC)/ NMACs	Airprox/TCAS Alerts, Loss of separation as well as NMAC or collisions between aircraft inflight.	
Fire/Smoke (F-NI)	Fire or smoke in or on the aircraft, in flight, or on the ground, which is not the result of impact.	
Runway Incursion (RI)	Any occurrence at aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for landing and takeoff of aircraft.	
System Component Failure –Non-Power Plant (SCF-NP)	Failure or malfunction of an aircraft system or component other than the power plant.	
Turbulence Encounter (TURB)	In-flight turbulence encounter.	
Birdstrike (BIRD)	Occurrences involving collisions/near collisions with bird(s).	
Navigation Errors (NAV)	Occurrences involving the incorrect navigation of aircraft on the ground or in the air	

System Component Failure- Power Plant (SCF-PP)	Failure or malfunction of an aircraft system or components related to the power plant.	
Security related (SEC)	Criminal/Security acts which result in accidents or incidents (per Annex 13 to the Convention on International Civil Aviation).	
Wind shear	Flight into wind shear or thunderstorm	

NB: States may share any other occurrence category or national safety concern.

APPENDIX 5.1B

TEMPLATE FOR THE COLLECTION OF ACCIDENT, SERIOUS INCIDENT AND INCIDENT DATA AND SAFETY ANALYSIS

Name of State:

1- **Occurrences:** *The data to be collected be based on scheduled commercial operations involving aircraft having a Maximum Take-off Weight (MTOW) above 5700 kg.*

[illegible]

10	BIRD															
11	Navigation Errors (NAV)															
12	System Component Failure- Power Plant (SCF-PP)															
13	Security related (SEC)															
14	Wind shear															

States should provide the number of accident, serious incidents, and incidents related to each category mentioned in the template above for the past five years (2018-2022)

Scope: State of Occurrence

2- Brief- Safety data Analysis (Root-cause analysis, Trends, Low probability high consequence (LPHC) events if any, etc.)

3- Identified Top Five safety risks

4- Safety mitigations/Recommendations

APPENDIX 5.2A

Safety Actions- Consolidated List of SEIs with their respective Actions

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
Organizational Challenges and Emerging Risks					
Goal 2: Strengthen States' Safety Oversight Capabilities					
G2-SEI-01:	Strengthening of States' Safety Oversight Capabilities	A1- Conduct Capacity Building Activities (Workshops, Training, Webinars, GSI Courses) to promote effective implementation of SARPs, with a focus on the following technical areas: ANS, AGA, AIG and OPS.	ICAO	Workshops/Webinars conducted. <i>(Completed)</i>	2022 Completed Included in the Second MID-RASP Edition
		A2- Conduct technical assistance and NCLB missions to States.	ICAO	Technical assistance missions conducted. <i>(Completed)</i>	2022 Completed Included in the Second MID-RASP Edition
		A3- Develop and implement a specific NCLB plan of actions.	ICAO and concerned States	Postponed for 2023	2022 Included in the Second MID-RASP Edition

G2-SEI-02:	Improve Regional Cooperation for the Provision of Accident & Incident Investigation	A1- Development and signature of the MOU among MENA ARCM States	ICAO, ACAO, and MENA ARCM Member States	The MENA ARCM MoU has been signed by Fourteen (14) States namely Djibouti, Iraq, Iran, Jordan, Kuwait, Libya, Mauritania, Morocco, Palestine, Oman, Saudi Arabia, Sudan, United Arab Emirates, and Yemen. The kick-off of the MENA ARCM operations has been officially announced during the Future Aviation Forum held in Riyadh, Saudi Arabia (9-11 May 2022). Second MENA ARCM Conducted in Jeddah. <i>(Completed)</i>	2022 Completed
		A2- Conduct AIG Capacity Building Activities	Joint event KSA AIB/ICAO	Aircraft Accident and Incident investigation Workshop held Jeddah in September 2022 during AIIG/2. <i>(Completed)</i>	2022 Completed Included in the Second MID-RASP Edition
G2-SEI-03:	Sharing of Safety Recommendations related to Accidents and Serious Incidents	A1- Development of questionnaire to be circulated to MENA States on sharing safety recommendations on dedicated platform.	ICAO, ACAO, and States (KSA & UAE)	The questionnaire endorsed by the RASG-MID/9. SL has been circulated to the MENA ARCM member States. Analysis presented to MENA ARCM Committee/2 Meeting. <i>(Completed)</i>	2022 Completed Included in the Second MID-RASP Edition

5.2A-3

G2-SEI-04:	Enhance State Oversight on Dangerous Goods	A1- Dangerous Goods (DG) Workshop for States 'inspectors.	ICAO and ACAO. Supported by FAA	1. Joint ACAO/ICAO Dangerous Good Webinar has been held on 8 November 2021. 2. Joint event ACAO/ICAO Dangerous Goods Workshop back to back with Ground handling Workshop planned to be held in Rabat. 3. ACAO/GCAA Webinar on Regulating The Transport of Dangerous Goods by Air in United Arab Emirates has been conducted the 23 June 2022. (Completed)	2022 Completed Included in the Second MID-RASP Edition Joint Event ACAO/ICAO DG Workshop in Casablanca 12-15 December 2022
		A2- Develop guidance material/share best practices to support States' inspectors for the conduct of the oversight for DG.	States (Bahrain and Oman)	Draft to be presented to SEIG/4 for review. (Completed)	Completed
		A3- Develop guidance material and providing Webinar high energy devices.	IATA	IATA will provide the tentative dates on Jan 2022 or Q1 2022.	2022 Included in the Second MID-RASP Edition
		A4: Organize DG Capacity Building Training	ICAO	Postponed for 2023	2022 Included in the Second MID-RASP Edition

G2-SEI-05:	Human factors and Competence of Personnel	A1- Advisory Circular: Crew Resource Management Training Programme (CRM). (Action addressed under G1-SEI-04: CFIT).	IATA	IATA will provide the tentative dates on January 2022 or Q1 2022.	Included in the Second MID-RASP Edition
		A2- Organize Crew Resource Management Training Workshop/webinar to share experience and best practices on CRM practical implementation.	ICAO, ACAO, and IATA	Crew Resource Management (CRM) Webinar planned held 20 June 2022. Joint ACAO/ICAO/IATA. (Completed)	2022 Completed Included in the Second MID-RASP Edition
		A3- Conduct Workshop/Webinar on Fatigue Risk Management and Mental Health Best Practices.	IATA, ACAO, and CANSO	1. Webinar organized on 9 June 2022 jointly between ACAO/IATA/CANSO. 2. An online Workshop conducted on FRMS jointly by ACAO and CAAS/SAA from 20 to 24 September 2021. (Completed)	2022 Completed Included in the Second MID-RASP Edition
		A4- Organize Team Resource Management Training Workshop/Webinar to share experience and best practices on TRM practical implementation.	ICAO, ACAO, IATA, CANSO, FAA, and States (TBD)	Postponed for 2023	2022 Included in the Second MID-RASP Edition

5.2A-5

G2-SEI-06:	Impact of security on safety	A1- Circulate ICAO Doc 10084 Risk Assessment Manual for Civil Aircraft Operations Over or Near Conflict Zones.	ICAO	SL issued by ICAO July 2021. (Completed)	2021 Completed
		A2- Organize seminar/Symposium to exchange experiences and good practices on assessing the risks and sharing of information related to the overflying of conflict zones in coordination with RASFG-MID and MIDANPIRG.	ICAO and ACAO. Supported by IATA, CANSO, States (TBD)	To be included with the Civil-Military Cooperation Workshop. Postponed for 2023	2022 Included in the Second MID-RASP Edition
		A3- Encourage States to issue NOTAMs to share threats information emanated from conflict zones within their airspaces.	ICAO	(Completed)	2021 Completed
		A4- AIM forum NOTAM standardized template.	ICAO and IATA	Presented to AIM SG9 meeting in September. (Completed)	2022 Completed

Goal 3: Ensure the Appropriate Infrastructure is available to Support Safe Operations

.G3-SEI-01:	Certification of International Aerodromes	A1- Support States on the implementation of the ICAO Annex 14 requirements to achieve compliance with regards to Aerodrome Design and Operations, through Workshops/Training.	ICAO and ACI. Supported by ACAO	1. Training course conducted on implementing Annex 14, during period of 8-12 November 2020. 2. Online Workshop on airport certification conducted by ACAO during the period 25-28 October 2021. (completed)	2022 Completed Included in the second MID-RASP Edition
		A2- Enhance capacity building for States CAAs and Airport operators related to Aerodromes Certification through Workshops/Training	ICAO and ACI	Conducted Training on Aerodrome Certification 15-19 Nov 2021. (completed)	2022 Completed Included in the second MID-RASP Edition

		A3- Develop guidance material/ share best practices on Apron Management	States (UAE and Egypt)	Endorsed by the RASG-MID/9 and published on the ICAO Web Site. <i>(completed)</i>	2022 Completed
		A4 - Deployment of iPack on Aerodrome Re-Start	ICAO	iPack for Aerodrome Restart deployed for Syria. <i>(completed)</i>	2022 Completed
G3-SEI-02:	Establish Runway Safety Team (RST) at International Aerodromes	A1- Conduct of assistance missions by the Runway Safety Go-Team (RST)	ICAO. Supported RSP (Runway Safety Programme Partners)	Postponed for 2023	2022 Included in the second MID-RASP Edition
		A2: Support States to implement the Global Reporting Format Methodology through Workshops/trainings: (Action addressed under G1-SEI-02: Runway Excursion).	ICAO and ACI.	1. Webinar has been conducted on 27 Oct 20 2. ACI webinar on Implementing GRF at airports with non-winter conditions; dated 27 May 2021 3. Five customized training on GRF implementation conducted. <i>(completed)</i>	2022 Completed Included in the Second MID-RASP Edition
Goal 4: Expand the Use of Industry Programmes					
G4-SEI-01:	Promote the Use of industry Programmes	A1- Encourage IATA's IOSA and ISAGO registrations through safety promotion	IATA	6 States signed the MoU 2 potential States to be added to the list 2022. <i>(completed)</i>	2022 Completed Included in the Second MID-RASP Edition
		A2- Encourage the implementation of ACI Airport Excellence (APEX) in Safety Programme	ICAO and ACI	Postponed for 2023	2022 Included in the Second MID-RASP Edition

Goal 5: Implementation of Effective SSPs and SMSs

5.2A-7

G5-SEI-01:	Implement an effective Safety Management	A1- Conduct ICAO SSP Training Course in Cairo	ICAO	SSP course planned for 18-23 September 2022. Postponed for 5-10 February 2023	2022 Included in the Second MID-RASP Edition
		A2- Conduct SSP Workshop in coordination with ACAO in Casablanca, Morocco	ICAO and ACAO	1. ACAO/ICAO SSP Implementation Workshop planned 23-27 May 2022. 2. An Event Risk Assessment webinar was delivered on 7 June 2021organised by ICAO MID Office. <i>(completed)</i>	2022 Completed Included in the Second MID-RASP Edition
		A3- Provide SSP/SMS Workshops for MID States personnel	ICAO and ACAO	1. SSP Workshop conducted in Kuwait in March 20. 2. SMS implementation training online course jointly with Singapore CAAS 7-11 Feb 2022. <i>(completed)</i>	2022 Completed Included in the Second MID-RASP Edition
		A4- Develop guidance material/share best practices on occurrence reporting for the CAA personnel on establishing an effective operation of the mandatory and voluntary reporting systems	States (UAE)	WP and GM will be presented by UAE during this meeting. <i>(completed)</i>	2022 Completed
		A5- Support and guide States in the	ICAO	1. ICAO organized series of RASP	2022

		development of NASPs through Workshops and sharing of best practices		webinars: - MID-RASP Webinar conducted by ICAO on 25 May 2021. 2. ICAO organized series of Webinars related to GASP/NASP: - 16 March 2021: ICAO's Global Safety Strategy: the Global Aviation Safety Plan. - 30 March 2021: Introduction to the National Aviation Safety Plan. - 13 April 2021: Using the Roadmap to Develop a National Aviation Safety Plan. 3. SSP workshop conducted in Morocco including NASP 4. Regional NASP Workshop Cairo	Completed Included in the Second MID-RASP Edition
		A6- Development of guidance/share best practices for the processes and procedures for oversight of SMS	States (UAE)	WP and GM will be presented by UAE during this meeting. (completed)	2022 Completed
		A7- Deployment of the Aviation Safety Risk Management iPack	ICAO	Completion of ASRM iPACK related to COVID-19 project with PACA Oman and conducted the closing meeting on 4 May 2021. <i>(Completed)</i>	2020 Completed
		A8- Conduct assistance missions by SMIT to support States with SSP implementation	SMIT.	SMIT Handbook endorsed by RASG-MID/9. <i>(Completed)</i>	2022 Completed Included in the Second MID-RASP Edition

Goal 6: Increase Collaboration at the Regional Level to Enhance Safety						
	To be developed in the future					
Regional Operational Safety Risks						
Goal 1: Achieve a Continuous Reduction in Operational Risks						
G1-SEI-01:	Aircraft upset in flight (LOC-I)	A1-	Guidance material on flight crew proficiency	IATA and Aircraft manufacturers	IATA will provide the tentative dates on Jan 2022 or Q1 2022	2022 Included in the Second MID-RASP Edition
		A2-	Advisory Circular: Mode Awareness and Energy State Management Aspects of Flight Deck Automation	IATA and Aircraft manufacturers.	IATA will provide the tentative dates on January 2022 or Q1 2022	2022 Included in the Second MID-RASP Edition
		A3-	Conduct Upset Recovery Workshop/webinar	ICAO, KSA, and FAA	ICAO, KSA, and FAA UPRT conducted in February 2020.	2022. Included in the Second MID-RASP Edition
		A4-	Develop guidance material/share best practices on Ground Handling Service Provider Certification Process	IATA and KSA	Reviewed by SPIG meeting and be presented to RASG-MID/10 for endorsement by RASG-MID/10. (completed)	2022. Completed
		A5-	Conduct a Ground Handling Workshop	ACAO and ICAO. Supported by FAA	Ground handling Workshop back to back with Dangerous Goods Workshop planned to be held in Joint event ACAO/ICAO	2022 Completed To be conducted 12-15 December 2022 in Rabat
G1-SEI-02:	Runway Safety- Runway Excursion	A1-	Support States to implement the Global Reporting Format (GRF) Methodology through Webinar/ Workshops/Training	ICAO and ACI. s	05 virtual GRF Training classrooms conducted for the MID Region States/Airport Operators.	2022 Completed Included in the Second MID-

					RASP Edition
		A2- Guidance material on un-Stabilized Approach	IATA.	GM on UA shared by IATA. Circulated to States. <i>(Completed)</i>	2022 Completed
		A3- MID Region Action Plan/Milestones on the Global Reporting Format (GRF) Implementation.	ICAO	Completed and submitted for the States.	2022 Completed Included in the Second MID-RASP Edition
G1-SEI-03:	Runway Safety- Runway Incursion	A1- Support States to implement aerodrome inspection through Workshops/Trainings/Webinars.	ICAO. Supported by FAA and UAE	Postponed for 2023	2022 Included in the Second MID-RASP Edition
G1-SEI-4:	Controlled Flight into Terrain (CFIT)	A1- Advisory Circular: Guidance for Operators to Ensure Effectiveness of GPWS Equipment.	IATA and Aircraft manufacturers	Draft to be presented to SEIG/4 for review. <i>(Completed)</i>	2022 Completed
		A2- Advisory Circular: Instrument Approach Procedures Using Continuous Descent Final Approach Techniques.	IATA and Aircraft manufacturers	IATA will provide the tentative dates on January 2022 or Q1 2022	2022 Included in the Second MID-RASP Edition
		A3- Circulate ICAO Guidance Doc 10000 on Flight Data Analysis Programme (FDAP) to support States providing oversight to air operators	ICAO	SL on ICAO Guidance Doc 10000 circulated by ICAO during July 2021. <i>(Completed)</i>	2022 Completed
		A4- Advisory Circular: Crew Resource Management Training Programme (CRM)	IATA, Aircraft manufacturers	IATA will provide the tentative dates on Jan 2022 or Q1 2022	2022 Included in the Second MID-RASP Edition
G1-SEI-	Loss of separation between	A1- States and regional organizations to	ICAO. Supported by	NMACs analysis to be provided by	2022

5.2A-11

05A1:	civil and military aircraft”	share occurrences and/or safety analysis/information related to Near Mid Air Collisions (NMACs) including to the “Loss of separation between civil and military aircraft” and ATM-SG to perform a technical analysis of the reported occurrences and and/or safety analysis/information and then come out with recommendations. The technical analysis of the reported occurrences and recommendations be shared with ASRG.	IATA, CANSO, and States	IATA to the ATM-SG for technical review and then the ATM-SG to provide recommendations for the next course of actions. The subject was also presented to the ATM SG/7 to raise awareness and urge the States and ORGs to share occurrences or safety analysis/information related to NMACs to enable the ATM SG to perform the technical analysis.	Proposed to be deleted
		A2: Guidance/raising awareness/ coordination related to the civil and military cooperation in particular over high seas.	ACAO and ICAO. Supported by States	Workshop planned to be 10 – 13 October 2022. Postponed for 2023	2022 Included in the Second MID-RASP Edition

G1-SEI-05A2:	Interference to GNSS Signals	A1: GNSS/GPS Interferences	ICAO and IATA	1. RSA developed and circulated in 2020 2. Safety Data analysis provided by IATA and included in the 11 th MID ASR. <i>(Completed)</i>	2022 Completed Included in the Second MID-RASP Edition
G1-SEI-05B:	Ensure the Safe Operations of UAS (drones)	A1- Circulate ICAO developed guidance and advisory circulars: Regulatory framework for the operation of drones to support states' CAA personnel in the implementation and oversight of UAS operations	ICAO	SL issued on the subject by ICAO MID office July 2021. <i>(Completed)</i>	2021 Completed
		A2- Organize symposium on Drones related subjects	ICAO, ACAO. Supported FAA	An ACAO-DfT-TSA Joint Virtual Workshop on Drones has been conducted the 9 & 10 Nov 21 with the attendance of more than 100 participants from 14 Arab States, 5 Regional Organizations and industry stakeholders. The symposium is postponed for 2023	2022 Included in the Second MID-RASP Edition
		A3- States and Regional Organizations to share occurrences and/or safety analysis/information involving drones to ASRG to perform a technical analysis of the reported occurrences and come out with recommendations.	ICAO, IATA, ACI, CANSO, and States (TBD)	IATA to provide safety information and safety analysis if available.	2022 Proposed to be deleted

APPENDIX 5.2B



RASG-MID SAFETY ADVISORY – 16

(RSA-16)

13 July 2022

MID-Region

Guidance Material on Measures to Improve the Effectiveness Of Enhanced Ground Proximity Warning System (EGPWS)/Terrain Awareness And Warning System (TAWS)

Date of Issue:	July 2022
Revision No:	First Edition – July 2022
Document Ref. No.:	RSA-16

Owner:	RASG-MID

These guidelines are developed by the Safety Enhancement Implementation Group (SEIG), as part of Middle East Regional Aviation Safety Plan (MID-RASP) 2020-2022 Edition Safety Enhancement Initiatives (Ref: G1-SEI-01: A1) developed by IATA in coordination with ICAO MID Regional Office and the Regional Aviation Safety Group - Middle East (RASG-MID).

Disclaimer

This document has been compiled by the MID Region civil aviation stakeholders to mitigate the operational impact of the Controlled Flight Into Terrain (CFIT) by providing guidance for civil aviation regulators and aircraft operators on actions that could be taken by stakeholders to reduce the likelihood of false warnings of Enhanced Ground Proximity Warning System (EGPWS) /Terrain Awareness And Warning System (TAWS) or, more seriously, the system's failure to provide a timely warning. It is not intended to supersede or replace existing materials produced by the National Regulator or in ICAO SARPs. The distribution or publication of this document does not prejudice the National Regulator's ability to enforce existing National regulations. To the extent of any inconsistency between this document and the National/International regulations, standards, recommendations or advisory publications, the content of the National/International regulations, standards, recommendations and advisory publications shall prevail.

TABLE OF CONTENTS

1. BACKGROUND	4
2. ANALYSIS	4
3. RECOMMENDED ACTION	5

APPENDIX A: Guidance material Performance assessment of pilot response to Enhanced Ground 4 Proximity Warning System (EGPWS)

Measures to Improve the Effectiveness of Enhanced Ground Proximity Warning System (EGPWS)/ Terrain Awareness and Warning System (TAWS)

1. BACKGROUND

1.1 A controlled flight into terrain (CFIT) accident occurs when an airworthy aircraft under the control of the flight crew is flown unintentionally into terrain, obstacles, or water, usually with no awareness of the impending collision on the part of the crew.

1.2 ICAO's first action in this regard can be traced to 1978, when requirements for equipping commercial air transport aircraft with GPWS were introduced into Annex 6 Part I International Commercial Air Transport - Aeroplanes. This led to a significant decrease in the number of CFIT occurrences, but not to their complete elimination. A significant advancement in technology was achieved with the development of GPWS with a forward-looking terrain avoidance function, generally referred to as Enhanced Ground Proximity Warning System (EGPWS) and known also as Terrain Awareness and Warning System (TAWS).

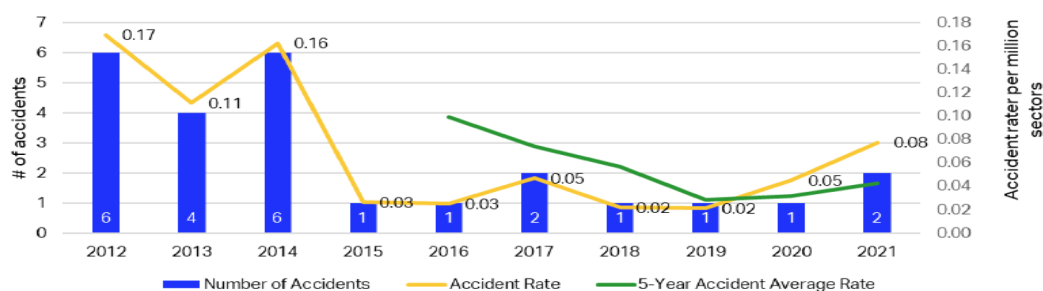
1.3 With the advent of EGPWS/ TAWS in 1996, there has been a significant reduction in the frequency of CFIT accidents. ICAO subsequently required that aircraft be equipped with this equipment and Annex 6 Part I currently requires all turbine-engine aero planes of a maximum certificated take-off mass more than 5 700 kg or authorized to carry more than nine passengers, to be equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.

1.4 ICAO requires States to ensure that operators have procedures in place to ensure the integrity electronic navigation data products and that the operator continues to monitor both process and products. While EGPWS/TAWS data base would not be utilized for navigation purposes, it would be considered important to ensure that the equipment is functioning with the latest software and data base available.

1.5 There are several factors that can reduce the effectiveness of enhanced ground proximity warning system (EGPWS) equipment. Several measures can be taken by stakeholders to reduce the likelihood of false EGPWS warnings or, more seriously still, the system's failure to provide a timely warning.

2. ANALYSIS

2.1 CFIT is the second cause of fatal accidents. The industry has been working to reduce the CFIT accidents and during the last decade, the accident rate has fallen from **0.17 per million sectors in 2012 to 0.08 per million sectors in 2021**. Thanks to improvements in training, standards, technology, policies, and SOPs.



2.2 In 2019, IATA and Honeywell produced guidance on performance assessment of pilot compliance to EGPWS. In our continuing effort to ensure the applicability and quality of the published Guidance Material, together with Honeywell conducted a survey to investigate the barriers and enablers in the implementation of such guidance.

2.3 The shortcoming identified involves the software utilized by EGPWS/TAWS. Software updates are issued regularly, yet industry sources reveal these are not always being implemented by all operators or are not installed in a timely manner.

2.4 Application of software updates improves the characteristics of the equipment. Such improvements are possible based on operational experience and enable earlier warnings in situations that occur closer to the runway threshold where previously it was not possible to provide such warnings. Similarly, it is important to regularly update the obstacle, runway and terrain database provided by manufactures for use with their equipment.

2.5 EGPWS/TAWS equipment was designed to function with a position update system, but not all installations are linked to Global Navigation Satellite System (GNSS) receivers. While the required position data can be acquired by using an effective ground-based navaid network, such support for area navigation systems is not available everywhere. Use of GNSS eliminates the possibility of position.

3. RECOMMENDED ACTION

A number of recommendations are listed below to aid in CFIT risk reduction.

3.1 Recommendations to Operators:

3.1.1 EGPWS Software & Terrain Database are kept up to date:

- Operators should have a policy in place or a program of continuous maintenance that periodically checks the system operation, updates the runway, terrain and obstacle databases and EGPWS software to the latest available.
- Guidance to airline's Technical Operations dept. (Engineering & Maintenance) should emphasize the safety benefit that can be obtained by keeping the EGPWS software / terrain database up to date.

3.1.2 Operators should encourage the use of GNSS/GPS as a position source for the EGPWS.

3.1.3 Operators should publish a clear SOP for the use of terrain awareness display during critical phases of flight.

3.1.4 Train flight crews to respond immediately to a hard Enhanced Ground Proximity Warning System (EGPWS) warning, and respect and respond to EGPWS soft warnings. Use simulators to show their crews exactly how close terrain is when the EGPWS warning occurs to reinforce the need for an immediate response to the warning to avoid the terrain.

3.1.5 Encourage operators to use FDM or FOQA data to monitor proper responses by flight crew to EGPWS events and reinforce a policy of go-around from an unstable approach.

3.1.6 Operators are encouraged to have procedures in place to ensure that EGPWS equipment always remains activated and serviceable.

3.1.7 Operators are encouraged to report GPS interference or any disruption of radio altimeter operation to the appropriate national authorities, with a copy to faqirj@iata.org.

3.1.8 Operators to create awareness of the impact of GPS jamming or radio altimeter anomalies on aviation safety.

3.2 Recommendations to States & Regulators:

3.2.1 EGPWS Software & Terrain Database are kept up to date:

- ensure the navigation references are updated in accordance with WGS-84;
- ensure air operators have procedures in place to ensure that EGPWS/TAWS software and data bases (including obstacle, runway and terrain databases) are updated to the latest available standard; and
- ensure that air operators maintain and monitor the provision of most accurate positioning information to the EGPWS/TAWS system (e.g., encourage the broader use of GNSS input linked to EGPWS).

3.2.2 Terrain Display during Critical Phases of Flight Policy:

- to check if the terrain display SOP is implemented by operators.

3.2.3 Training for Flight Crew to respond to EGPWS Alerts:

- to check if the EGPWS training is performed in compliance with regulations.

APPENDIX A:

Guidance material Performance assessment of pilot response to Enhanced Ground Proximity Warning System (EGPWS)



iata_guidance_per
formance_assessmen

APPENDIX 5.2C

RASG-MID SAFETY ADVISORY – 18

(RSA-18)



7 November 2022

MID-Region

Guidance Material for ICAO Dangerous Good

Date of Issue:	November 2022
Revision No:	First Edition – November 2022
Document Ref. No.:	RSA-18
Owner:	RASG-MID

These guidelines are developed by the Safety Enhancement Implementation Group (SEIG), as part of Middle East Regional Aviation Safety Plan (MID-RASP) 2020-2022 Edition Safety Enhancement Initiatives (Ref: G2-SEI-04: A2) based on the work of Kingdom of Bahrain and the Sultanate of Oman in coordination with ICAO MID Regional Office and the Regional Aviation Safety Group - Middle East (RASG-MID).

Disclaimer

This document is intended to provide guidance for civil aviation authorities in order to support States inspectors to conduct oversight to ensure safe transport of dangerous goods by air.

This document has been compiled by members of the aviation industry to enhance aviation safety at the regional level. It is not intended to supersede or replace existing materials produced by the State or in ICAO SARPs. The distribution or publication of this document does not prejudice the State's ability to enforce existing National regulations. To the extent of any inconsistency between this document and the National/International regulations, standards, recommendations or advisory publications, the content of the National/International regulations, standards, recommendations and advisory publications should prevail.

TABLE OF CONTENTS

1.	GENERAL -----	6
1.1	Mandatory-----	6
2.	DEFINITIONS AND ACRONYMS -----	6
2.1	Definitions -----	6
2.2	Acronyms -----	6
3.	LEGISLATION-----	6
3.1	International Regulation -----	6
3.2	National Regulations [SSP Component 1 (State safety Policy, objectives and resources addressing CE 1 Primary aviation legislation, CE 2 specific Operating regulations)] -----	7
4.	DANGEROUS GOODS INSPECTOR CONDUCT AND RESPONSIBILITIES -----	7
4.1	Dangerous Goods Inspector Conduct-----	7
4.2	Dangerous Goods Inspector Responsibilities-----	7
4.3	Dangerous Goods Inspector Training and Qualifications (this section also addresses the CE 4 Qualified technical personnel)-----	8
5.	DANGEROUS GOODS AUDITS AND INSPECTIONS [SSP component 2 state safety risk management and SSP component 3 State Safety assurance (CE 6 Licensing certification, authorization, and/or approval obligations, CE 7 Surveillance Obligations and CE 8 Resolution of safety issues)] -----	9
5.1	Oversight Aims -----	9
5.2	Annual Surveillance Programme (ASP) and Reporting Procedures -----	9
5.3	Surveillance-----	9
5.4	Oversight Methodology-----	9
5.5	Surveillance Audit Checklist -----	9
5.6	Inspection Procedures -----	10
5.7	Frequency of Inspections -----	10
5.8	How to Plan an Inspection -----	11
5.9	Results of Inspections (Including Safety Risk Assessment) -----	11
5.10	Safety risk assessment and hazard identification to transport Cargo, including Dangerous Goods in the cargo compartment-----	11
6.	ESTABLISHMENT OF DANGEROUS GOODS TRAINING PROGRAMME (CE 6 Licensing certification, authorization, and/or approval obligations, CE 7 Surveillance Obligations) -----	12
6.1	Introduction-----	12
7.	OBJECTIVE OF DANGEROUS GOODS TRAINING-----	12
7.1	Training as per need -----	12
7.2	Recurrent Training and Assessment -----	13
7.3	Training and Assessment Record-----	13
7.4	Approval of Training Programmes using the CBTA Approach-----	14
8.	COMPETENCY BASED TRAINING AND ASSESSMENT (CBTA) APPROVAL PROCESS -----	14
8.1	Application for Approval-----	14
8.2	Documentation Evaluation: Dangerous Goods Training Manual or Equivalent -----	15
8.3	Instructor Qualifications and Competencies -----	15

9.	CERTIFICATION OF FREIGHT FORWARDERS & DG AGENTS (CE 6 Licensing certification, authorization, and/or approval obligations, CE 7 Surveillance Obligations)	18
9.1	Application	18
9.2	List of Appropriate National Authority Certified Agencies	18
10.	CONSIGNMENT INSPECTION AT CARGO FACILITIES (Package and Documents)	19
10.1	General	19
10.2	Package Inspection	20
10.3	Document Inspection	20
11.	RAMP INSPECTION (LOADING AND STOWAGE)	20
11.1	General	20
11.2	Loading and Stowage	21
11.3	Training of Crew	21
12.	PASSENGER INFORMATION INSPECTION (WARNING NOTICES)	21
12.1	General	21
13.	APPROVAL TO CARRY DANGEROUS GOODS & EXEMPTION IN SPECIAL CIRCUMSTANCES	21
13.1	Conditions and Special Provisions	21
14.	DANGEROUS GOODS ACCIDENTS AND INCIDENTS (SSP Component 2 State Safety Risk Management)	23
14.1	Introduction	23
14.2	Reporting of Dangerous Goods Accidents and Incidents	23
14.3	Investigating of Dangerous Goods Accidents and Incidents	23
14.4	Dangerous Goods Accident	24
14.5	Dangerous Goods Incident	24
14.6	Recording of Dangerous Goods Accidents and Incidents	24
14.7	Cooperation between States in the investigation of DG Accidents and Incidents (SSP component 4 State Safety promotion: internal and External communication and dissemination of safety information)	25
14.8	The Aims of Cooperation between States	25
14.9	Liaison and Cooperation between States	25
15.	PASSENGER PUBLIC AWARENESS PROGRAMME	25
15.1	Introduction	25
15.2	Awareness Plan Achievement	26
15.3	Avenues of Communication	26
15.4	Passenger Public Awareness Devices	26
15.5	Availability of Materials for Passenger Public Awareness Programme	26
16.	SOURCE OF ADDITIONAL INFORMATION	27
16.1	Introduction	27
16.2	Cooperation	27
16.3	Objectives	27
16.4	Dangerous Goods Websites	27
17.	ANNEXES (SAMPLE CHECKLISTS: FREIGHT FORWARDERS AND CARGO AGENTS)	29
17.1	Annex - A	29

1. GENERAL

1.1 Mandatory

1.1.1 In Pursuance to standards and as necessary by ICAO Annex 18 to the Chicago Convention, each Contracting State shall establish inspection, surveillance and enforcement procedures with a view to achieving compliance with its safe transport of dangerous goods by air regulatory regime. The relevant standards from Annex 18 designed to help the implementation of the air transport of dangerous goods inspection programme and to promote the Inspector's uniform understanding.

1.1.2 The SSP is an integrated set of regulations and activities aimed at improving safety, which includes the critical elements (CEs) of State Safety Oversight (SSO) system and the SSP components. These responsibilities have been integrated in ICAO Annex 19-Safety Management and referred as the State's Safety Management (SM) responsibilities. The aim of the SSP is to combine elements of both prescriptive and performance-based approaches towards management of safety. It is important to implement an SSP in conjunction with the implementation of a Safety Management System (SMS) by service providers. Using SM principles, the relationship between a State and its aviation organization should evolve beyond compliance and enforcement, to a partnership aimed at maintaining or continuously improving safety performance. Therefore, states in order to implement ICAO requirements documented in Annexes 1, 6, 8, 13, 18 and 19 and associated Documents (Doc 9284, Doc 9859, Doc 10102, Doc 9841, Doc 10121, Doc 10147) in the management of Air Cargo Management System including Dangerous Goods aiming to strengthen the oversight process.

1.1.3 Guidance is offered to assist primarily in the inspection of aircraft operators, handling agents and training providers, it further recognises that in some states it is mandatory to conduct inspections on freight forwarding agents and or shippers. This Working Paper outlines the procedures the Dangerous Goods Inspector should follow in conducting his/her duties.

2. DEFINITIONS AND ACRONYMS

2.1 Definitions

2.1.1 The ICAO Annex 18 to the Convention on International Civil Aviation "The Safe Transport of Dangerous Goods by air" and the International Civil Aviation Organisation "Technical Instructions for the Safe Transport of Dangerous Goods by Air" (ICAO TI's) definitions apply.

2.2 Acronyms

- a. "CBTA" means Competency Based Training and Assessment
- b. "DGI" means Dangerous Goods Inspector
- c. "ERAP" means Emergency Response Assistance Plan
- d. "FDG" to be used in Annexes means Finding
- e. "IAEA" means the International Atomic Energy Agency
- f. "IATA" means International Air Transport Association
- g. "ICAO TI" means the current edition of the International Civil Aviation Organisation Technical Instruction for the Safe Transport of Dangerous Goods by Air
- h. "MSDS" means Material Safety Data Sheet
- i. "UN" means United Nations

3. LEGISLATION

3.1 International Regulation

3.1.1 International Civil Aviation Organisation Annex 18 to the Chicago Convention was developed to respond to a demand by Contracting States for an internationally agreed upon set of provisions addressing the safe transport of dangerous goods by air.

3.1.2 The International Civil Aviation Organisation Technical Instructions for the Safe transport of Dangerous Goods by Air contain the detailed technical information needed to support the broad application of provisions of Annex 18 providing a fully comprehensive set of international regulations.

3.1.3 The Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air provides information that is primarily of interest to States. Certain dangerous goods, which are normally forbidden (identified in Table 3-1 of the ICAO TI by Special Provision A-1, A-2 or A-109), may be specifically authorised for air transport by approval of the appropriate national authority.

3.1.4 The Supplement to the TI provides information to State for the processing of approvals or exemptions. States are encouraged to refer to ICAO Annex 6 Operation of Aircraft, Annex 19 Safety Management, Guidance for Safe Operations Involving Aeroplane Cargo Compartments (Doc 10102), Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment (Doc 10147).

3.2 *National Regulations [SSP Component 1 (State safety Policy, objectives and resources addressing CE 1 Primary aviation legislation, CE 2 specific Operating regulations)]*

3.2.1 ICAO Annex 18 Standards and Recommended Practices for the Safe Transport of Dangerous Goods by air must be established in the state's legislative framework of the civil aviation industry. The law shall have relevant articles or clauses under the relevant law substantiating the enactment and giving powers to the Appropriate National Authority/Competent Authority to establish, maintain, develop and implement such regulations in line with the technical documents mentioned above.

4. DANGEROUS GOODS INSPECTOR CONDUCT AND RESPONSIBILITIES

4.1 *Dangerous Goods Inspector Conduct*

4.1.1 At all times, Inspectors must act in such a manner that speaks well of the Appropriate National Authority and its Inspectors. Every official or company shall be dealt with in an equitable manner. Advice and guidance are frequently sought and must be readily provided in such a manner that public safety and the authority are not compromised.

4.2 *Dangerous Goods Inspector Responsibilities*

4.2.1 The Dangerous Goods Inspector is assigned the following responsibilities:

- a) Inspection and certification to ensure training and competence of:
 - I. Freight forwarding agencies based in the state that receive and process dangerous goods for transport by air;
 - II. Ground Handling Agents acting for Operators that transport dangerous goods by air;
 - III. Approved Training Organisations/schools that conduct dangerous goods acceptance courses, initial and recurrent; and
 - IV. Operators registered/based in the state that are involved in the transport of DG.
- b) Approval of DG packing materials suppliers.
- c) Audit of foreign operators to ensure compliance with state legislation.
- d) Investigation of dangerous goods incidents and accidents.
- e) Recommendation for the grant of exemption for the transport of forbidden dangerous goods.
- f) Other duties as directed by the Appropriate National Authority.

4.3 *Dangerous Goods Inspector Training and Qualifications (this section also addresses the CE 4 Qualified technical personnel)*

4.3.1 The dangerous goods inspector applicant should have relevant experience in commercial air transport operations involving dangerous goods based on a competency framework. Dangerous Goods Inspector shall be "qualified" and "current" to perform the task to which they are assigned based on a competency framework:

- a) Minimum professional qualifications shall be established and implemented for each technical position performing safety oversight functions.
- b) Dangerous Goods Inspector is provided with the technical and administrative training necessary for them to effectively fulfil their safety oversight responsibilities.
- c) Dangerous Goods Inspector is provided the opportunity to continually develop their knowledge and skills related to their respective responsibilities.
- d) Dangerous Goods Inspector is provided with the resources required to undertake necessary training.
- e) This includes but is not limited to financial resources.
- f) The necessary training shall include:
 - I. Initial training;
 - II. Recurrent training;
 - III. On Job Training (OJT) and;
 - IV. Specialized and Recommended training
- g) Any determination of the "qualifications" of the Dangerous Goods Inspector shall be based on an assessment of his experience, formal training, OJT or evidence that the task has direct positive transfer of methodology from similar or related tasks. The previous training or experience shall be assessed by the senior Dangerous Goods Inspector/Flight Safety Director.
- h) Dangerous Goods Inspector shall be current and qualified in accordance with the documented CAA and ICAO requirements. Legality is established by assessing whether the previous experience and recency meet the documented CAA requirements.
- i) Recurrent training, also known as refresher or periodic training, covers and reviews elements of the initial training programme and should be scheduled over a cycle of not more than 5-years and depends on the periodicity of the training.

4.3.2 The competency framework for DG inspector should take in consideration the following:

- a) Ethics and values
- b) Communication
- c) Problem solving and decision making
- d) Initiative
- e) Technical expertise
- f) Systems thinking
- g) Risk management
- h) Leadership and teamwork
- i) Critical thinking

5. DANGEROUS GOODS AUDITS AND INSPECTIONS [SSP component 2 state safety risk management and SSP component 3 State Safety assurance (CE 6 Licensing certification, authorization, and/or approval obligations, CE 7 Surveillance Obligations and CE 8 Resolution of safety issues)]

5.1 Oversight Aims

5.1.1 As required by Annex 18 to the Chicago Convention, each contracting State shall establish inspection procedures with a view to achieving compliance with its dangerous goods regulations.

5.1.2 The aim of the inspection is to assess the suitability of the organisation and procedures established by the operator and of the facilities provided for the handling of dangerous goods, taking into account the nature and scale of the operation. If the operator uses a handling agent, the liaison between them needs to be checked to confirm that each knows what is expected of them by the other.

5.1.3 The establishment of inspection procedures will ensure that dangerous goods are transported safely without placing an aircraft or its occupants at risk.

5.2 Annual Surveillance Programme (ASP) and Reporting Procedures

5.2.1 The designated Lead/Senior Inspector or the entity within the Appropriate National Authority's organisation should prepare an Annual Surveillance Programme (ASP) and the DG Inspectors shall carry out the surveillance audits as per the ASP.

5.3 Surveillance

5.3.1 Surveillance is a planned inspection of an approved facility or part thereof, carried out at regular intervals by the Dangerous Goods entity, to ensure adherence to the laid down requirements by approved organizations for continued approval from Appropriate National Authority. The planned inspections should include station facility, base facility and operator's manuals. Guidance material with Checklists/Forms to be used by Dangerous Goods Inspectors while carrying out the surveillance of operators should be prepared aligning the objectives with Appropriate National Authority and is available in ICAO TI Doc 9284 Supplement. Refer to [Annex B](#) as a sample checklist.

5.4 Oversight Methodology

5.4.1 The oversight will be based on the continuous analysis of data collected under the audit and inspection activities. A risk-based approach will be applied to help with the selection and prioritization of quality-related activities, as well as for any other related decision-making needs.

5.4.2 The oversight activities will use historical data or will continue to collect current data to establish benchmarks for the purpose of determining the risk profile of the individual or entity to be audited. This data will be recorded within the Operator's Risk Assessment File such that an accurate record of findings and subsequent mitigation action applied has reduced or eliminated the recognised finding for each certified operator. This risk profile will be used to decide whether any additional oversight activity is to be performed, and its frequency. States may consider the frequency of incidents and the involvement therein.

5.4.3 In addition to audit performance oversight activities, Appropriate National Authority may conduct spot checks (or any other effective means of gathering feedback) to determine stakeholder expectations, levels of satisfaction, and identify ways to improve oversight overall.

5.5 Surveillance Audit Checklist

5.5.1 Dangerous Goods entity shall design and develop Surveillance Audit Checklists for certified operators concerning the acceptance and carriage of Dangerous Goods including those not certified for the carriage of Dangerous Goods as specified in Annex 18, ICAO Technical Instructions and Supplement, IATA Dangerous Goods Regulations. The Surveillance Audit shall be carried out in

line with the checklist and any findings, other than issues not detailed in the checklist shall be treated and reported as 'observations' in the Audit Report.

5.5.2 The surveillance must consist of the below mentioned points:

- a) Inspector shall ensure that the operator has established the required manuals detailing the procedures required for the carriage of dangerous goods by air.
- b) An operator has developed and uses acceptance checklist as an aid to be in compliance with ICAO TI/IATA DGR Manual.
- c) Loading and stowage of Dangerous Goods on an aircraft is in accordance with the provisions of TI/IATA DGR Manual.
- d) Marking, Package, overpack or ULD (Unit Load Device) containing Dangerous Goods shall be inspected for evidence of leakage or damage before being loaded on an aircraft.
- e) Damaged ULDs shall not be loaded on aircraft.
- f) Loading restrictions inside passenger cabin or on flight deck is in compliance with TI/IATA DGR manual.
- g) Separation and segregation of Dangerous Goods is in compliance with TI/IATA DGR manual.
- h) Inspector shall ensure that the operator has ensured a structured provision of information regarding Notification to the pilot-in-command (NOTOC).
- i) Inspector shall ensure that the operator has defined the provision of information in the event of an aircraft accident/incident.
- j) Operators must secure dangerous goods cargo loads and protect the same from being damaged.
- k) Loading of radioactive Materials should be in compliance with TI/IATA DGR Manual.
- l) Packages of Dangerous Goods bearing "Cargo Aircraft Only" label shall be loaded in accordance with the provisions in the TI/IATA DGR manual.
- m) The operator/shipper must retain a copy of the Dangerous Goods transport document and additional documentation as specified in TI/IATA DGR manual.
- n) Inspector must verify the handling responsibilities if operator is availing services of external handling company.
- o) In case if the operator is availing services from subcontractor, it must verify the appropriate documents and operational manuals are provided to the same.
- p) Inspector must ensure that there is an inspection planned for authorized, non-authorized, national and foreign operators.
- q) Inspector must ensure that the passengers are warned as to the types of dangerous goods that they are prohibited or restricted from transporting aboard an aircraft.
- r) In case of radioactive shipments Air Operators/ Airport Operators/ Ground Handling Agencies shall ensure that these shipments are stored only in the area designated area

5.6 Inspection Procedures

5.6.1 Inspections are carried out at cargo facilities, on the apron, in passenger terminals and, occasionally, other places such as security checkpoints, shippers, freight forwarders, packaging manufacturers, at a frequency commensurate with the scale and nature of the operation. In addition, audit of procedure(s) includes visiting operator's or handling agent's premises, as appropriate.

5.7 Frequency of Inspections

5.7.1 The Technical Instructions does not specify the frequency of such inspections. However, the "Manual of Procedures for Operations Inspection, Certification and Continued Surveillance" ([Doc 8335](#)), produced by ICAO, recommends that all significant aspects of the operator's procedures and practices should be inspected at least once every twelve-month period. Consequently, states should consider inspecting all aspects related to dangerous goods of an operator engaged in the carriage of dangerous goods as cargo on an annual basis, as a minimum. Operators choosing not to

transport dangerous goods as cargo may be inspected at a less frequent rate. A judicious application of management of safety risks should be considered.

5.8 *How to Plan an Inspection*

5.8.1 Before an inspection is started, all information concerning the operator's procedures shall be inspected.

- a) Pre-Inspection: Examine all relevant operator information such as:
 - I. Operator file, or
 - II. Certification file (AOC)
 - III. Operator Manuals
 - IV. Occurrence report/s
 - V. Previous inspection records
 - VI. State Approvals
 - VII. Referral materials
 - VIII. Any other relevant carrier/company information available
- b) Site Inspection: When an inspection is scheduled, adequate notice should be given to advise the operator /handling agent and arrangements made for access to relevant areas. On some occasions, the inspection may be carried out without giving prior notice. However, this may not always be practicable or desirable.
- c) On arrival:
 - I. Inspector should introduce self to the representative of the inspected organisation and or provide a business card or show credentials, as appropriate;
 - II. State purpose of inspection and request name of appropriate person to contact;
 - III. Explain to appropriate person in-charge, reason for inspection and general inspection process;
 - IV. Ensure safety equipment meets carrier/company requirements;
 - V. Arrange for accompaniment of person in charge.

5.9 *Results of Inspections (Including Safety Risk Assessment)*

5.9.1 The results of a dangerous goods inspection are recorded so as to produce a record of what was seen and noted at the time. The record must be sufficiently comprehensive to identify any deficiencies, since these will need to be identified in a request to the operator to take action to remedy them. The request to the operator should include a time scale for taking remedial action (refer [Annex A](#)). If during an inspection an Inspector discovers a violation, his response will be determined by various factors which will warrant different courses of action.

5.10 *Safety risk assessment and hazard identification to transport Cargo, including Dangerous Goods in the cargo compartment*

5.10.1 The Dangerous Goods Inspector shall ensure that the operator carrying or not carrying Dangerous Goods (any Cargo) establishes policies and procedures for the transport of items in the cargo compartment, which include the conduct of a specific safety risk assessment. This risk assessment is part of the initial/renewal certification requirements. The risk assessment shall include at least the following:

- a) hazards associated with the properties of the items to be transported;
- b) capabilities of the operator;
- c) operational considerations (e.g. area of operations, diversion time);
- d) capabilities of the aeroplane and its systems (e.g. cargo compartment fire suppression capabilities);
- e) containment characteristics of unit load devices;
- f) packing and packaging;

- g) safety of the supply chain for items to be transported; and
- h) quantity and distribution of dangerous goods items to be transported

5.10.2 The CAA inspector shall ensure that the risk assessment provided by the Air operator is covering the above-mentioned items during the evaluation as well as the following:

- a) Clear understanding of hazards and their related consequences;
- b) Identification of hazards exist at all levels in the organization and for specified item transported;
- c) Consideration should be taken to the class of Dangerous Goods frequently transported;
- d) Special consideration to lithium batteries, undeclared dangerous Goods and COMAT;
- e) Consequences of the hazards identified: smokes, fumes, fire;
- f) Fire class attached to the type of fire in relation to the materials that are involved;
- g) Source of fuel and potential ignition sources such as Lithium batteries;
- h) Heat or ignition source, oxygen or oxidizing agent to be considered;
- i) The subsequent consequences of the fire must also be considered in the risk mitigation process.

Note: ICAO DOC 10102 provides additional guidelines in this context

6. ESTABLISHMENT OF DANGEROUS GOODS TRAINING PROGRAMME (CE 6 Licensing certification, authorization, and/or approval obligations, CE 7 Surveillance Obligations)

6.1 Introduction

6.1.1 A training programme includes elements such as design methodology, assessment, initial and recurrent training, instructor qualifications and competencies, training records and evaluation of the effectiveness of training.

6.1.2 The employer must establish and maintain a Dangerous Goods training programme for personnel performing any function described in the state's Guidance material to the aviation industry of the state.

6.1.3 The employer must establish and maintain a Dangerous Goods training programme for personnel who may not perform any function described in this WP but do perform functions related to the movement of cargo, baggage, passengers or mail. The aim of the programme is to ensure personnel are competent to perform functions aimed at preventing undeclared Dangerous Goods are not permitted from being carried on an aircraft.

Note: Security personnel who are involved with the screening of passengers and crew and their baggage and cargo or mail are required to be trained irrespective of whether the operator on which the passenger or cargo is to be transported carries dangerous goods as cargo.

6.1.4 All operators must establish a Dangerous Goods training programme regardless of whether or not they are approved to transport Dangerous Goods as cargo.

6.1.5 Training courses may be developed and delivered by or on behalf of the employer.

7. OBJECTIVE OF DANGEROUS GOODS TRAINING

7.1 Training as per need

7.1.1 The employer must ensure that personnel are competent to perform any function for which they are responsible prior to performing any of these functions. This must be achieved through

training and assessment commensurate with the functions for which they are responsible. Such training must include:

- a) General awareness/familiarization training — Personnel must be trained to be familiar with the general provisions;
- b) Function-specific training—Personnel must be trained to perform competently any function for which they are responsible; and
- c) Safety training — Personnel must be trained on how to recognize the hazards presented by dangerous goods, on the safe handling of dangerous goods, and on emergency response procedures.

7.1.2 Personnel who have received training but have been assigned to new functions must be assessed to determine their competence in respect of their new activity. If competency is not demonstrated, appropriate additional training must be provided.

7.1.3 Personnel must be trained to recognize the hazards presented by Dangerous Goods, to safely handle them and to apply appropriate emergency response procedures as per ERM.

7.1.4 Upon successful completion of the dangerous goods training, a person shall be able to:

- a) Fully understand and differentiate between shipper's and operator's responsibilities;
- b) identify all dangerous goods which are:
- c) forbidden for air transport; or
- d) permitted as cargo in accordance with the Technical Instructions; or
- e) excepted from the requirements of the Technical Instructions.
- f) identify the nine classes of dangerous goods by their principal criteria;
- g) extract the relevant information from the List of Dangerous Goods and apply it;
- h) comprehend and apply the packing instructions;
- i) properly mark and label a dangerous goods package and verify that the marking or labelling requirements have been met;
- j) complete a dangerous goods transport document and verify that the information provided thereon complies with the Technical Instructions.
- k) using an acceptance checklist, correctly accept or reject a shipment;
- l) comprehend and apply the separation and segregation requirements;
- m) comply with the requirements for providing the pilot-in-command
- n) with the pertinent information on the dangerous goods on board the aircraft;
- o) recognize and apply the appropriate State and/or Operator variations; and
- p) apply relevant customized emergency procedures as per ERM.

7.2 Recurrent Training and Assessment

7.2.1 Personnel must receive recurrent training and assessment within 24 months of previous training and assessment to ensure that competency has been maintained. However, if recurrent training and assessment is completed within the final three months of validity of the previous training and assessment, the period of validity extends from the month on which the recurrent training and assessment was completed until twenty-four (24) months from the expiry month of that previous training and assessment.

Note: An example would be the following: If recurrent training is required by the end of May 2023, then any training occurring between March 2023 and the end of May 2023 will result in a new recurrent training date of May 2025.

7.3 Training and Assessment Record

7.3.1 The employer must maintain a record of training and assessment for personnel.

\

7.3.2 The record of training and assessment must include:

- a) Name of the individual;
- b) The month of completion of the most recent training and assessment;
- c) A description, copy or reference to training and assessment materials used to meet the training and assessment requirements;
- d) The name and address of the organization providing the training and assessment; and
- e) Evidence which shows that the personnel have been assessed as competent.

7.3.3 Training and assessment records must be retained by the employer for a minimum period of thirty-six (36) months from the most recent training and assessment completion month and must be made available upon request to personnel or the Appropriate National Authority's inspectors.

7.3.4 The training records for the CBTA approach shall be as per state regulations.

7.4 *Approval of Training Programmes using the CBTA Approach*

7.4.1 Dangerous Goods training programmes for operators shall be approved by the Appropriate National Authority in accordance with the Civil Aviation regulations.

7.4.2 Training providers are certified as per state regulations.

7.4.3 A safe and efficient air transport system is dependent upon a competent workforce. ICAO has recognized that this can be achieved through the implementation of a competency-based approach to training and assessment. The Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Doc 9284, "Technical Instructions") require that employers ensure personnel are competent to perform any function for which they are responsible prior to performing it. A competency-based approach to training and assessment is an effective way to ensure this requirement is met;

7.4.4 The applicable regulation/s of the state shall require operators involved in the transport of Dangerous Goods to train their employees using the competency-based training and assessment approach prior the mandated date 1st January 2023;

7.4.5 The next section provides guidance in implementing a competency-based approach to dangerous goods training and assessment for personnel involved in the transport of cargo, mail, passengers and baggage by air.

7.4.6 The Appropriate National Authority may utilise the Attachment B of Part S-7 of Chapter 8 of ICAO TI (Doc 9284) Supplement as a checklist to document and approve DG training programmes.

8. COMPETENCY BASED TRAINING AND ASSESSMENT (CBTA) APPROVAL PROCESS

8.1 *Application for Approval*

8.1.1 An application to grant an approval for establishment of a Dangerous Goods Training Programme shall be made to the Appropriate National Authority following the road map set in the state regulations as established/amended.

8.1.2 The application shall be accompanied by the Dangerous Goods Training Manual or equivalent and shall include, in addition to any other relevant information, the following details:

- a) Name of the training organization;
- b) Functions of personnel to be trained (as mentioned in this guideline and the Appropriate National Authority provided tool).
- c) Particulars of the classroom/virtual/CBT/Online this facilities and training aids;
- d) Description of the training materials to be used to meet the training requirements.

- e) Names, qualifications and experience of the senior Instructor and other Instructors;
- f) Maximum number of participants to be enrolled in a class; and
- g) The frequency at which the course is likely to be conducted;

Note: The application form should be published on the Appropriate National Authority's website

8.2 Documentation Evaluation: Dangerous Goods Training Manual or Equivalent

8.2.1 The application form shall be submitted with the supported Documents such as the training manual. The Dangerous Goods Training Manual, (hereinafter Manual) shall, in addition to any other relevant information, contain the following chapters, namely:

- a) Introduction
- b) State's legal regime on carriage of dangerous goods by air
- c) Categories/Functions of personnel to be trained
- d) Qualifications and experience of the instructors
- e) Course Objective
- f) Course Structure/Methodology
- g) Course Contents
- h) Course Schedule/outline
- i) Lesson Plan
- j) Assignments/Exercises
- k) Model Examination Papers (3 sets)
- l) Course Evaluation
- m) Specimen Certificate
- n) Maintenance of Training Records
- o) Instructor Qualification and maintenance

8.2.2 The terms to be used in the Manual shall be in line with those defined in the Technical Instructions and the state Civil Aviation regulations.

8.2.3 A system shall be developed to review and revise the Manual so as to incorporate the amendments, as and when issued, to the provisions of Annex 18 to the Chicago Convention, the Technical Instructions (Doc. 9284 AN/905), the state regulations and the state variation/s (if any), and any other related document. A copy of the Manual so revised shall be submitted to the Appropriate National Authority immediately for concurrence/approval.

Note: The Compliance check list (once established) shall be used by the operators to submit all phases regarding the CBTA.

8.3 Instructor Qualifications and Competencies

8.3.1 To teach effectively, an instructor would need to demonstrate many competencies, and personnel who are nominated/allocated to take up instructing duties should be adequately trained. For competency-based training, the instructors would specifically require:

- a) To instruct on the basis of the training plan and associated training materials. The training plan details the structure and order of the training, which is directly linked to the requirements of the assessment plan.
- b) To understand the merits of and provide timely and continuous feedback on trainee performance. Feedback is an important component of learning that helps the trainees to progress towards the interim and final competency standards. Feedback may be positive to reinforce desirable performance, or it may be information about how a trainee's performance differs from the standard. Feedback should be supportive and timely, and trainees should finish each session with a clear understanding of what they need to do to progress.

- c) To use the adapted competency model to identify the root cause(s) of performance related challenges/lags. The adapted competency model, particularly the performance criteria, helps the instructor to analyse a trainee's performance and identify which competencies have not yet been fully mastered. For example, a trainee is routinely becoming overloaded and as a result starts to make poor control decisions. The instructor could easily begin by focusing exclusively on correcting the poor control decisions, however, with the aid of the adapted competency model, the instructor may consider identifying a wider number of possible performance issues that could be the root cause affecting the trainee's performance, including, but not limited to the following:

- I. the trainee's failure to make use of the tools and equipment that increase efficiency;
- II. the trainee putting too much focus on the use of the tools and equipment and thereby digressing or not focussing enough upon the situation;
- III. the trainee is not fully familiar with the standard procedures and is spending significant amount of time to think and work out the modalities of what to do; and/or
- IV. the trainee is not taking appropriate action to ensure that demand does not exceed capacity.

If the instructor in the above example focusses only on correcting the trainee's control actions when in reality the problem is incompetent use of the tools available to increase efficiency, the problem is likely to persist, and very slow progress will be made.

- d) To recognize the challenges associated with instructing and diagnosing deficiencies in the cognitive processes, it is not possible to observe what a trainee is thinking, so it is difficult to monitor the development of competencies such as situational awareness, problem-solving and decision-making, etc.
- e) At best, the instructor can observe the trainee's performance and infer from the outcomes that the trainee's strategies, problem-solving and planning are effective. However, without any further exploration of the trainee's thinking, it is also possible that the observed outcomes were achieved by chance. To address this challenge, instructors may ask their trainees to explain their control plan prior to carrying it out, their reasons for performing certain actions, or their priorities at a particular moment in time. Of course, the instructor should recognize when it is appropriate to ask these questions and when it would distract the trainees from their tasks.
- f) The instructor should also recognize that the questions must be appropriate for the phase of training being conducted, for example, it is unlikely that the questions asked of new trainees who have just started their first training at a unit would be the same as the questions asked of experienced personnel who are undertaking conversion training onto a new system. If it is not possible to ask these questions during the training session, the instructor should save these discussions for the debriefing afterwards. Getting insight into how the trainee is thinking will help the instructor to diagnose if a problem with competencies needs to be addressed.
- g) To manage issues related to attitude, it is usually identified in the adapted competency model and elaborated in the evidence guide. Instructors should use the evidence guide to identify attitudinal issues. They should be able to employ the appropriate technique(s) to support trainees in acquiring or adjusting attitudes (e.g. coaching, mental fitness).

current Dangerous Goods Regulations certificate in the applicable category commensurate with his/her training delivery along with the training skills certificate.

8.3.3 The approval process shall comprise of the following:

- a) **Step 1:** Application and submission of the documentation required;
- b) **Step 2:** Evaluation of the application and documentation submitted;
- c) **Step 3:** Demonstration by the instructor a lecture under the supervision of the Appropriate National Authority Inspectors or designated personnel;
- d) **Step 4:** Issuance of Approval letter/certificate.

8.3.4 The instructor conducting the Dangerous Goods training must have the following qualifications:

- a) For all categories of dangerous goods, the instructor must hold current certification in DGR CAT 6 and IATA Professional Skills for Dangerous Goods Instructors training.
- b) For Category 6 Instructor, a minimum of five (5) years working experience in Air cargo operations, with a minimum of three (3) years in acceptance, handling and loading of dangerous goods including providing the NOTOC (Notification to the Captain) to the flight crew of an aircraft. Member states can establish their own Instructor qualification criteria based on the national competency matrices.
- c) Category 6 Instructor who is not in compliance with requirement under section 8.3.4(b), shall undertake a practical familiarization in acceptance, handling and loading of dangerous goods including providing the NOTOC (Notification to the Captain) to the flight crew of an aircraft under a senior DGR Category 6 DGR instructor and experienced operations staff. The content and duration of the practical familiarization shall be documented and submitted to Appropriate National Authority for approval.
- d) Instructors shall demonstrate Dangerous Goods Regulations adequate technical knowledge in the category/job function related to his/her training responsibilities and instructional skills to Appropriate National Authority officials.
- e) The dangerous goods instructors shall undergo a simulated or a practical activity every three (3) years in the function related to his/her training responsibilities.

8.3.5 In addition to the above prior to the approval, for conducting the Competency Based Training and Assessment Dangerous Goods Training which shall be in force on 1st January'2023 instructor shall have the following qualifications:

- a) Competency based Training Instructors shall demonstrate "advanced" proficiency level related to the functions they are dealing with according to the Level of Proficiency in Terms of Competency Factors;
- b) Trainee Dangerous Goods instructor using Competency Based Training and Assessment Dangerous Goods Training shall undergo the following process:
 - I. Observation: Observe a course in the same function to be approved for, with a senior instructor;
 - II. Interaction: Prepare a course in the same function to be approved for with a senior instructor; and
 - III. Lead: Conduct, lead and establish a full training and assessment program for functions to be considered in his qualification.

8.3.6 To maintain their qualification, dangerous goods instructors shall comply with the following:

- a) Instructors delivering initial and recurrent dangerous goods training shall at least every 24 months deliver two (2) training courses as a minimum, the training conducted shall be in the function/category in which he has been approved;

- b) or in the absence of point mentioned above, attend a recurrent training in the function/category in which the instructor has been approved.

8.3.7 The process determined in accordance with state regulatory mandates (qualification of instructor) shall be documented in the Training manual and subject to approval by the Appropriate National Authority.

8.3.8 Evidence of all the above-mentioned requirements shall be provided.

9. CERTIFICATION OF FREIGHT FORWARDERS & DG AGENTS (CE 6 Licensing certification, authorization, and/or approval obligations, CE 7 Surveillance Obligations)

9.1 Application

9.1.1 Freight Forwarders, acting on behalf of a shipper and located in and operating from the state, shall be certified by the Appropriate National Authority for the handling of dangerous goods.

9.1.2 Ground Handling Agencies, acting on behalf of an operator and located in and operating from the state, shall also be certified by the Appropriate National Authority for the handling of dangerous goods.

Note: The certification process for Freight Forwarders and Ground Handling Agencies may be the responsibility of another entity within the regulatory framework of the state and is included here for ready reference of the Inspector's information only. Should an audit be requested, it shall be conducted by an Inspector from the designated office of the Appropriate National Authority and recommendations for issuance/non-issuance made to the licence issuing entity.

9.1.3 The requirements for the issue of a certificate are as follows:

- a) An application to be submitted for DG certification on Appropriate National Authority's Form/process or enclosing copies of current training certificates of at least two staff members and a cheque of payment for the annual fee (if any);
- b) Absence of any previous offence which could have led to the revocation of the certificate.
- c) Sufficient staff possessing current DG training certificate (ab-initio or biennial refresher) issued by the Appropriate National Authority approved DG training facility.
- d) Clearance of any discrepancies identified during an inspection of the agency by the Appropriate National Authority;
- e) Unless already procured, the agency must obtain or shall have access to;
 - I. State Regulations
 - II. ICAO Technical Instructions for the Transport of Dangerous Goods by Air (current edition); or
 - III. IATA DG Regulations (current edition).

9.2 List of Appropriate National Authority Certified Agencies

9.2.1 Freight forwarding and ground handling agencies which meet the certification requirements of this section shall be placed on Appropriate National Authority's Certified DG Agencies List.

9.2.2 Freight forwarding and ground handling agencies which have licence/permission/certification suspended or revoked due to incident/ accident involvement are removed from the listing until investigation is over.

9.2.3 Freight forwarding and ground handling agencies which fail either of the following conditions are removed from the listing until such time they comply with the requirements.

- a) maintain the minimum number of required DG trained staff members; or
- b) do not renew their DG Acceptance Certificate;

9.2.4 The Appropriate National Authority may wish to maintain this list but will amend the listing based on recommendation from the licence issuing authority (after audit) to either add or remove an agency from it.

9.2.5 The amended list is then sent to all airport/s, air Cargo warehouse operators/handlers and Ground Handling Agencies with a covering letter.

9.2.6 The affected freight forwarding, and ground handling agency is informed in writing of its addition/deletion from the listing.

Note: Inspectors may wish to maintain a copy of this list in coordination with the issuing authority.

10. CONSIGNMENT INSPECTION AT CARGO FACILITIES (Package and Documents)

10.1 General

10.1.1 The aim of checking consignments of dangerous goods is to determine that, as far as can be ascertained from an external check, the packages and their associated documents comply with the requirements; it also aims to determine, as far as possible, that associated documentation (e.g., air waybill, shipper's declaration, acceptance check list, written notification to commander) meets all applicable requirements.

10.1.2 A consignment inspection consists of a package inspection and a documents inspection. Consignment inspections are carried out, also to determine whether or not the operators/handling agent's procedures are being followed. Inspections are carried out in the operator's or handling agent's premises and after the dangerous goods have been accepted for transport or whilst they are still in the care of the operator or handling agent.

10.1.3 Both export and import consignments are to be inspected, with the added emphasis on export consignments, since, if a consignment is found which does not comply with the requirements, action can be taken to prevent it from being loaded on an aircraft and investigation made into how it was offered for transport and accepted in the state in which it has been found.

10.1.4 Import consignments are also to be checked, since although they have been carried by air, the finding of evidence of non-compliance with the requirements needs to be reported to the State where the goods were originally loaded on an aircraft.

10.1.5 If a consignment inspection is part of an in-depth inspection, check there are procedures in place that are suitable for handling dangerous goods, given the nature and scale of the operation, including recurrence of training, acceptance procedures, notices at cargo acceptance points, loading procedures and provision of information (manuals, NOTOC, emergency response guidance).

10.1.6 When an inspection is scheduled, adequate notice should be given to advise the operator/handling agent and arrangements made for access to relevant areas. In certain cases, the inspection may be carried out without giving prior notice as an Ad-hoc oversight/quality control measure. However, this may not always be practicable or desirable. If the inspection is unannounced, the senior most official on duty responsible for operational functions should be contacted and informed of the inspection. It should be confirmed which consignments are available for inspection and, if necessary, a final decision be made on what will be checked.

10.2 Package Inspection

10.2.1 A package inspection comprises of a visual inspection of the external appearance of all the packages of dangerous goods currently held by the operator or handling agent, irrespective of whether they are due for transport or have been transported, providing they are still in the operator's or handling agent's custody.

10.2.2 The inspection will check that the marking and labelling requirements have been met, that the type of packaging used is permitted and of the correct specification, for radioactive material packages the radiation level and that the packages are, or would appear to have been, in a safe and acceptable state for transport by air.

10.3 Document Inspection

10.3.1 A document inspection is to determine, as far as possible, that a dangerous goods consignment meets all applicable requirements. Information is contained in several documents and to transport the same a thorough check is necessary to cross referring the same with each other is necessary.

10.3.2 Where the operator or handling agent has stored packages of dangerous goods within their premises, the associated documents are to be checked. Wherever there is no package available for inspection, a check of all relevant DG transport documents shall suffice. The method is to look at the documents of every consignment that was carried during a specific period. For export consignments, the documents that need to be inspected are as follows:

- a) The Air Waybill;
- b) The Dangerous Goods Transport Document (Shipper's Declaration);

Note: The purpose of inspecting the Air Waybill, Dangerous Goods Transport Document and other documents relating to a consignment is to ensure that they have been completed correctly and that, as far as can be ascertained, the correct classification and method of packing was used.

- c) The Acceptance Check List;

Note: The Acceptance check list is inspected to establish that the operator or handling agent uses a form or other system which allows for completion by the acceptance clerk, either manually or mechanically, and that consignments of dangerous goods were accepted in accordance with the requirements or that any errors were correctly identified.

- d) The Notification to Captain/Commander (NOTOC);

Note: The Notification to Captain/Commander (NOTOC) is checked to establish that all the required information was given, that the form was correctly signed and that the loading /stowage requirements were met.

- e) Other documents relating to a consignment that may assist in assessing it.

11. RAMP INSPECTION (LOADING AND STOWAGE)

11.1 General

11.1.1 Ramp inspections take place on or adjacent to an aircraft and sometimes, also in a warehouse/freight shed prior to loading, with the aim of checking that the operator has prepared the DG consignment for loading and or loaded the aircraft according to the principles of the Technical Instructions, including the training for the crew (both flight and cabin crew, if appropriate), that all required manuals/staff instructions, etc., are on board and up-to-date and that any necessary approvals/exemptions are being carried and the conditions on them have been complied with.

11.1.2 A ramp inspection is likely to comprise primarily with confirming that loading and stowage of dangerous goods meet the requirements of ICAO Technical Instructions.

11.2 Loading and Stowage

11.2.1 An inspection on loading and stowage includes ensuring that dangerous goods are adequately secured to prevent movement during the flight, as well as to ascertain that any radioactive material has been stowed as per the required and duly maintained segregation distances and that any cargo aircraft only dangerous goods are on the main deck and accessible on a freighter aircraft as per the requirements of the Technical Instructions; and that toxic or infectious substances are not in close proximity to live animals (AVI) or foodstuffs (EAT).

11.3 Training of Crew

11.3.1 An inspection on training for flight crew and cabin crew consists of talking and or interviewing the crew in the form of representative selection from the group asking for details of their last training, with open ended questions such as when it was and who carried it out. Subsequently, the names of crew members interviewed should be recorded and the operator should be advised to provide the details of their training records.

11.3.2 The training inspection should also confirm that both flight and cabin crew understand what actions to take in the event of emergencies whilst the aircraft is in flight, as required by the Technical Instructions.

12. PASSENGER INFORMATION INSPECTION (WARNING NOTICES)

12.1 General

12.1.1 The Technical Instructions requires that the operator (or his handling agent) provide information for passengers about the types of dangerous goods forbidden from transporting aboard aircraft. This information must consist of notices, warning passengers of the prohibition on dangerous goods in baggage, to be prominently displayed and in sufficient numbers so that passengers see them during their normal progression through departure procedures.

12.1.2 The aim of inspecting information provided for passengers is to ascertain those operators (or their agents) are providing such information. The method of inspecting notices is to check those areas in terminals where the operator (or his handling agent) issues tickets, checks in passengers and assembles them to board an aircraft.

12.1.3 The inspection should confirm that notices are at the required places (check-in desks, ticket sales desk and operator-maintained aircraft boarding areas including websites). Notices should be conspicuous and in sufficient number so as to be seen by passengers during their normal progression through the check in procedures through to departure.

12.1.4 The method of inspecting warning material in or with tickets is to ask to look at passenger's tickets or during the web based online check-in portals to be demonstrated by the operator. Passengers must be assured that the inspection concerns operator's responsibilities and in no way directly involves them.

Note: With e-ticketing the terms and conditions for the carriage of dangerous goods should be part of the purchase arrangement.

13. APPROVAL TO CARRY DANGEROUS GOODS & EXEMPTION IN SPECIAL CIRCUMSTANCES

13.1 Conditions and Special Provisions

13.1.1 Whilst the Civil Aviation Authority or the Appropriate National Authority of the state issues a general approval to freight forwarders, handling gents and foreign air operators, one off

approvals or exemptions for the transport of certain classes of dangerous goods which are normally forbidden on passenger aircraft and/or cargo aircraft may be issued by the Appropriate National Authority. Those dangerous goods are identified in Table 3-1 of the ICAO TI by Special Provision A-1, A-2 or A-109 and may include the carriage of:

- a) Transportation of Arms, Ammunition and Explosives
- b) Transport of Forbidden Dangerous Goods
- c) Radioactive Material

13.1.2 The state may offer to propose as a rule that the operator shall inform the Appropriate National Authority of their intention before transportation of dangerous goods by air, by sending an application/letter/email for an authorisation to transport Dangerous Goods in special circumstances. The Technical Instructions make a distinction between exemption and approval and define them as:

- a) **Exemption:** An authorisation issued by the appropriate authority providing relief from the provisions of the Instructions
- b) **Approval:** An authorisation issued by the appropriate authority for:
 - I. transport of those entries in the dangerous goods list which are forbidden on passenger aircraft and/or cargo aircraft and to which Special Provision A1, A2 or A109 has been assigned; or
 - II. other purposes as specified in the Technical Instructions Supplement under chapter 1 of S-1.

13.1.3 In case of extreme urgency or when other form of transport is inappropriate or full compliance with the prescribed requirements is contrary to the public interest, the Appropriate National Authority may grant exemptions as per the provisions provided that in such cases every effort shall be made to achieve an overall level of safety in transport which is equivalent to the level of safety provided by the state regulations. For over-flight, if none of the criteria for granting an exemption are relevant, an exemption may be granted based solely on whether it is believed that an equivalent level of safety in air transport has been achieved. The applicant will need to demonstrate that an "equivalent level of safety" can be achieved and the approval or exemption must contain whatever conditions are necessary to ensure that level of safety, in addition to any conditions which the Technical Instructions identifies as being required on any approval or exemption.

13.1.4 Any conditions on other approvals or exemptions granted by other States concerned in the flight are be reflected on the approval or exemption granted, in order to avoid conflicting requirements. The approvals or exemptions are usually valid for short periods, for a single flight or short series of flights, although if the need arises, they can be granted for longer periods of time. The Technical Instructions contains a system of granting approvals for the carriage of some dangerous goods which are forbidden in normal circumstances on either passenger aircraft or both passenger and cargo aircraft. This system permits these goods on aircraft with an approval granted by the State of Origin.

13.1.5 The approval can only be granted if the method of packing and the quantity per package is in accordance with that set down in the Technical Instructions or the Supplement to the Technical Instructions and these conditions need to be stated on the document of approval which is issued. These approvals are usually valid for short periods, for a single flight or short series of flights, although if the need arises, they can be granted for longer periods of time. After an approval or exemption has been granted, circumstances may arise when all or some of the conditions on it are no longer valid and a variation may be needed; this will vary that part of the original approval or exemption which has changed. Only if some time has elapsed since the original approval, etc., was granted or there is a major difference between what was originally requested and what is now sought is a complete reissue of it to be considered.

14. DANGEROUS GOODS ACCIDENTS AND INCIDENTS (SSP Component 2 State Safety Risk Management)

14.1 Introduction

14.1.1 Each State must establish procedures for reporting, investigating and compiling information concerning dangerous goods accident and incident which occur on its territory, and which involve the transport of dangerous goods originating in or destined for another State.

14.1.2 Dangerous Goods accidents and incidents need to be recorded and investigated to establish their cause in order to discover, among other things, if the requirements of the Technical Instructions are inadequate or there has been a violation.

14.1.3 It is also recommended that the member State participate in cooperative efforts with other States concerning violations of dangerous goods regulations with the aims of eliminating such violations.

14.2 Reporting of Dangerous Goods Accidents and Incidents

14.2.1 As required by the ICAO Technical Instructions, “An operator must report dangerous goods accidents or incidents to the authorities of the State of the operator and the State in which the accident or incident occurred in accordance with the reporting requirements of those authorities”. A suspected violation of the requirements (undeclared or mis-declared dangerous goods) must also be reported to the appropriate authorities of the State of the operator, or the State in which it occurred.

14.2.2 When a report is received of a dangerous goods accident or incident it must be checked as quickly as practicably possible to confirm that all relevant details have been reported. If any details are missing, the reporter should be asked to provide them as soon as they are available.

14.2.3 A review will be undertaken of all information currently available in order to establish what action needs to be taken. Wherever a decision has been made that the situation does not necessitate any further action or action is not possible at that stage, the record is annotated to show the same. The review will aim to establish whether or not the incident is regarded as serious (i.e.: there is evidence of non-compliance with the Technical Instructions such that there was a potentially unsafe situation) or not serious (e.g.: misunderstanding of the requirements but not resulting in a potentially unsafe situation).

14.2.4 The aim of investigating a dangerous goods accident and incident is to establish its potential seriousness and determine the cause so that action can be taken to prevent a recurrence. Moreover, any other State from which, or through which, the dangerous goods travelled needs to be notified quickly of all relevant details, particularly if it seems likely that persons in that State may have been exposed to the dangerous goods.

14.2.5 To aid the reporting of dangerous goods accidents and incidents by operators please refer to Part S-7, Chapter 4 of ICAO TI (Doc 9284) Supplement. A sample [DG Accident/Incident Reporting Form](#) is hereby made available by the participating states of (Kingdom of Bahrain and the Sultanate of Oman) responsible for this WP, for the benefit of member states, which may be utilised to encourage the Operators to report.

14.3 Investigating of Dangerous Goods Accidents and Incidents

14.3.1 As required by Annex 18, with the aim of preventing the recurrence of dangerous goods accidents and incidents, Appropriate National Authority shall establish procedures for investigating and compiling information concerning such accidents and incidents which occur on its territory, and which involve the transport of dangerous goods originating in or destined for another State.

14.4 *Dangerous Goods Accident*

14.4.1 A dangerous goods accident is a very serious occurrence and may involve air accident investigators. If there has been a dangerous goods accident any request for information or assistance from other organizations must be dealt with immediately. Any request from another State for details about the dangerous goods on board an aircraft involved in an accident in that State must also be dealt with immediately.

14.4.2 The State in which a dangerous goods accident occurs involving goods originating in or destined for another State must institute an investigation into the circumstances of the accident.

14.4.3 If it becomes known or is suspected that dangerous goods were a causative factor in an aircraft accident, any dangerous goods investigation shall be coordinated with the air accident investigation team.

14.4.4 The recording and investigation of dangerous goods accidents as detailed in the Supplement to the Technical Instructions, Part S-7.4 shall be observed at all times.

14.5 *Dangerous Goods Incident*

14.5.1 The State in which a dangerous goods incident occurs involving goods originating in or destined for another State must transport out an investigation into the circumstances of the incident such as is considered appropriate to its seriousness.

14.5.2 Preliminary enquiries will be made to establish what has happened, who is involved and what evidence is available. The enquiries will identify if the incident warrants investigation by professional investigators with the aim of securing evidence for prosecution. If professional investigation is not justified or not possible (e.g.: all evidence needed is not available), a detailed investigation still needs to be carried out. The process shall be thorough, to confirm the cause and identify the organizations or individuals responsible for the incident.

14.5.3 When making preliminary enquiries it must be determined whether the dangerous goods in their current state are a danger to persons. If the above is established, arrangements must be made to either make them safe, or dispose of as quickly as possible, using expert assistance. If an investigation is to be made of the dangerous goods, it is essential that personal safety be taken into account, since many dangerous goods have the potential to cause permanent harm/injury. Protective clothing must be worn, including gloves and goggles. Although it is important to confirm identification of the dangerous goods, this should not be done if in order to do so there is a risk of personal injury.

14.5.4 Upon completion of an investigation of a serious incident, a report shall be produced outlining the details of the incident, the findings of the investigation and recommended action. The report will be reviewed to determine what further action has to be taken. If the investigation shows that the requirements of the ICAO Technical instructions were inadequate or to prevent the recurrence of similar incidents, a report of the incident must be forwarded to ICAO and to the other States concerned. For import consignments, a copy of the report must be sent to the State of Origin and any other State involved in transfer or transit of such DG. For export consignments, if the report has evidence of wrongdoing such that penalty action is justified against those responsible, this must be initiated.

14.6 *Recording of Dangerous Goods Accidents and Incidents*

14.6.1 A record is to be maintained of all reported dangerous goods accidents and incidents. The aim is for the record to be kept in such a way that all relevant details are included for each accident and incident, so as to provide a permanent record of all reportable accidents and incidents, to allow for a review to establish the cause, to facilitate reporting to other involved States and to allow analysis to establish weaknesses in the requirements or trends. The record can be used also to establish if a

particular shipper, operator, agent, etc., is involved in numerous reported incidents and presents a valid justification for an in-depth investigation.

14.6.2 Details of an accident or incident are to be entered into the record as soon as possible, even if initially few details are known; it is to be up-dated as additional information becomes available. The record will indicate when all action on an accident or incident is complete, and a review made at regular intervals to identify any outstanding action. Past records are not destroyed but may be archived, providing they can be retrieved if the need arises.

14.7 Cooperation between States in the investigation of DG Accidents and Incidents (SSP component 4 State Safety promotion: internal and External communication and dissemination of safety information)

14.7.1 Annexe 18, Section 11.2 recommends that Contracting States should participate in cooperative efforts with other States concerning violations of dangerous goods regulations, with the aim of eliminating such violations. It is envisaged that cooperative efforts include coordination of investigations and enforcement action, exchanging information and joint inspections.

14.8 The Aims of Cooperation between States

14.8.1 States need to cooperate in the investigation of occurrences in order to establish what has happened, take remedial action if required and deal with an entity responsible for the violation.

14.8.2 States need to demonstrate that they are jointly in control of the response to the occurrence so that a suspected violator cannot try to exploit any situation where one enforcing agency takes a different or more lenient view of an investigation than the other.

14.8.3 Cooperation between States is needed to ensure all the relevant information about an occurrence is identified, so that correct decisions can be made as to the measures needed to deal with it and prevent any recurrence.

14.8.4 Cooperation is also needed to ensure that where a violator is identified, it is possible to take action, notwithstanding the State where the entity responsible for the violation is situated and penalties could be imposed.

14.9 Liaison and Cooperation between States

14.9.1 Wherever possible, States should liaise and cooperate with other States on a regular basis, so that the members of the enforcing agencies know the persons to contact in the event of an occurrence and who they would be dealing with in any investigation. A list of National Authority for DG by Air is available through this [link](#).

14.9.2 If no contact has been established with other member States and it is necessary to report an occurrence to them, assistance of ICAO may be sought in regard:

International Civil Aviation organization
Dr. Katherine Rooney
Chief, Cargo Safety Section
E-mail: CSS@icao.int

15. PASSENGER PUBLIC AWARENESS PROGRAMME

15.1 Introduction

15.1.1 Each State must ensure that information is promulgated in such a manner that passengers are warned as to the types of dangerous goods they are prohibited or restricted from transporting aboard an aircraft.

15.1.2 In addition to the mandatory information that must be promulgated by operators, State should encourage all agencies involved in air transport to assist in raising the level of public awareness of the risks of dangerous goods in air transport.

15.2 Awareness Plan Achievement

15.2.1 A Dangerous Goods Awareness Plan should be designed to increase public knowledge in the safe transport of dangerous goods.

15.2.2 Providing information to the travelling public may be achieved through the assistance of all agencies involved in air transportation.

15.3 Avenues of Communication

15.3.1 Several avenues of communication are available to assist States in raising the level of public awareness of the risks of transport of dangerous goods by air. This could be achieved through the following:

- a) Travel agents
- b) Tour operators
- c) Airport authorities
- d) Aircraft operators
- e) Sports Associations
- f) Outdoor Associations
- g) Publication in newspapers
- h) Magazines
- i) Trade publications
- j) Newsletters
- k) Websites
- l) Exhibits at trade shows
- m) Conferences.

15.4 Passenger Public Awareness Devices

15.4.1 There are number of methods that may be used to convey easy to understand information to the public regarding restrictions or prohibitions associated with the transport of dangerous goods in passenger carry-on and checked-in baggage or on the person. Some passenger-public awareness methods/tools are as follows:

- a) Posters
- b) Brochures
- c) Display cabinets
- d) Electronic media
- e) Handouts
- f) Websites
- g) Information articles
- h) Advisory bulletin.

15.5 Availability of Materials for Passenger Public Awareness Programme

15.5.1 The ICAO Technical Instructions Supplement, Appendices to Part S-8 illustrates some examples of material that may be used for a passenger public awareness programme. Some industry websites also cater to the passenger awareness information and are also available from ICAO Dangerous Goods Panel Secretary. The artwork for some of the above methods is available with ICAO, alternatively for further information the State may contact:

Dr. Katherine Rooney
Chief, Cargo Safety Section
E-mail: CSS@icao.int

16. SOURCE OF ADDITIONAL INFORMATION

16.1 Introduction

16.1.1 Each State should participate in cooperative efforts with other Appropriate National Authorities concerning the transport of dangerous goods with the aim of eliminating violations of the regulations as other regulations might have an impact on the safe transport of Dangerous Goods by air. Cooperative efforts could include joint inspections, technical liaisons, exchange of information and joint meeting and conferences. Participation by the industry stakeholders and other regulatory bodies is paramount. Appropriate information that could be exchanged includes safety alerts, bulletins or advisory, incident reports, and educational/outreach materials suitable for public dissemination.

16.2 Cooperation

16.2.1 Please refer to [14.7](#) , [14.8](#) and [14.9](#) for international cooperation between states.

16.3 Objectives

16.3.1 Participation towards development of recommendations for amendments to ensure implementation within the state's regulations governing Dangerous Goods.

16.3.2 To develop and approve documentary requirements and procedures for the handling and processing of dangerous goods.

16.3.3 Providing for a forum allowing member airlines to exchange and develop information specific to the transport of dangerous goods contained in company material (COMAT) with regular meetings at regular intervals, as appropriate, between the participating agencies, wherein inter-alia, the promotion of an open dialogue with operators throughout the state to ensure safe and compliant operations should be encouraged.

16.3.4 Implementing a strategy for effective dangerous goods training standards within the state based on industry best practice for operators, Ground Handling Agents (GHA) and freight forwarders

16.3.5 Developing checklists and other tools to be used in establishing "proof of compliance" checks for dangerous goods safety standards in accordance with the state regulations and ICAO Technical Instructions.

16.4 Dangerous Goods Websites

16.4.1 Appropriate National Authority should endeavour to provide updated information to the industry pertaining to state specific requirements regarding authority and or limitations using a public website:

- a) Overview of Appropriate National Authority for Safe Transportation of Dangerous Goods and associated programme
- b) Provisions for dangerous goods carried by passengers focussed upon public awareness.
- c) National regulations on the transportation of dangerous goods by air
- d) Relevant and applicable amendments to regulatory documents
- e) Newsletter and necessary additional information (e.g. safety bulletins etc.)
- f) Links to ICAO, IATA and or other dangerous goods related websites (government, associations, industry).
- g) A set of Frequently Asked Questions and Answers

- h) List of contacts either of Government contacts or resources associated with the industry within the state.
- i) Dangerous goods primer addressing the following areas:
 - I. Dangerous goods definitions
 - II. Training
 - III. Classification, proper shipping names and UN numbers
 - IV. Quantity limitations
 - V. Packaging standards
 - VI. Marking and labelling
 - VII. Documentation

17. ANNEXES (SAMPLE CHECKLISTS: FREIGHT FORWARDERS AND CARGO AGENTS)

17.1 Annex - A

DGR Inspection LOG														
Sl. No.	Freight Agency / Aircraft Operator	Phone	Mobile	email	Contact Person	Expiry Date	Proposed Inspection Date	Actual Inspection Date	Report date	Corrective Action Deadline	Revisit date	PPM Benchmark (Working days)	Actual PPM	Remarks
										Minor observations & Recommendations given 7 days.				Revised SOP provided on (date)

17.2 Annex - B

State/ICAO TI / IATA DGR Standard Identifier	Audit Questions	Compliance (Quote Relevant State Act/Regulation or Document Reference) *	Compliant	Non- Compliant	Not Applicable	Comments
Company name:				Date:		
Documentation						
	Is the agency an IATA or FIATA authorized member?	Confirm with authorised and valid Commercial Registration				
	Do you use a checklist to ascertain whether DG articles/substances are correctly classified, packed, marked, labelled and documented?	Provide at least two completed checklists for two different shipments to ensure the same.				

State/ICAO TI / IATA DGR Standard Identifier	Audit Questions	Compliance (Quote Relevant State Act/Regulation or Document Reference) *	Compliant	Non- Compliant	Not Applicable	Comments
	Please provide a copy of the most recent Shipper Declaration for Dangerous Goods held by your agency.	<i>Ensure the Shipper's Declaration provides all the necessary information, and it is current, sensibly filled.</i>				
	Is the agency in possession of the state regulations and guidance material for DG?	<i>Discuss & confirm by asking for a copy of the publication or awareness about the same</i>				
	Determine if the Operations Manual is available to company personnel as required.	<i>A copy of the operations manual or the SOP for handling any eventuality</i>				
	Determine if the airway bill procedures are in compliance with the appropriate regulations.	<i>Cross examine with DGD</i>				
	Determine if the Shipper's Declaration completion procedures are in compliance with the appropriate regulations.	<i>Cross examine with checklist and AWB</i>				
	Determine if a reporting system exists to identify undeclared or misdeclared dangerous goods.	<i>Ask staff about DG Reporting Form</i>				
	With regard to Undeclared or Misdeclared articles falling into one of the DG categories, would you make a report?	<i>Ask the nominated staff, in a brief interview</i>				
	Review dangerous occurrence reports, where applicable.	<i>Awareness about the reporting form</i>				
	Determine that copy of the applicable regulations are available.	<i>A copy of the IATA DGR current edition</i>				
	Review manual and determine if there have been any amendments to the dangerous goods section of the company operations manual.	<i>Check for amendments included with the Operations manual and or SOP.</i>				
	Identify any outstanding Audit Findings respecting the last audit. (PRE)	<i>Verify from the last audit report</i>				
Nominated Person						

State/ICAO TI / IATA DGR Standard Identifier	Audit Questions	Compliance (Quote Relevant State Act/Regulation or Document Reference) *	Compliant	Non- Compliant	Not Applicable	Comments
	Is the PoC for the agency duly trained to accept and process DG?	Ask the Point of contact or nominated staff.				
	Please state the supplier(s) of packaging materials used for the movement of DG:	<i>Verify the name of the third-party supplier and ensure that appropriate packaging material is being used.</i>				
	Have you ever been asked to transport forbidden articles or substances by air?	<i>Supply the procedure of transportation, documentation and third-party name.</i>				
	Explain in detail how you would determine whether a substance is to be classified as 'Dangerous Goods'	<i>Ensure adequate information is supplied; staff must be knowledgeable regarding classification and labelling.</i>				
	Is the agency involved in handling and transportation of radioactive materials? (W/H)	<i>Verify if training includes radioactive and if the facility can accommodate radioactive materials.</i>				
	Who in your agency Inspect the <i>Shipper Declaration</i> ?	<i>Provide detailed information of why that person is credible.</i>				
	Does your agency provide the <i>Shipper's Letter of Instruction</i> in which a statement is made by the shipper pertaining to the nature of the goods being shipped?	<i>Supply a current letter of instruction and documentation of the usage. Provide nominated staff member credentials.</i>				
	Has sufficient information regarding procedures for handling and transporting Dangerous Goods been made available to your employees?	<i>Bestow that information and procedures. Ask if employees have received any information regarding the matter.</i>				
Packaging and Labelling						
	Please state the supplier(s) of packaging materials used for the movement of DG:	<i>Verify the name of the third-party supplier and ensure that appropriate packaging material is being used.</i>				

State/ICAO TI / IATA DGR Standard Identifier	Audit Questions	Compliance (Quote Relevant State Act/Regulation or Document Reference) *	Compliant	Non- Compliant	Not Applicable	Comments
	Determine the capability of the carrier to replace lost or stolen safety marks.	<i>Adequate stock of labels in custody of the agent, ask for samples</i>				
Training						
	Is your training current? - Documentation?	<i>Procure copies of certificate/training nominations.</i>				
	Who provides staff training? (TRNG)	<i>Appropriate National Authority /host state's approval for Training Organisation. Check</i>				
	Are they an accredited training establishment? (TRNG)	<i>Establish whose accreditation is being given.</i>				
	Is the training subject to a competency test?	<i>Ask the staff the type of tests undergone.</i>				
	Are any records kept?	<i>If internal training is being conducted ask for training records.</i>				
	Are you able to produce certification of training?	<i>Establish the same with documentary evidence.</i>				
	Verify that trained employees are able to produce certificates of Training upon request. (TRNG)	<i>Copy of certificates as evidence to be collected</i>				
	Determine that the certificate of training contains the required Information.	<i>Cross check in conjunction with 1st & 4th Question in this section</i>				
	Determine that the company has a record of training for trained Employees on file.	<i>Verify with training plans or programmes current fiscal year</i>				
	What action would you take in the event of the shipper being unable to provide you with a PROPER SHIPPING NAME and/or UN number? – Please explain	<i>Provide detailed information of the procedures and if possible, supply copies of rejected shipments regarding same issue.</i>				
	On average, state the most common DG item(s) accepted by your agency?	<i>Present sufficient information and references of the most common DG item.</i>				

State/ICAO TI / IATA DGR Standard Identifier	Audit Questions	Compliance (Quote Relevant State Act/Regulation or Document Reference) *	Compliant	Non- Compliant	Not Applicable	Comments
	Determine if the company's acceptance procedures are in compliance with the regulations.	<i>Verify the awareness of the IATA DGR acceptance rules</i>				
	Is your staff properly trained to react professionally in the event of an emergency, which may be defined as a spillage, leakage or fire etc.? (W/H)	<i>Emergency Response measures as per ERAP or HSE manual of the organisation</i>				
	List the categories of staff that receive Dangerous Goods training, e.g. DRIVER/PACKER/WAREHOUSEMAN etc.	<i>Cross check compliance with DG Training Manual or IATA DGR Table 1.5 A or Appendix H</i>				
	Does the company's dangerous goods' training programme match the Appropriate National Authority approved programme?	<i>Ask for Training plan for the organisation</i>				
	Determine if the company has the Appropriate National Authority approved dangerous goods training programme.	<i>Verify the same in compliance with IATA Table 1.5A</i>				
	Determine if the training programme reflects all regulatory or Operational amendments.	<i>If internal training is provided, verify the lesson plans with evidence</i>				
Warehouse						
	Is the Warehouse certified by the Civil Defence Fire and Emergency standards	<i>Request for the copy of the certificate and check validity</i>				
	Does your agency have separate storage facilities solely for dangerous goods?	<i>Can the current facility accommodate DG and if not, there must be a separate facility that can do so? Provide Layout of the Facility that holds DG.</i>				
	Are there sufficient numbers and types of Fire Extinguishers available near the storage area?	<i>Check the expiry dates of all extinguishers.</i>				
	Is there a spillage and leakage kit available?	<i>Check the condition and expiry date for validity. Or any other method of containment?</i>				

State/ICAO TI / IATA DGR Standard Identifier	Audit Questions	Compliance (Quote Relevant State Act/Regulation or Document Reference) *	Compliant	Non- Compliant	Not Applicable	Comments
	If the agency is involved in handling, storage and transportation of radioactive materials?	<i>Verify if the warehouse the facility to accommodate radioactive materials.</i>				
	At your cargo acceptance point, are there notices prominently displayed relating to information regarding the transportation of Dangerous Goods?	<i>Confirm display of DG posters or declaration notifications.</i>				
	Does the warehouse have segregation table displayed, safety signage in close proximity to the DG Storage area	<i>Verify visually and ask the DG PoC</i>				
	Determine if untrained personnel, who are handling offering for transport and transporting, are appropriately supervised.	<i>Monitor staff in person and observe</i>				
	List the categories of staff that receive DG training, e.g. DRIVER/PACKER/WAREHOUSEMAN etc.	<i>Interview the staff handling DG at the warehouse</i>				
	Are emergency instructions or ERAP included?	<i>Verify that the emergency procedures are listed and are being carried out and collect copies of emergency procedures or ERAP</i>				
	Verify the company has the proper measures to address incidents related to DG in place.	<i>Emergency Response measures as per ERAP or the HSE manual of the organisation</i>				

APPENDIX 5.2D

RASG-MID SAFETY ADVISORY – 17

(RSA-17)



7 November 2022

MID-Region

Guidance Material for Occurrence Reporting concerning CAA personnel on establishing an effective operation of Mandatory and Voluntary Reporting Systems

Date of Issue:	November 2022
Revision No:	First Edition – November 2022
Document Ref. No.:	RSA-17

Owner:	RASG-MID

These guidelines are developed by the Safety Enhancement Implementation Group (SEIG), as part of Middle East Regional Aviation Safety Plan (MID-RASP) 2020-2022 Edition Safety Enhancement Initiatives (Ref: G5-SEI-04: A4) based on the work of the UAE General Civil Aviation Authority in coordination with ICAO MID Regional Office and the Regional Aviation Safety Group - Middle East (RASG-MID).

Disclaimer

This document is intended to provide guidance for civil aviation authorities to develop reporting system. This document has also been compiled by members of aviation industry to improve aviation safety at the regional level. It is not intended to supersede or replace existing materials produced by the State or in ICAO SARPs. The distribution or publication of this document does not prejudice the State's ability to enforce existing National regulations. To the extent of any inconsistency between this document and the National/International regulations, standards, recommendations or advisory publications, the content of the National/International regulations, standards, recommendations and advisory publications should prevail.

Related Documents:

- ICAO Document 9859 SMM
- ICAO Annex 19
- GCAA CAR Part X
- GCAA Acceptable Means of Compliance 22
- GCAA Acceptable Means of Compliance 57
- EASA REGULATION (EU) No 376/2014
- GCAA NPA on Civil Aviation Regulation for Occurrence Reporting

Description and Objective

It is necessary to ensure that aviation professionals report occurrences that pose a risk to aviation safety. Occurrence reporting helps improve aviation safety by ensuring that relevant safety information is reported, collected, stored, protected, exchanged, disseminated, and analyzed. Furthermore, it is not to be used to attribute blame or liability but supports continued learning to make aviation operations safe.

The purpose of this Guidance Material is to provide interpretative material and direction for the reporting of Safety Related incidents using various occurrence reporting system by persons/organizations licensed/regulated under the State Civil Aviation Authority

In addition to reporting of safety incidents to the Civil Aviation Authority, this Guidance Material also covers what qualifies to be a reportable occurrence, whose responsibility is it to report, sharing of best practices to establish an effective occurrence reporting system, what is the value of occurrence reports and how this data can be used to improve and contribute in developing a State Safety Program.

Mandatory Occurrence Reports:

The provisions in Chapter 8 of ICAO Annex 13 require the States to establish mandatory occurrence (incident) reporting systems to facilitate the collection of information on actual or potential safety deficiencies. Further to that, ICAO requirements relating to the implementation of safety management systems (SMS) require that aviation service providers develop and maintain a formal process for effectively collecting, recording, acting on and generating feedback about hazards in operations, based on a combination of reactive, proactive and predictive methods of safety data collection. During the collection of Mandatory Reports it is a good practice to group in the following domains (Examples covered in Appendix A of this GM):

- Aircraft flight operations
- Aircraft technical, maintenance and repair
- Air navigation services and facilities
- Aerodromes and ground services.

Voluntary Occurrence Reports:

Voluntary reporting systems are established in order to facilitate collection of information on actual or potential safety deficiencies that may not be captured by the mandatory incident reporting system, from all aviation stakeholders and should be managed totally independent from all other reporting systems. The system ensures that relevant data on safety is reported, collected, stored, protected and disseminated. The system is also designed to accept anonymous reports. The following points are fundamental for the effectiveness of Voluntary Reporting Systems:

- Trust
- Non-punitive
- Ease of reporting
- Promotion
- Inclusive reporting base
- Confidentiality
- Acknowledgment

What Type of reports are collected.

The following types of occurrence classifications fall under the category of reportable occurrences and which CAAs should differentiate between when collecting and storing the data:

Accidents:

An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shutdown, in which:

a) a person is fatally or seriously injured as a result of:

- being in the aircraft, or
- direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
- direct exposure to jet blast, except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:

- adversely affects the structural strength, performance or flight characteristics of the aircraft, and
- would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or

c) the aircraft is missing or is completely inaccessible.

Serious Incidents:

An incident involving circumstances indicating that there was a high probability of an accident and associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to

move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down.

Incident:

An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

Dangerous Goods:

Articles or substances which are capable of posing a risk to health, safety, property or the environment and which are shown in the list of dangerous goods in the Technical Instructions or which are classified according to those Instructions.

Unlawful Acts:

These are acts or attempted acts such as to jeopardize the safety of civil aviation, including but not limited to:

- unlawful seizure of aircraft,
- destruction of an aircraft in service,
- hostage-taking on board aircraft or on aerodromes,
- forcible intrusion on board an aircraft, at an airport or on the premises of an aeronautical facility,
- introduction on board an aircraft or at an airport of a weapon or hazardous device or material intended for criminal purposes,
- use of an aircraft in service for the purpose of causing death, serious bodily injury, or serious damage to property or the environment,
- communication of false information such as to jeopardize the safety of an aircraft in flight or on the ground, of passengers, crew, ground personnel or the general public, at an airport or on the premises of a civil aviation facility.

Unapproved Parts

Unapproved aircraft parts are aircraft parts not approved by civil aviation authorities for installation on type certified aircraft.

Who should report:

The following section identifies the categories of Organizations / Personnel that should be considered and addressed to submit Occurrence Reports:

- All Civil Registered Aircraft (air operators) operating in or outside the territory of State of Registry;
- All non-State air operators operating State Registered Aircraft.
- State approved or certified organizations including:
- Overseas organizations (CAR M, 21 & CAR145) as applicable; and
- Recreation aviation aircraft (Light Sport Aircraft).
- Approved Training Organizations.
- Air Navigation Service Providers.

- Certified Aerodromes
- Certified Heliports

Within the above-mentioned organizations, following categories of personnel can be included for submitting Occurrence Reports:

- Operator or commander of an aircraft, whether registered or not under the State CAA, but operated by the holder of an Air Operator Certificate or ATO certificate issued by the State CAA; or
- personnel that carry out in the State or outside State the business of designing, manufacturing, modifying or maintaining State registered aircraft, or any equipment or part thereof; or
- Personnel who sign a certificate of release to service in respect of the aircraft indicated in paragraph (a); or any equipment or part thereof; or
- Personnel declared as Air Navigation Service Provider that perform a function connected with the installation, modification, maintenance, repair, overhaul, flight checking or inspection of air navigation facilities or other services which are approved by the CAA; or
- Personnel that perform a function connected with the ground handling of aircraft, including fueling, servicing, load sheet preparation, loading, dangerous goods and towing at State Aerodromes.

It should be understood that, while the above items define those who have to report, anyone may report, should they consider it necessary. Persons should report any reportable occurrence of which they have positive knowledge, even if they have good reason to believe that appropriate details of the occurrence have already been, or will be, reported by someone else. A report should also be submitted on any occurrence that involves an unsatisfactory condition, behavior or procedure, which did not immediately endanger the aircraft but if allowed to continue uncorrected, or if repeated in other foreseeable circumstances, would create a hazard to aircraft or individuals or property.

What is the value of safety reporting for CAAs?

Occurrence reports are a core data source used to inform the CAAs decision and policy making, it also assists in setting State's Strategic Safety Objectives and safety intelligence. Making frequent use of occurrence data helps to identify safety trends, hazards, risks and issues that have the potential to impact on the safety of the whole aviation system.

Occurrence reporting data once having reached maturity levels, can also be used to support numerous academic and aviation safety related studies through the provision of analysis and de-identified datasets.

Best Practices on establishing effective Occurrence Reporting Systems

- **Reporting Timelines**

CAAs should establish reporting timelines when it comes to Mandatory Occurrence Reports, as for Voluntary Reports There is no time limitation to submit a report. However, in the interest of safety, time critical information may be reported at the earliest opportunity. The following can be considered when establishing reporting timelines for Mandatory Reports:

For Accidents and Serious Incidents: Immediate Notification to the Air Accident Investigation Authority through the duty investigator and a Mandatory Occurrence Report submitted within 24 hours containing all pertinent information about the condition and evaluation results known to the person or organization and details of the investigation and actions it intends to take to prevent similar occurrences in the future.

All other incidents: For the purpose of reducing the burden and pressure of reporting on the organizations and personnel, occurrences which did not have a significant impact on safety of aircraft operation can be considered for submission within 15 calendar days containing all pertinent information about the condition and evaluation results known to the person or organization and details of the investigation and actions it intends to take to prevent similar occurrences in the future. If additional detailed information become available after 15 calendar days then the concerned organizations shall update the submitted occurrence report.

- **Categories of reports by domains:** Please refer to Appendix A of this GM for list of Occurrence Categories by domain.
- **Reporting form criteria:**
An Occurrence Reporting form should include the following Mandatory data fields (in dropdown format with data fields standardized) to ensure data analysis activities and publishing of safety information is accurate and actual as possible:

Note: When entering, in their respective databases, information on every occurrence mandatorily reported and, to the best extent possible, every occurrence voluntarily reported, organizations, must ensure that occurrence reports recorded in their databases contain at least the following information:

- (a) Organization name, originator's name and ID.
- (b) Aircraft Registration Mark, Flight Details/Aircraft configuration/Maintenance Incidents/Approval Reference (if relevant)
- (c) Information necessary to identify the aircraft, crew or part affected
- (d) Date, time and route or location
- (e) Classification and categorization of events;
- (f) A written short description of the incident including root cause identification, any immediate corrective measures/actions taken or planned.

Note: For any incident involving a system or component:

- (a) If monitored or protected by a warning and/or protection system (for example: fire detection/extinguishing) the incident report should always state whether such system(s) functioned properly.
- (b) Identification if its reliability is of concern as per the established reliability programme (if applicable)

SPECIFIC MANDATORY DATA FIELDS

Aircraft-related data fields

When entering, in their respective databases, information on every occurrence mandatorily reported and, to the best extent possible, every occurrence voluntarily reported, organizations, must ensure that occurrence reports recorded in their databases contain at least the following information:\

- (a) Aircraft Identification
 - (1) State of Registry
 - (2) Make/Model/Series
 - (3) Aircraft serial number
 - (4) Aircraft Registration
 - (5) Call sign
- (b) Aircraft Operation
 - (1) Operator
 - (2) Type of operation
- (c) Aircraft Description
 - (1) Aircraft Category
 - (2) Propulsion Type
 - (3) Mass Group
- (d) History of Flight
 - (1) Last Departure Point
 - (2) Planned Destination
 - (3) Flight Phase
- (e) Weather
 - (1) Weather relevant

DATA FIELDS RELATING TO AIR NAVIGATION SERVICES

When entering, in their respective databases, information on every occurrence mandatorily reported and, to the best extent possible, every occurrence voluntarily reported, organizations, must ensure that occurrence reports recorded in their databases contain at least the following information:

- (a) ATM relation
 - (1) ATM contribution
 - (2) Service affected (effect on ATM service)
 - (3) Phase of Flight (*Flight Level*)
- (b) ATS Unit Details
 - (1) Airspace and control positions
 - (2) Personnel involved
- (c) Meteorological information

SEPARATION MINIMA INFRINGEMENT/LOSS OF SEPARATION AND AIRSPACE INFRINGEMENT-RELATED DATA FIELDS

When entering, in their respective databases, information on every occurrence mandatorily reported and, to the best extent possible, every occurrence voluntarily reported, organizations, must ensure that occurrence reports recorded in their databases contain at least the following information:

- (a) Airspace
 - (1) Airspace type
 - (2) Airspace class
 - (3) FIR/UIR name

AERODROME-RELATED DATA FIELDS

When entering, in their respective databases, information on every occurrence mandatorily reported and, to the best extent possible, every occurrence voluntarily reported, organizations must ensure that occurrence reports recorded in their databases contain at least the following information:

- (a) Location Indicator (ICAO indicator of the airport)
- (b) Location on the aerodrome
- (c) Information relating to any vehicle involved (company/call sign etc.)
- (d) Information relating to the Department and/or company of personnel involved

AIRCRAFT DAMAGE OR PERSONAL INJURY-RELATED DATA FIELDS

When entering, in their respective databases, information on every occurrence mandatorily reported and, to the best extent possible, every occurrence voluntarily reported, organizations must ensure that occurrence reports recorded in their databases contain at least the following information:

- (a) Severity
 - (1) Highest Damage
 - (2) Injury Level
 - (b) Injuries to persons
 - (1) Number of injuries on ground (fatal, serious, minor)
 - (2) Number of injuries on aircraft (fatal, serious, minor).
- **Common Hazard Taxonomy: (See ECCAIRS – ADREP Taxonomy) for complete list of hazard taxonomies which can be embedded within the occurrence reporting system**
<https://www.icao.int/safety/airnavigation/aig/pages/adrep-taxonomies.aspx>
 - a) Aims to improve Hazard Identification by taking pre-emptive action to prevent similar incidents occurring in the future.
 - b) Analysis of safety data and producing safety information to enable data driven decision making (D3M).
 - c) Encourage aviation industry to follow a common reporting scheme to ensure harmonization.
 - d) Ease the establishment of Safety Data and Information Exchange Platforms.

What can Safety Data be used for:

- a) Sharing and Exchange of Safety data and information on a national and international level
- b) Detailed periodic as well as executive Safety Reports
- c) Data Analysis and Trends
- d) Setting State Safety Indicators / Targets / Acceptable Levels of Safety Performance
- e) Industry Safety Performance Monitoring
- f) Specific internal and external Data and information requests

APPENDIX A: List of example occurrence by domain

Remark: This Appendix is structured in such a way that the pertinent occurrences are linked with categories of activities during which they are normally observed, according to experience, in order to facilitate the reporting of those occurrences. However, this presentation must not be understood as meaning that occurrences must not be reported in case they take place outside the category of activities to which they are linked in the list.

I. AIRCRAFT FLIGHT OPERATIONS

A. Operation of the Aircraft

- 1) Aircraft maneuver:
 - a) Risk of collision with an aircraft, terrain or other object or an unsafe situation when avoidance action would have been appropriate.
 - b) An avoidance maneuver required to avoid a collision with an aircraft, terrain or other object.
 - c) An avoidance maneuver to avoid other unsafe situations.
- 2) Take-off or landing incidents, including precautionary or forced landings.
- 3) Incidents such as under-shooting, over running or running off the side of runways.
- 4) Take-offs, rejected take-offs, landings or attempted landings on a closed, occupied or incorrect runway.
- 5) Inability to achieve predicted performance during take-off or initial climb.
- 6) Critically low fuel quantity or inability to transfer fuel or use total quantity of usable fuel.
- 7) Loss of control (including partial or temporary loss of control) from any cause.
- 8) Incident close to or above V1 resulting from or producing a hazardous or potentially hazardous situation (e.g. tail strike, engine power loss, rejected take-off etc.).
- 9) Go-around/Missed Approach producing a hazardous or potentially hazardous situation including rejected landing.
- 10) Unintentional significant deviation from airspeed, intended track or altitude (more than 300ft) from any cause.
- 11) Descent below decision height/altitude or minimum descent height/altitude without the required visual reference.
- 12) Loss of position awareness relative to actual position or to other aircraft.
- 13) Breakdown in communication between flight crew (CRM) or between Flight crew and other parties (cabin crew, ATC, engineering).
- 14) Heavy/hard landing - a landing deemed to require a 'heavy landing check'.
- 15) Exceedance of fuel imbalance limits.

- 16) Incorrect setting of an SSR code or of an altimeter subscale.
- 17) Incorrect programming of, or erroneous entries into, equipment used for navigation or performance calculations, or use of incorrect data.
- 18) Incorrect receipt or interpretation of radiotelephony messages.
- 19) Fuel system malfunctions or defects, which had an effect on fuel supply and/or distribution.
- 20) Aircraft unintentionally departing a paved surface.
- 21) Collision between an aircraft and any other aircraft, vehicle or other ground object.
- 22) Inadvertent and/or incorrect operation of any controls.
- 23) Inability to achieve the intended aircraft configuration for any flight phase (e.g. landing gear and doors, flaps, stabilisers, slats etc).
- 24) A hazard or potential hazard which arises as a consequence of any deliberate simulation of failure conditions for training, system checks or training purposes.
- 25) Abnormal vibration.
- 26) Operation of any primary warning system associated with manoeuvring of the aircraft e.g. configuration warning, stall warning (stick shake), over speed warning etc. unless:
 - a) the crew conclusively established that the indication was false.
 - b) provided that the false warning did not result in difficulty or hazard arising from the crew response to the warning; or
 - c) operated for training or test purposes.
- 27) GPWS/TAWS 'warning' when:
 - a) the aircraft comes into closer proximity to the ground than had been planned or anticipated; or
 - b) the warning is experienced in IMC or at night and is established as having been triggered by a high rate of descent (Mode 1); or
 - c) the warning results from failure to select landing gear or landing flap by the appropriate point on the approach (Mode 4); or
 - d) any difficulty or hazard arises or might have arisen as a result of crew response to the 'warning' e.g. possible reduced separation from other traffic. This could include warning of any Mode or Type i.e. genuine, nuisance or false.
- 28) GPWS/TAWS 'alert' when any difficulty or hazard arises or might have arisen as a result of crew response to the 'alert'.
- 29) TCAS/ ACAS RAs.
- 30) Jet or prop blast incidents resulting in significant damage or serious injury.
- 31) Taxiway incursion/Runway incursion.
- 32) Laser interference incidents.

33) Unstable approach reported by pilots or analyzed through FDM program.

B. Emergencies

- 1) Fire, explosion, smoke or toxic or noxious fumes, even though fires were extinguished.
- 2) The use of any non-standard procedure by the flight or cabin crew to deal with an emergency when:
 - a) the procedure exists but is not used; or
 - b) a procedure does not exist; or
 - c) the procedure exists but is incomplete or inappropriate; or
 - d) the procedure is incorrect; or
 - e) the incorrect procedure is used.
- 3) Inadequacy of any procedures designed to be used in an emergency, including when being used for maintenance, training or test purposes.
- 4) An event leading to an emergency evacuation
- 5) Depressurization events.
- 6) The use of any emergency equipment or prescribed emergency procedures in order to deal with a situation.
- 7) An event leading to the declaration of an emergency ('Mayday' or 'Pan Pan').
- 8) Failure of any emergency system or equipment, including all exit doors and lighting, to perform satisfactorily, including when being used for maintenance, training or test purposes.
- 9) Events requiring any emergency use of oxygen by any crew member.

C. Crew Incapacitation

- 1) Incapacitation of any member of the flight crew, including that which occurs prior to departure if it is considered that it could have resulted in incapacitation after take-off.
- 2) Incapacitation of any member of the cabin crew which renders them unable to perform essential emergency duties.

D. Aircrew Fatigue

- 1) A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety related duties.
- 2) Fatigue is a major human factor hazard because it affects most aspects of a crewmember's ability to do their job. It therefore has implications for safety.
- 3) For example, crew member reports on fatigue due to an incident happened on the aircraft and it is believed that fatigue is considered to be the main reason for the occurrence of such incident.

E. Injury

1) An incident, which have or could have led to significant injury to passengers or crew but which are not considered reportable as an accident under ANNEX 13.

F. Meteorology

1) A lightning strike which resulted in damage to the aircraft or loss or malfunction of any essential service.

2) A hail strike which resulted in damage to the aircraft or loss or malfunction of any essential service.

3) Severe turbulence encounters resulting in injury to occupants or deemed to require a 'turbulence check' of the aircraft.

4) A wind shear encounter.

5) Icing encounter resulting in handling difficulties, damage to the aircraft or loss or malfunction of any essential service.

G. Security

1) Unlawful interference with the aircraft including a bomb threat or hijack.

2) Difficulty in controlling intoxicated, violent or unruly passengers.

3) Discovery of a stowaway.

H. Aerodrome and Aerodrome Facilities

1) Significant spillage during fueling operations.

2) Loading of incorrect fuel quantities likely to have a significant effect on aircraft endurance, performance, balance or structural strength.

3) Unsatisfactory ground de-icing / anti-icing

I. Passenger Handling, Baggage and Cargo

1) Significant contamination of aircraft structure, or systems and equipment arising from the carriage of baggage or cargo.

2) Incorrect loading of passengers, baggage or cargo, likely to have a significant effect on aircraft mass and/or balance.

3) Incorrect stowage of baggage or cargo (including hand baggage) likely in any way to hazard the aircraft, its equipment or occupants or to impede emergency evacuation.

4) Inadequate stowage of cargo containers or other substantial items of cargo.

5) Dangerous goods incidents.

J. Aircraft Ground Handling and Servicing

- 1) Failure, malfunction or defect of ground equipment used for test or checking of aircraft systems and equipment when the required routine inspection and test procedures did not clearly identify the problem when this results in a hazardous situation.
- 2) Noncompliance or significant errors in compliance with required servicing procedures.
- 3) Loading of contaminated or incorrect type of fuel or other essential fluids (including oxygen and potable water).

K. Other incidents

- 1) Repetitive instances of a specific type of incident which in isolation would not be considered 'reportable' but which due to the frequency at which they arise, form a potential hazard.
- 2) Bird strike that may have or may have not resulted in damage to the aircraft or loss or malfunction of any essential service.
- 3) Note: All bird strike incidents shall be reported in the Bird Strike & Wildlife Hazard module of the ROSI system.
- 4) Wake turbulence encounters.
- 5) Any other incident of any type considered to have endangered or which might have endangered the aircraft or its occupants on board the aircraft or on the ground.

II. AIRCRAFT TECHNICAL

A. Structural

Not all structural failures need to be reported. Engineering judgement is required to decide whether a failure is serious enough to be reported. The following examples can be taken into consideration:

1) Damage to a Principal Structural Element that has not been qualified as damage tolerant (life limited element). Principal Structural Elements are those which contribute significantly to carrying flight, ground, and pressurization loads, and whose failure could result in a catastrophic failure of the aircraft. Typical examples of such elements are listed for large aircrafts in EASA AMC to CS25.571 (a) “damage tolerance and fatigue evaluation of structure” and in equivalent AMC material for rotorcraft.

2) Defect or damage exceeding admissible damages to a Principal Structural Element that has been qualified as damage tolerant.

3) Damage to or defect exceeding allowed tolerances of a structural element which failure could reduce the structural stiffness to such an extent that the required flutter, divergence or control reversal margins are no longer achieved.

4) Damage to or defect of a structural element, which could result in the liberation of items of mass that may injure occupants of the aircraft.

5) Damage to or defect of a structural element, which could jeopardise proper operation of systems. See paragraph II.B. below

6) Loss of any part of the aircraft structure in flight.

B. Systems

The following generic criteria applicable to all systems are proposed:

1) Loss, significant malfunctions or defects of any system, subsystem or set of equipment when standard operating procedures, drills etc. could not be satisfactorily accomplished.

2) Inability of the crew to control the system, e.g.:

- a) uncommented actions;
- b) incorrect and or incomplete response, including limitation of movement or stiffness;
- c) runaway;
- d) Mechanical disconnection or failure.

3) Failure or malfunction of the exclusive function(s) of the system (one system could integrate several functions).

4) Interference within or between systems.

5) Failure or malfunction of the protection device or emergency system associated with the system.

6) Loss of redundancy of the system.

7) Any incident resulting from unforeseen behaviour of a system.

- 8) For aircraft types with single main systems, subsystems or sets of equipment: Loss, significant malfunctions or defects in any main system, subsystem or set of equipment.
- 9) For aircraft types with multiple independent main systems, subsystems or sets of equipment: The loss, significant malfunctions, or defects of more than one main system, subsystem or set of equipment
- 10) Operation of any primary warning system associated with aircraft systems or equipment unless the crew conclusively established that the indication was false provided that the false warning did not result in difficulty or hazard arising from the crew response to the warning.
- 11) Leakage of hydraulic fluids, fuel, oil or other fluids which resulted in a fire hazard or possible hazardous contamination of aircraft structure, systems or equipment, or risk to occupants.
- 12) Malfunction or defect of any indication system when this results in the possibility of misleading indications to the crew.
- 13) Any failure, malfunction or defect if it occurs at a critical phase of flight and relevant to the operation of that system.
- 14) Incidents of significant shortfall of the actual performances compared to the approved performance which resulted in a hazardous situation (taking into account the accuracy of the performance calculation method) including braking action, fuel consumption etc.
- 15) Asymmetry of flight controls; e.g. flaps, slats, spoilers etc.

C. Propulsion (including Engines, Propellers and Rotor Systems) and APUs

- 1) Flameout, shutdown or malfunction of any engine.
- 2) Over speed or inability to control the speed of any high speed rotating component (for example: Auxiliary power unit, air starter, air cycle machine, air turbine motor, propeller or rotor).
- 3) Failure or malfunction of any part of an engine or power plant resulting in any one or more of the following;
 - a) Non-containment of components/debris;
 - b) Un-controlled internal or external fire, or hot gas breakout;
 - c) Thrust in a different direction from that demanded by the pilot;
 - d) Thrust reversing system failing to operate or operating inadvertently;
 - e) Inability to control power, thrust or rpm;
 - f) Failure of the engine mount structure;
 - g) Partial or complete loss of a major part of the power plant;
 - h) Dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers;
 - i) Inability, by use of normal procedures, to shutdown an engine;
 - j) Inability to restart a serviceable engine.
- 4) An un-commanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTIC):
 - a) For a single engine aircraft; or

- b) Where it is considered excessive for the application, or
 - c) Where this could affect more than one engine in a multi-engine aircraft, particularly in the case of a twin engine aircraft; or
 - d) For a multi engine aircraft where the same, or similar, engine type is used in an application where the event would be considered hazardous or critical.
- 5) Any defect in a life controlled part causing retirement of before completion of its full life.
- 6) Defects of common origin which could cause an in flight shut down rate so high that there is the possibility of more than one engine being shut down on the same flight.
- 7) An engine limiter or control device failing to operate when required or operating inadvertently.
- 8) Exceedance of engine parameters.
- 9) FOD resulting in damage.
- 10) Propellers and –transmission: Failure or malfunction of any part of a propeller or power plant resulting in any one or more of the following:
- a) An overspeed of the propeller;
 - b) The development of excessive drag;
 - c) A thrust in the opposite direction to that commanded by the pilot;
 - d) A release of the propeller or any major portion of the propeller;
 - e) A failure that results in excessive unbalance;
 - f) The unintended movement of the propeller blades below the established minimum in-flight low-pitch position;
 - g) An inability to feather the propeller;
 - h) An inability to command a change in propeller pitch;
 - i) An un-commanded change in pitch;
 - j) An uncontrollable torque or speed fluctuation;
 - k) The release of low energy parts.
- 11) Rotors and-transmission
- a) Damage or defect of main rotor gearbox/ attachment which could lead to in-flight separation of the rotor assembly, and / or modifications of the rotor control.
 - b) Damage to tail rotor, transmission and equivalent systems.
- 12) APUs
- a) Shut down or failure when the APU is required to be available by operational requirements, e.g. ETOPS, MEL.
 - b) Inability to shut down the APU.
 - c) Over speed.
 - d) Inability to start the APU when needed for operational reasons.

D. Human Factors

1) Any incident where any feature or inadequacy of the aircraft design could have led to an error of use that could contribute to a hazardous or catastrophic effect.

E. Other Incidents

1) Any incident where any feature or inadequacy of the aircraft design could have led to an error of use that could contribute to a hazardous or catastrophic effect.

2) An incident not normally considered as reportable (for example, furnishing and cabin equipment, water systems), where the circumstances resulted in endangering of the aircraft or its occupants.

3) A fire, explosion, smoke or toxic or noxious fumes.

4) Any other event which could affect the safety of the aircraft/occupants of the aircraft, or people or property in the vicinity of the aircraft or on the ground.

5) Failure or defect of passenger address system resulting in loss or inaudible passenger address system.

6) Loss of pilots' seat control during flight.

III. AIRCRAFT MAINTENANCE AND REPAIR

1) Incorrect assembly of parts or components of the aircraft found during an inspection or test procedure not intended for that specific purpose.

2) Hot bleed air leak resulting in structural damage.

3) Any defect in a lift controlled part causing retirement before completion of its full life.

4) Any damage or deterioration (i.e. fractures, cracks, corrosion, delaminating, dis-bonding etc.) resulting from any cause (such as flutter, loss of stiffness or structural failure) to;

- a) Primary structure or a principal structural element (as defined in the manufacturers' Repair manual) where such damage or deterioration exceeds allowable limits specified in the Repair Manual and requires a repair or complete or partial replacement of the element;
- b) Secondary structure which consequently has or may have endangered the aircraft;
- c) The engine, propeller or rotorcraft rotor system.

5) Any failure, malfunction or defect of any system or equipment, or damage or deterioration found as a result of compliance with an Airworthiness Directive or other mandatory instruction issued by a Regulatory Authority, when;

- a) It is detected for the first time by the reporting organization implementing compliance;
- b) On any subsequent compliance where it exceeds the permissible limits quoted in the instruction and/or published repair/rectification procedures are not available.

6) Failure of any emergency system or equipment, including all exit doors and lighting, to perform satisfactorily, including when being used for maintenance or test purposes.

- 7) Non-compliance or significant errors in compliance with required maintenance procedures.
- 8) Suspected unapproved Products, parts, appliances and materials (Safety Alert 05-2014).
- 9) Misleading, incorrect or insufficient maintenance data or procedures that could lead to maintenance errors.
- 10) Failure, malfunction or defect of ground equipment used for test or checking of aircraft systems and equipment when the required routine inspection and test procedures did not clearly identify the problem when this results in a hazardous situation.

IV. AIR NAVIGATION SERVICES PROVIDERS

This list is in no way exhaustive and any occurrence which is believed to be a flight safety issue shall be reported.

- 1) ACAS Event: An incident where a resolution advisory event (RA) did or may have occurred.
- 2) AIRPROX: A situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised.
 - a) Risk of collision. The risk classification of an aircraft proximity in which serious risk of collision has existed
 - b) Safety not assured. The risk classification of an aircraft proximity in which the safety of the aircraft may have been compromised.
 - c) No risk of collision. The risk classification of an aircraft proximity in which no risk of collision has existed.
 - d) Risk not determined. The risk classification of an aircraft proximity in which insufficient information was available to determine the risk involved, or inconclusive or conflicting evidence precluded such determination.
- 3) ASMI Category A: An incident in which a reduction in required ATC separation occurs where the separation remaining is 25% or less of the required minimum, regardless of whether or not corrective action or an evasive response to avoid a collision was taken.
- 4) ASMI Category B: An incident in which a reduction in required ATC separation occurs where the separation remaining is 26% up to and including 50% of the required minimum and no ATC action is taken, or the initial action to resolve the situation was determined by the pilot or ACAS.
- 5) ASMI Category C: An incident in which a reduction in required separation occurs where:
 - a) The separation remaining is 26% up to and including 50% of the required minimum and ATC resolved the situation; or
 - b) The separation remaining is 51% up to and including 75% of the required minimum and no ATC action is taken, or the initial action to resolve the situation was determined by the pilot or ACAS.
- 6) ASMI Category D: An incident in which a reduction in required separation occurs where:
 - a) The separation remaining is 51% up to but not including 90% of the required minimum and ATC resolved the situation; or
 - b) The separation remaining is 76% or more and no ATC action is taken, or the pilot or ACAS resolved the situation.

- 7) ASMI Category E: An incident in which a reduction in required separation occurs where the separation remaining is 90% or more of the required minimum and ATC resolved the situation.
- 8) Airspace Penetration (CTA/CTR/SUA) without Clearance or Approval: An incident where an aircraft enters civil or military controlled airspace or SUA without clearance or proper authorization.
- 9) Apron Incident: An incident reported to ATC where the flight safety of an aircraft was or may have been affected on the apron area.
- 10) ATC Coordination Error: An incident where the coordination between ATC Sectors or units is not completed correctly, where the ATC coordination failure affected flight safety.
- 11) ATC Operational Issue: An incident, not resulting in any other category, where incorrect ATCO actions or ATC procedures affected, or may have affected flight safety.
- 12) ATS/AD Equipment Failure: An incident where there is a failure or irregularity of ATS or Aerodrome communication, navigation or surveillance systems or any other safety-significant systems or equipment which could adversely affect the safety or efficiency of flight operations and/or the provision of an air traffic control service.
- 13) Communications Failure: An incident where an aircraft experiences a total or partial communications failure.
- 14) Deviations from ATC Clearance (not including a Level Bust) : An incident where an aircraft fails to comply with any component of an ATC clearance, excluding a cleared altitude or flight level.
- 15) Emergency (other than Engine Failure or Fuel Shortage) : An incident, excluding an accident, security event, engine failure, fuel emergency or medical emergency, where a pilot declares an emergency, Mayday or Pan.
- 16) Engine Failure: An incident where a pilot reports he has experienced an engine failure during takeoff, in flight or landing, or reports that he has shut down an engine due to a technical problem.
- 17) Flight Planning Error: An incident where a flight planning error has been reported which may affect the safety of a flight.
- 18) FOD: An incident involving FOD detected on a runway including reported tyre bursts from aircraft which have recently operated on a runway.
- a) Category A: FOD which is likely to cause damage to an aircraft on a runway or runway shoulder;
 - b) Category B: FOD which is likely to cause damage to an aircraft found within runway strip or RESA;
 - c) Category C: FOD which is likely to cause damage to an aircraft on taxiways or taxiway shoulders;
 - d) Category D: FOD which is likely to cause damage to an aircraft found on the taxiway strips, apron areas or elsewhere on the airfield.
- 19) Fuel Emergence: An incident where a pilot reports he is experiencing a minimum fuel situation which requires an emergency declaration.
- 20) Go-Around Event: Any go- around event, except where an aircraft intentionally goes around for training purposes.
- 21) Level Bust:

- a) Category A: An incident where an aircraft deviates from an assigned level by 800 feet or more, and there was no loss of separation.
- b) Category B: An incident where an aircraft deviates from an assigned level by 600 or 700 feet and there was no loss of separation.
- c) Category C: An incident where an aircraft deviates from an assigned level by 400 or 500 feet, and there was no loss of separation.
- d) Category D: An incident where an aircraft deviates from an assigned level by 300 feet or less and there was no loss of separation.

22) Loss of Runway Separation Category A: An incident in which a reduction in required runway separation occurs where:

- a) A collision is narrowly avoided; or
- b) The separation remaining is 25% or less of the required minimum, regardless of whether or not corrective action or an evasive response to avoid a collision was taken.

23) Loss of Runway Separation Category B: An incident in which a reduction in required runway separation occurs where:

- a) A significant potential for collision which may result in a time-critical corrective evasive response to avoid a collision; or
- b) The separation remaining is 26% up to and including 50% of the required minimum, and no ATC action is taken, or the initial action to resolve the situation was determined by the pilot.

24) Loss of Runway Separation Category C: An incident in which a reduction in required runway separation occurs where:

- a) There is ample time or distance to avoid a potential collision; or
- b) The separation remaining is 26% up to and including 50% of the required minimum, and ATC resolved the situation; or
- c) The separation remaining is 51% or more of the required minimum and no ATC action is taken, or the initial action to resolve the situation was determined by the pilot.

25) Loss of Runway Separation Category D: An incident in which a reduction in required runway separation occurs where:

- a) The separation remaining is 51% or more of the required minimum and ATC resolved the situation; or
- b) An aircraft is in receipt of a landing or take-off clearance, while another aircraft is on the runway, and the initial action to resolve the situation was determined by the pilot.

26) LSALT/Terrain Event: An incident where an IFR aircraft is flown below a Lowest Safe Altitude (LSALT) or an ATC Minimum Radar Vectoring Altitude (MRVA)

27) LVP Violations: An incident where an aircraft conducts an operation when RVR, Met visibility and/or cloud base conditions are below the required approach minima or the aerodrome operator minima.

28) Maneuvering Area Excursion:

- a) Category A: An incident in which an aircraft has an excursion from a runway – i.e. overruns, excursion off the side of the runway – resulting in damage to aircraft
- b) Category B: An incident in which an aircraft has an excursion from a taxiway – excursion off the side of the taxiway – resulting in damage to aircraft

- c) Category C: An incident in which an aircraft has an excursion from a runway – i.e. overruns, excursion off the side of the runway – resulting in no damage to aircraft
- d) Category D: An incident in which an aircraft has an excursion from a taxiway- excursion off the side of the taxiway – resulting in no damage to aircraft.

29) Medical Emergency: An incident where a pilot reports a medical emergency requiring a diversion or priority track or landing due to a sick or injured passenger or crew member.

30) Military Due Regard Event: An incident where actions of a military aircraft under limited civil ATC control results in a situation where flight safety in controlled airspace is or may have been compromised.

31) Non-compliance with climb gradient: An incident where an aircraft fails to comply with the published minimum departure climb gradient requirement.

32) Operator complaint or operational issue (not resulting in any other category) : An incident involving:

- a) A direct operational related complaint or query received from an operator or State; or
- b) An ATC issue with an operator

33) Runway Incursion Category A: A serious incident in which a collision is narrowly avoided.

34) Runway Incursion Category B: A runway incursion in which the separation decreases and there is a significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision. This includes a runway incursion occurring while a departing aircraft has commenced its take-off roll or an arriving aircraft has crossed the threshold.

35) Runway Incursion Category C: A runway incursion characterized by ample time and/or distance to avoid a collision, including a runway incursion occurring while a departing aircraft has been cleared to line up, or cleared for take-off or an arriving aircraft has been cleared to land but has not crossed the threshold.

36) Runway Incursion Category D: A runway incursion that meets the definition of a runway incursion such as the incorrect presence of a vehicle, person or aircraft on the protected area of a surface designated for the landing and take-off of aircraft but with no immediate safety consequences.

37) Runway Incursion Category E: Insufficient information or inconclusive or conflicting evidence precludes a severity assessment.

38) Runway Operation Incident An incident occurring on a runway, where operational safety was or may have been affected, excluding a runway incursion, such as

- a) an aircraft conducts an operation on a runway without proper authority, e.g. conducting a take-off or landing on an operational or closed runway without a clearance; or
- b) attempting a take-off or landing from a taxiway not approved for such an operation.

39) Security Event: An incident involving a security event relating to an aircraft, which may adversely affect flight safety, such as a Hijack, Bomb Warning or an unruly passenger, which results in a request for a priority diversion or landing, or the attendance to an aircraft by security personnel.

40) Taxiway Incursions

41) Technical Problem: An incident excluding a declared emergency where a pilot reports an aircraft technical problem.

42) Visual Hazard Report: An incident where a pilot or ATC unit becomes aware of a situation involving a light source, including laser, spotlights or pyrotechnics, where flight safety was or may have been compromised

43) Wake Turbulence Event: An incident relating to a pilot's report of turbulence, or its effects, from another aircraft's wake, excluding a reduction of required wake turbulence separation.

V. AERODROMES

1) Maneuvering Area Excursion - Category A - An incident in which an aircraft has an excursion from a runway – i.e. overruns, excursion off the side of the runway – resulting in damage to aircraft.

2) Maneuvering Area Excursion - Category B - An incident in which an aircraft has an excursion from a taxiway – excursion off the side of the taxiway – resulting in damage to aircraft.

3) Maneuvering Area Excursion - Category C - An incident in which an aircraft has an excursion from a runway – i.e. overruns, excursion off the side of the runway – resulting in no damage to aircraft.

4) Maneuvering Area Excursion - Category D - An incident in which an aircraft has an excursion from a taxiway – excursion off the side of the taxiway – resulting in no damage to aircraft.

5) FOD Category A - FOD which is likely to cause damage to an aircraft on runway or runway shoulder.

6) FOD Category B - FOD which is likely to cause damage to an aircraft found within runway strip or RESA.

7) Aircraft Damage Category A - Destroyed – Aircraft is unlikely to ever fly again – total write off.

8) Aircraft Damage Category B - Substantially Damaged – Major damage that prevents the aircraft from flight until significant maintenance is undertaken.

9) Aircraft Damage Category C - Minor Damage – Minor damage that prevents the aircraft from immediate flight and requires some maintenance to rectify.

10) Runway Incursion - Category A - A serious incident in which a collision is narrowly avoided.

11) Runway Incursion - Category B - A Runway Incursion incident in which the separation decreases and there is a significant potential for collision, which may result in a time critical corrective / evasive response to avoid a collision, including a runway incursion occurring while a departing aircraft has commenced its take-off roll or an arriving aircraft has crossed the threshold.

12) Runway Incursion - Category C - A Runway Incursion incident characterised by ample time and/or distance to avoid a collision, including a runway incursion occurring while a departing aircraft has been cleared to line up, or cleared for take-off, or an arriving aircraft has been cleared to land but has not crossed the threshold.

13) Runway Incursion - Category D - A Runway Incursion incident that meets the definition of a runway incursion such as the incorrect presence of a single vehicle, person or aircraft on the protected area of a surface designated for the landing and take-off of aircraft but with no immediate safety consequences.

14) Bird & Wildlife Hazard - Category A - An incident where a pilot experiences wildlife striking an aircraft resulting in significant damage to the aircraft and or requiring an aborted take-off, in-flight diversion, prioritized landing or resulting in an accident.

15) Bird & Wildlife Hazard - Category B - An incident where a pilot reports an actual or potential wildlife strike, which does not result in significant damage or adversely affect the flight.

16) Bird & Wildlife Hazard - Category C - An incident where dead wildlife is found on the runway when a strike has not been reported by a pilot.

17) Taxiway Incursion Category A: A Taxiway Incursion incident in which there is a potential for collision with an aircraft, which results in a corrective/evasive response to avoid a collision.

18) Taxiway Incursion Category B: A Taxiway Incursion incident that meets the definition of a taxiway incursion such as the incorrect presence of a vehicle, person or aircraft on the taxiway or within the taxiway strip with no safety consequence.

VI. REPORTABLE INCIDENT TO SPECIFIC SYSTEMS

The following subparagraphs give examples of reportable incidents resulting from the application of the generic criteria to specific systems:

1) Air conditioning/ventilation

- a) Complete loss of avionics cooling;
- b) depressurization

2) Auto-flight system

- a) Failure of the auto-flight system to achieve the intended operation while engaged
- b) Significant reported crew difficulty to control the aircraft linked to auto-flight system functioning
- c) Failure of any auto-flight system disconnect device
- d) Un-commanded auto-flight mode change

3) Communications

- a) Failure or defect of Passenger Address System resulting in loss or inaudible passenger address;
- b) Total loss of communication in flight.

4) Electrical system

- a) loss of one electrical system distribution system (AC or DC)
- b) total loss or loss of more than one electrical generation system
- c) failure of the backup (emergency) electrical generating system

5) Cockpit/Cabin/Cargo

- a) Pilot seat control loss during flight;
- b) Failure of any emergency system or equipment, including emergency evacuation signalling system, all exit doors, emergency lighting, etc.;
- c) Loss of retention capability of the cargo loading system.

6) Fire protection system

- a) Fire warnings, except those immediately confirmed as false;
- b) Undetected failure or defect of fire/smoke detection/protection system, which could lead to loss or reduced fire detection/protection;

- c) Absence of warning in case of actual fire or smoke.

7) Flight controls

- a) Asymmetry of flaps, slats, spoilers etc.;
- b) Limitation of movement, stiffness or poor or delayed response in the operation of primary flight control systems or their associated tab and lock systems;
- c) Flight control surface run away;
- d) Flight control surface vibration felt by the crew;
- e) Mechanical flight control disconnection or failure;
- f) Significant interference with normal control of the aircraft or degradation of flying qualities;

8) Fuel system

- a) fuel quantity indicating system malfunction resulting in total loss or erroneous indicated fuel quantity on board;
- b) leakage of fuel which resulted in major loss, fire hazard , significant contamination;
- c) malfunction or defects of the fuel jettisoning system which resulted in inadvertent loss of significant quantity, fire hazard, hazardous contamination of aircraft equipment or inability to jettison fuel;
- d) fuel system malfunctions or defects which had a significant effect on fuel supply and/or distribution;
- e) inability to transfer or use total quantity of usable fuel;

9) Hydraulics

- a) loss of one hydraulic system (ETOPS only)
- b) failure of the isolation system to operate
- c) loss of more than one hydraulic circuits
- d) failure of the backup hydraulic system
- e) inadvertent Ram Air Turbine extension

10) Ice detection/protection system

- a) undetected loss or reduced performance of the anti-ice/de-ice system
- b) loss of more than one of the probe heating systems
- c) inability to obtain symmetrical wing de icing
- d) abnormal ice accumulation leading to significant effects on performance or handling qualities
- e) crew vision significantly affected

11) Indicating/warning/recording systems

- a) malfunction or defect of any indicating system when the possibility of significant misleading indications to the crew could result in an inappropriate crew action on an essential system
- b) loss of a red warning function on a system
- c) For glass cockpits: loss or malfunction of more than one display unit or computer involved in the display/warning function.

12) Landing gear system /brakes/tyres

- a) Brake fire
- b) Significant loss of braking action
- c) Unsymmetrical braking leading to significant path deviation
- d) Failure of the L/G free fall extension system (including during scheduled tests)
- e) Unwanted gear or gear doors extension/retraction
- f) Multiple tyres burst

13) Navigation systems (including precision approaches system) and air data systems

- a) Total loss or multiple navigation equipment failures;
- b) Total failure or multiple air data system equipment failures;
- c) Significant misleading indication;
- d) Significant navigation errors attributed to incorrect data or a database coding error;
- e) Unexpected deviations in lateral or vertical path not caused by pilot input;
- f) Problems with ground navigational facilities leading to significant navigation errors not associated with transitions from inertial navigation mode to radio navigation mode.

14) Oxygen

- a) for pressurized aircraft: loss of oxygen supply in the cockpit;
- b) loss of oxygen supply to a significant number of passengers (more than 10%), including when found during maintenance or training or test purposes.

15) Bleed air system

- a) Hot bleed air leak resulting in fire warning or structural damage;
- b) Loss of all bleed air systems;
- c) Failure of bleed air leak detection system.

APPENDIX 5.2E

RASG-MID SAFETY ADVISORY – 19

(RSA-19)



7 November 2022

MID-Region

Guidance Material for SMS Assessment

Date of Issue:	November 2022
Revision No:	First Edition – November 2022
Document Ref. No.:	RSA-19

Owner:	RASG-MID

These guidelines are developed by the Safety Enhancement Implementation Group (SEIG), as part of MID Region Aviation Safety Plan (MID-RASP) 2020-2022 Edition Safety Enhancement Initiatives (Ref: G5-SEI-01: A6) based on the work of the UAE General Civil Aviation Authority in coordination with ICAO MID Regional Office and the Regional Aviation Safety Group - Middle East (RASG-MID).

Disclaimer

This document is intended to provide guidance for civil aviation authorities in order to support States' on developing and conducting an SMS oversight on their Service providers.

This document has been also compiled by members of the aviation industry to improve aviation safety at the regional level. It is not intended to supersede or replace existing materials produced by the State or in ICAO SARPs. The distribution or publication of this document does not prejudice the State's ability to enforce existing National regulations. To the extent of any inconsistency between this document and the National/International regulations, standards, recommendations or advisory publications, the content of the National/International regulations, standards, recommendations and advisory publications should prevail.

REFERENCE :		
TITLE :	GUIDANCE - SMS ASSESSMENT	

INFORMATION					
Assessment Title :		Compliance ☐	Effectiveness ☐	Assessment Date :	
Organization :				Certificate No.	
Post Holder Name :		Title:		Present ☐	Absent ☐
Delegated / Representative:		Title:			
Assessment Team:	Lead:	SME:		Member 1:	
	Member 2:	Member 3:		Member 4:	
Assessment Criteria					
Applicable Regulations (LOCAL):		Additional Applicable References			
Applicable Manual/s:					

ASSESSMENT SUMMARY

1. SAFETY POLICY AND OBJECTIVES 1.1

MANAGEMENT COMMITMENT

ICAO References		Local Requirements - <i>(Local Regulation Reference)</i> .				
1. Annex 19 Appendix 2 Page APP 2-2 2. DOC 9859 4 th edition Ch. 9 / 9.3		(Adopted from UAE GCAA References). The service provider shall define its safety policy in accordance with <i>(Local Regulation Reference)</i> . The safety policy shall: 1) include a clear statement about the provision of the necessary resources for the implementation of the safety policy; 2) be signed by the accountable executive of the organization; 3) be periodically reviewed to ensure it remains relevant and appropriate to the service provider.				
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
1.1.1	There is a safety policy, signed by the Accountable Manager, which includes a commitment to continuous improvement; observe all applicable legal requirements and standards; and considers best practices.					
1.1.2	The safety policy includes a statement to provide appropriate resources and the organization is managing resources by anticipating and addressing any shortfalls.					
1.1.3	There are policies in place for safety critical roles relating to all aspects of Fitness for Duty (for example, Alcohol and Drugs Policy or Fatigue).					
Guidance	Present	Suitable		Operating		Effective
	There is a safety policy, signed by the Accountable Manager, which includes a commitment to continuous improvement; observes all applicable legal requirements and standards; and considers best practices. The safety policy includes a statement to provide appropriate resources	The safety policy is easy to read. The content is customized to the organization. There is a process for assessing resources and addressing any shortfalls.		The safety policy is reviewed periodically to ensure it remains relevant to the organization. The organization is assessing the resources being provided to deliver a safe service and taking action to address any shortfalls.		The Accountable Executive is familiar with the contents of the safety policy and endorses it. The organization is reviewing and taking action to address any forecasted shortfalls in resources.

ICAO References		Local Requirements - <i>(Local Regulation Reference)</i> .					
1. Annex 19 Appendix 2 Page APP 2-2 2. DOC 9859 4 th edition Ch. 9 / 9.3		(Adopted from UAE GCAA References). The safety policy shall : 4) reflect organizational commitment regarding safety; 5) be communicated, with visible endorsement, throughout the organization;					
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks	
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.							
1.1.4	There is a means in place for the communication of the safety policy.						
1.1.5	The Accountable Executive and the senior management team promote a positive safety/just culture and demonstrate their commitment to the safety policy through active and visible participation in the safety management system.						
Guidance	Present	Suitable		Operating		Effective	
	There is a means in place for the communication of the safety policy. The management commitment to safety is documented within the safety policy.	The safety policy is clearly visible to all staff (consider multiple sites). The safety policy is understandable (consider multiple languages). The Accountable Executive and the senior management team have a well-defined role in the safety management system.		The safety policy is communicated to all personnel (including relevant contract staff and organizations). The Accountable Executive and the senior management team are promoting their commitment to the safety policy through active and visible participation in the safety management system.		Staff across the organization are familiar with the policy and can describe their obligations in respect of the safety policy. Decision making, actions, and behaviors reflect a positive safety/just culture and there is good safety leadership that demonstrates commitment to the safety policy.	

ICAO References		Local Requirements - <i>(Local Regulation Reference)</i> .				
1. Annex 19 Appendix 2 Page APP 2-2 2. DOC 9859 4 th edition Ch. 9 / 9.3		(Adopted from UAE GCAA References). The safety policy shall: 6) establish a non-punitive approach which supports safety reporting and encourages an open reporting culture for the purpose of safety improvement, not to apportion blame; 7) Clearly indicate which types of behaviors are unacceptable related to the service provider's aviation activities and include the circumstances under which disciplinary action would not apply.				
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
1.1.6	The safety policy actively encourages safety reporting.					
1.1.7	A just culture policy and principles have been defined that clearly identifies acceptable and unacceptable behaviors to promote a just culture.					
Guidance	Present	Suitable		Operating		Effective
	A Just Culture Policy and principles have been defined.	The just culture policy clearly identifies acceptable and unacceptable behaviors. The principles ensure that the policy can be applied consistently across the whole organization. The just culture policy and principles are understandable and clearly visible.		There is evidence of the Just Culture policy and supporting principles being applied and promoted to staff.		The Just Culture policy is applied in a fair and consistent manner and staff trust the policy. There is evidence that the line between acceptable and unacceptable behavior has been determined based in best practice.

ICAO References		Local Requirements - <i>(Local Regulation Reference)</i> .					
1. Annex 19 Appendix 2 Page APP 2-2 2. DOC 9859 4 th edition Ch. 9 / 9.3		(Adopted from UAE GCAA References). 8) Safety objectives identify what the organization intends to achieve in terms of safety management and they are expressed as a top-level statement describing the organization's commitment to achieving safety. 9) The safety objectives are linked with the Safety Performance Indicators, targets and mitigation plans.					
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks	
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.							
1.1.8	Safety objectives have been established that are consistent with the safety policy and they are communicated throughout the organization.						
1.1.9	The State Safety Program (SSP) is being considered and addressed as appropriate.						
Guidance	Present	Suitable		Operating		Effective	
	Safety objectives have been established that are consistent with the safety policy and there is a means to communicate them throughout the organization.	Safety objectives are relevant to the organization and its activities. Safety objectives are understandable and clearly visible. Safety objectives are aligned with the SSP.		Safety objectives are being regularly reviewed and are communicated throughout the organization.		Achievement of the safety objectives is being monitored by senior management and action taken to ensure they are being met.	

1.2 SAFETY ACCOUNTABILITY AND RESPONSIBILITIES

ICAO References		Local Requirements - <i>(Local Regulation Reference)</i> .				
1. Annex 19 Appendix 2 Page APP 2-2 2. DOC 9859 4 th edition Ch. 9 / 9.3.5		(Adopted from UAE GCAA References). The organization shall : 1) identify the Accountable Manager who has full control of the resources, final authority over operations under the certificate approval of the organization. 2) S/He shall have ultimate responsibility and accountability for the establishment, implementation and maintenance of the SMS; safety policies and the resolution of all safety issues.				
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
1.2.1	An Accountable Executive has been appointed with full responsibility and accountability to ensure the SMS is properly implemented and performing effectively.					
1.2.2	The Accountable Executive is fully aware of their SMS roles and responsibilities in respect of the safety policy, safety standards, and safety culture of the organization.					
Guidance	Present	Suitable		Operating		Effective
	An accountable Manager has been appointed with full responsibility and ultimate accountability for the SMS.	The Accountable Executive has control of resources.		The accountable manager ensures that the SMS is properly resourced, implemented and maintained and has the authority to stop the operation if there is an unacceptable level of safety risk. The Accountable Executive is fully aware of their SMS roles and responsibilities. The Accountable Executive is accessible to the staff in the organization.		The accountable manager ensures that the performance of the SMS is being monitored, reviewed and improved.

ICAO References		Local Requirements - <i>(Local Regulation Reference)</i> .					
1. Annex 19 Appendix 2 Page APP 2-2 2. DOC 9859 4 th edition Ch. 9 / 9.3.5		(Adopted from UAE GCAA References). The organization shall: b) clearly define lines of safety accountability throughout the organization, including a direct accountability for safety on the part of senior management; c) identify the responsibilities of all members of management, irrespective of other functions, as well as of employees, with respect to the safety performance of the SMS; d) document and communicate safety responsibilities, accountabilities and , and authorities throughout the organization; and e) define the levels of management with authority to make decisions regarding safety risk tolerability.					
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks	
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.							
1.2.3	Safety accountabilities, authorities, and responsibilities are defined and documented throughout the organization and staff understand their own responsibilities.						
Guidance	Present	Suitable		Operating		Effective	
	The safety accountability, authorities and responsibilities are clearly defined and documented.	Individuals have access to their safety accountability, authorities, and responsibilities (for example, through job descriptions or organizational charts).		Everyone in the organization is aware of and fulfil their safety responsibilities, authorities and accountabilities and encouraged to contribute to the SMS.		The Accountable Manager and the senior management team are aware of the risks faced by the organization and SMS principles exist throughout the organization so that safety is part of the everyday language.	

1.3 APPOINTMENT OF KEY PERSONNEL

ICAO References		Local Requirements - <i>(Local Regulation Reference)</i> .				
1. Annex 19 Appendix 2 Page APP 2-3 2. DOC 9859 4 th edition Ch. 9 / 9.3.6		(Adopted from UAE GCAA References). The organization shall appoint a properly educated, trained and experienced person who fulfils the role of Post Holder SMS for the development and maintenance of an effective Safety Management System.				
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
1.3.1	A competent safety manager who is responsible for the implementation and maintenance of the SMS has been appointed with a direct reporting line to the Accountable Executive.					
1.3.2	The organization has allocated sufficient resources to manage the SMS including, but not limited to, competent staff for safety investigation, analysis, auditing, and promotion.					
Guidance	Present	Suitable		Operating		Effective
	A Safety Manager who is responsible for the implementation and maintenance of the SMS has been appointed with a direct reporting line with the Accountable Manager.	The Safety Managers is competent. Sufficient time and resources are allocated to maintain the SMS.		The Safety Manager has implemented and is maintaining the SMS. The Safety Manager is in regular communication with the Accountable Manager and escalates safety issues when appropriate. The Safety Manager is accessible to staff in the organization.		The Safety Manager is competent to manage the SMS and identifies improvements in a timely manner. There is a close working relationship with the Accountable Manager and the Safety Manager is considered a trusted advisor and given appropriate status in the organization.

ICAO References		Local Requirements - <i>(Local Regulation Reference)</i> .				
1. Annex 19 Appendix 2 Page APP 2-3 2. DOC 9859 4 th edition Ch. 9 / 9.3.6		(Adopted from UAE GCAA References) - Depending on size, complexity and nature the organization may need to establish a Safety Review Board (SRB) which is a high level committee that considers matters of strategic safety importance in support of the Accountable Manager's safety accountability. - Organizations may establish a Safety Action Group to achieve the established performance, which reports to and takes strategic direction from the SRB.				
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
1.3.3	The organization has established appropriate safety committee(s) that discuss and address safety risks and compliance issues and includes the Accountable Executive and the heads of functional areas.					
Guidance	Present	Suitable		Operating		Effective
	The organization has established safety committee(s).	Safety committee(s)' structure and frequency supports the SMS functions across the organization. The scope of the safety committee(s) includes safety risks and compliance issues. The attendance of the highest-level safety committee includes at least the Accountable Executive and the heads of functional areas.		There is evidence of meetings taking place detailing the attendance, discussions, and actions. The safety committee(s) monitor the effectiveness of the SMS and compliance monitoring function by reviewing there are sufficient resources. Actions are being monitored and appropriate safety objectives and SPIs have been established.		Safety committees include key stakeholders. The outcomes of the meetings are documented and communicated and any actions are agreed, taken, and followed up in a timely manner. The safety performance and safety objectives are reviewed and actioned as appropriate.

REFERENCE :	GTF-SMS-002ab	 
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

1.4 CO-ORDINATION OF EMERGENCY RESPONSE PLANNING

ICAO References		Local Requirements - (Local Regulation Reference).				
1. Annex 19 Appendix 2 Page APP 2-3 2. DOC 9859 4 th edition Ch. 9 / 9.3.7		(Adopted from UAE GCAA References) The organization shall ensure that the Emergency Response Plan (ERP) is properly coordinated with the Emergency Response Plans of those organizations it must interface with during the provision of its services.				
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
1.4.1	An appropriate emergency response plan (ERP) has been developed and distributed that defines the procedures, roles, responsibilities, and actions of the various organizations and key personnel.					
1.4.2	The ERP is periodically tested for the adequacy of the plan and the results reviewed to improve its effectiveness.					
Guidance	Present	Suitable			Operating	Effective
	An coordinated emergency response plan (ERP) has been developed and distributed.	The ERP defines the procedures, roles, responsibilities, and actions of the various organizations and key personnel. The frequency and methods for testing the ERP are defined. The coordination with other organizations (including no aviation organizations) is defined with appropriate means.			The ERP is reviewed and tested to make sure it remains up to date. Key personnel have easy access to the relevant parts of the ERP at all times. There is evidence of coordination with other organizations as appropriate.	The results of the ERP review and testing are assessed and actioned to improve its effectiveness.

REFERENCE :	GTF-SMS-002ab	
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

1.5 SMS DOCUMENTATION

ICAO References		Local Requirements - (Local Regulation Reference).				
1. Annex 19 Appendix 2 Page APP 2-3 2. DOC 9859 4 th edition Ch. 9 / 9.3.8		(Adopted from UAE GCAA References) (a) The organization shall develop an SMS Manual endorsed by the Accountable Manager and acceptable to the Authority. (b) The organization shall establish a system of record keeping that allows adequate storage and reliable traceability of all records related to SMS processes.				
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
1.5.1	The SMS documentation includes the policies and processes that describe the organization's safety management system and processes and is readily available to all relevant personnel.					
1.5.2	SMS documentation, including SMS related records, are regularly reviewed and updated with appropriate version control in place.					
Guidance	Present	Suitable			Operating	Effective
	The SMS documentation includes the policies and processes that describe the organization's SMS and processes. The SMS documentation defines the SMS outputs and which records of SMS activities will be stored. Records to be stored, storage period, and location are identified.	The ERP defines the procedures, roles, responsibilities, and actions of the various organizations and key personnel. The frequency and methods for testing the ERP are defined. The coordination with other organizations (including no aviation organizations) is defined with appropriate means.			The ERP is reviewed and tested to make sure it remains up to date. Key personnel have easy access to the relevant parts of the ERP at all times. There is evidence of coordination with other organizations as appropriate.	SMS documentation is proactively reviewed for improvement. SMS records are routinely used as inputs for safety management-related tasks and continuous improvement of the SMS.

REFERENCE :	GTF-SMS-002ab	 
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

2. SAFETY RISK MANAGEMENT

2.1 HAZARD IDENTIFICATION

ICAO References		Local Requirements - <i>(Local Regulation Reference)</i> .				
1. Annex 19 Appendix 2 Page APP 2-3 2. DOC 9859 4 th edition Ch. 9 / 9.4.4 & 9.4.5		(Adopted from UAE GCAA References) – Hazard Identification & Service provider safety investigation In order to ensure continuity of data flow through internal safety reporting systems, the organization shall ensure that it effectively implements the non-punitive approach. Organizations should establish internal confidential reporting channels to maximize data capturing.				
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
2.1.1	There is a confidential safety reporting system to capture errors, hazards, and near misses that is simple to use and accessible to all staff.					
2.1.2	The safety reporting system provides feedback to the reporter of any actions taken (or not taken) and, where appropriate, to the rest of the organization.					
2.1.3	Safety investigations are carried out to identify underlying causes and potential hazards for existing and future operations.					
2.1.4	Safety reports are acted on in a timely manner.					

REFERENCE :	GTF-SMS-002ab	
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

2.1.5	Personnel responsible for investigating reports are trained in investigation techniques.					
2.1.6	Investigations establish causal/contributing factors (why it happened, not just what happened)					
2.1.7	Personnel express confidence and trust in the organization's reporting policy.					
Guidance	Present	Suitable			Operating	
	There is a confidential reporting system to capture mandatory occurrences and voluntary reports that includes a feedback system and stored on a database. The process identifies how reports are actioned, and timescales are specified and addressed.	The reporting system is accessible and easy to use by all personnel. Responsibilities, timelines, and format for the feedback are meaningful and well defined. Data protection and confidentiality is ensured.			The reporting system is being used by all staff. There is feedback to the reporter of any actions taken (or not taken) and, where appropriate, to the rest of the organization. Reports are evaluated, processed, analyzed, and stored. Reports are processed within the defined timescales.	
					Effective	
					There is a healthy reporting system based on the volume of reporting and the quality of reports received. Safety reports are acted on in a timely manner. Staff express confidence and trust in the organizations' reporting policy and process. The reporting system is being used to make better management decisions and continuously improve. The reporting system is available for third parties to report (partners, suppliers, and contractors).	

REFERENCE :	GTF-SMS-002ab	
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

ICAO References	Local Requirements - (Local Regulation Reference).
1. Annex 19 Appendix 2 Page APP 2-3 2. DOC 9859 4th edition Ch. 9 / 9.4.4 & 9.4.5	(Adopted from UAE GCAA References) The organization shall develop, implement and maintain a process that ensures that hazards associated with its aviation products or services are identified. In addition to the proactive and reactive methods of safety data collection the organization should employ where practical predictive methodologies which could arrest risks from potential hazards.

Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
2.1.8	There is a process that defines how hazards are identified from multiple sources through reactive and proactive methods (internal and external).					
2.1.9	The hazard identification process identifies human performance related hazards.					
2.1.10	There is a process in place to analyze safety data and safety information to look for trends and gain useable management information.					
	Present	Suitable		Operating		Effective
Guidance	There is a process that defines how hazards are identified through reactive and proactive methods. The triggers for safety investigations are defined.	Multiple sources of hazards (internal and external) are considered and reviewed, as appropriate. Hazards are documented in an easy-to-understand format. The level of sign-off for safety investigations is defined and commensurate with the level of risk. The data analysis process enables gaining useable safety information.		The hazards are identified and documented. Human and organizational factors related to hazards are being identified. Safety investigations are carried out and recorded.		The organization is continuously and proactively identifying hazards related to its activities and the operational environment and involves all key personnel and appropriate stakeholders including external organizations. Hazards are continuously assessed in a systematic and timely manner. A register of the hazards that is maintained and reviewed to ensure it remains up-to-date. Safety investigations identify causal/contributing factors that are acted upon.

REFERENCE :	GTF-SMS-002ab	
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

2.2 SAFETY RISK ASSESSMENT AND MITIGATION

ICAO References		Local Requirements - (Local Regulation Reference).				
1. Annex 19 Appendix 2 Page APP 2-3 2. DOC 9859 4 th edition Ch. 9 /9.4.6		(Adopted from UAE GCAA References) The organization shall develop, implement and maintain a process that ensures analysis, assessment and acceptable control of the safety risks associated with identified hazards.				
Compliance and Performance Indicators (Adopted from CASA)		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
2.2.1	There is a structured process for the management of risk that includes the assessment of risk associated with identified hazards expressed in terms of likelihood and severity.					
2.2.2	There are criteria for evaluating the level of risk the organization is willing to accept and risk assessments and ratings are appropriately justified.					
	Present	Suitable			Operating	Effective
Guidance	There is a process for the analysis and assessment of safety risks. The level of risk the organization is willing to accept is defined.	Organization has tailored and defined it's severity and likelihood criteria to fit it's actual circumstances. Risk assessment and mitigation responsibilities, rights and time-lines are clearly defined in the risk assessment and mitigation process and practical based on the size and complexity of the organization.			Risk analysis and assessments are carried out in a consistent manner based on the defined process. The defined risk acceptability is being applied.	Risk analysis and assessments are reviewed for consistency and to identify improvements in the processes. Risk assessments are regularly reviewed to ensure they remain current. Risk acceptability criteria are used routinely and applied in management decision making processes and are regularly reviewed.

REFERENCE :	GTF-SMS-002ab	 
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

ICAO References		Local Requirements - (Local Regulation Reference).				
1. Annex 19 Appendix 2 Page APP 2-3 2. DOC 9859 4 th edition Ch. 9 /9.4.6		(Adopted from UAE GCAA References) The organization shall develop, implement and maintain a process that ensures analysis, assessment and acceptable control of the safety risks associated with identified hazards.				
Compliance and Performance Indicators		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
2.2.3	The organization has a process in place to make decisions and apply appropriate and effective risk controls.					
2.2.4	Senior management have visibility of medium and high risk hazards and their mitigation and controls.					
	Present	Suitable			Operating	Effective
Guidance	The organization has a process in place to decide and apply risk controls.	Responsibilities and timelines for determining and accepting the risk controls are defined.			Appropriate risk controls are being applied to reduce the risk to an acceptable level including timelines and allocation of responsibilities. Human Factors are considered as part of the development of risk controls.	Risk controls are practical and sustainable, applied in a timely manner, and do not create additional risks. Risk controls take Human Factors into consideration.

REFERENCE :	GTF-SMS-002ab	
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

3. SAFETY ASSURANCE

3.1 SAFETY PERFORMANCE MONITORING AND MEASUREMENT

ICAO References	Local Requirements - (Local Regulation Reference).
1. Annex 19 Appendix 2 Page APP 2-4 2. DOC 9859 4 th edition Ch. 9 /9.5	(Adopted from UAE GCAA References) The organization shall establish safety performance monitoring and measurement processes by the establishment of Safety Performance Indicators (SPI) and Safety Performance Targets (SPT) to verify its safety performance and validate the effectiveness of the safety risk controls.

Compliance and Performance Indicators		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
3.1.1	Safety performance indicators (SPIs) linked to the organization's safety objectives have been defined, promulgated, and are being monitored and analyzed for trends.					
3.1.2	The organization uses a combination of leading and lagging indicators to measure the safety performance of the organization					
Guidance	Present	Suitable			Operating	Effective
	There is a process in place to measure the safety performance of the organization including SPIs and targets linked to the organization's safety objectives and to measure the effectiveness of safety risk controls.	SPIs are focused on what is important rather than what is easy to measure. Reliability of data sources is considered in the design of SPIs. SPIs are linked to the identified risks and safety objectives. Frequency and responsibility for the trend monitoring of SPIs are appropriate. Realistic targets have been set. State SPIs are considered, as applicable.			The safety performance of the organization is being measured and meaningful SPIs are being continuously monitored and analyzed for trends.	SPIs are demonstrating the safety performance of the organization and the effectiveness of risk controls based on reliable data. SPIs are reviewed and regularly updated to ensure they remain relevant. Where the SPIs indicate that a risk control is ineffective, appropriate action is taken.

REFERENCE :	GTF-SMS-002ab	
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

ICAO References	Local Requirements - (Local Regulation Reference).
1. Annex 19 Appendix 2 Page APP 2-4 2. DOC 9859 4th edition Ch. 9 /9.5	(Adopted from UAE GCAA References) - The organization shall develop, document and maintain safety assurance processes to ensure that the safety risks controls established as a consequence of the hazard identification and risk management activities achieve their intended objectives. - Safety assurance consists of processes and activities undertaken by the organization to determine whether the SMS is operating according to expectations and requirements.

Compliance and Performance Indicators		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
3.1.3	Risk mitigations and controls are being verified/audited to confirm they are working and effective.					
3.1.4	Safety audits and surveys are carried out that focus on the safety performance of the organization and its services and assess normal operations.					
3.1.5	Safety Assurance and Compliance Monitoring activities feed back into the hazard identification and risk management process.					
3.1.6	Safety assurance takes into account activities carried out by all directly contracted organizations.					
Guidance	Present	Suitable		Operating		Effective
	There is a process in place to assess whether the risk controls are applied and effective.	Responsibilities, methods, and timelines for assessing risk controls are defined. Contracted organizations are included in the safety assurance process.		Risk controls are being verified to assess whether they are applied and effective.		Risk controls are assessed and actions taken to ensure they are effective and delivering a safe service.

REFERENCE :	GTF-SMS-002ab	
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

3.2 MANAGEMENT OF CHANGE

ICAO References		Local Requirements - (Local Regulation Reference).				
1. Annex 19 Appendix 2 Page APP 2-4 2. DOC 9859 4 th edition Ch. 9 /9.5.5		(Adopted from UAE GCAA References) The organization shall develop, document and maintain a process to identify changes which may affect the level of safety risk associated with its aviation products or services and to identify and manage the safety risks or hazards that may arise from those changes.				
Compliance and Performance Indicators		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
3.2.1	The organization has a process to identify whether changes have an impact on safety and to manage any identified risks in accordance with existing safety risk management processes.					
3.2.2	Human Factor (HF) issues have been considered as part of the change management process and, where appropriate, the organization has applied the appropriate HF/human-centered design standards to the equipment and physical environment design.					
Guidance	Present	Suitable		Operating		Effective
	The organization has established a change management process to identify whether changes have an impact on safety and to manage any identified risks in accordance with existing safety risk management processes.	Triggers for the change management process are defined. The process also considers business related changes and interfaces with other organizations/departments. The process is integrated with the risk management and safety assurance processes. Responsibilities and timelines are defined.		The change management process is being used and includes hazard identification and risk assessments with appropriate risk controls being put in place before a decision to make the change is taken. HF issues have been considered and been addressed as part of the change management process.		The change management process is used for all changes that may impact safety, including HF issues, and considers the accumulation of multiple changes. It is initiated in a planned, timely, and consistent manner and includes follow up action that ensures the change was implemented safely. The change is communicated to those affected. Risk control and mitigation strategies associated with changes are achieving the planned effect.

REFERENCE :	GTF-SMS-002ab	 
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

3.3 CONTINUOUS IMPROVEMENT OF THE SMS

ICAO References		Local Requirements - (Local Regulation Reference).				
1. Annex 19 Appendix 2 Page APP 2-4 2. DOC 9859 4 th edition Ch. 9 /9.5.6		(Adopted from UAE GCAA References) The organization shall monitor and assess the effectiveness of its SMS processes to enable continuous improvement of the SMS.				
Compliance and Performance Indicators		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
3.3.1	The organization is continuously monitoring and assessing its SMS processes to maintain or continuously improve the overall effectiveness of the SMS.					
Guidance	Present	Suitable		Operating		Effective
	There is a process in place to monitor and review the effectiveness of the SMS using the available data and information.	The SMS is periodically reviewed, and the review is supported by safety information and safety assurance activities. Senior management and different departments are involved. The decision making is data informed. External information is considered in addition to internal information.		There is evidence of the SMS being periodically reviewed to support the assessment of its effectiveness and appropriate action being taken.		The assessment of SMS effectiveness uses multiple sources of information including the safety data analysis that supports decisions for continuous improvements.

REFERENCE :	GTF-SMS-002ab	 
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

4. SAFETY PROMOTION

4.1 TRAINING AND EDUCATION

ICAO References		Local Requirements - (Local Regulation Reference).				
1. Annex 19 Appendix 2 Page APP 2-4 2. DOC 9859 4 th edition Ch. 9 /9.6.4		(Adopted from UAE GCAA References) (a) The organization shall develop and maintain a safety training program that ensures that personnel are trained and competent to perform their duties relevant to the organization's SMS. (b) The scope of the safety training program shall be appropriate to each individual's involvement in the SMS.				
Compliance and Performance Indicators		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
4.1.1	There is a training program for SMS in place that includes initial and recurrent training. The training covers individual safety duties (including roles, responsibilities, and accountabilities) and how the organization's SMS operates.					
4.1.2	There is a process in place to measure the effectiveness of training and to take appropriate action to improve subsequent training.					
4.1.3	Training includes human and organizational factors including just culture and non-technical skills with the intent of reducing human error.					
Guidance	Present	Suitable			Operating	Effective
	There is an SMS training program in place that includes initial and recurrent training.	The training covers individual safety duties (including roles, responsibilities, and accountabilities) and how the organization's SMS operates. Training material and methodology are adapted to the audience and include human factors. All staff requiring training are identified.			The SMS training program is delivering appropriate training to the different staff in the organization and is being delivered by competent personnel.	SMS training is evaluated for all aspects (learning objectives, content, teaching methods and styles, tests, etc.) and is linked to the competency assessment. Training is routinely reviewed to take feedback from different sources into consideration.

REFERENCE :	GTF-SMS-002ab	
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

ICAO References		Local Requirements - (Local Regulation Reference).				
1. Annex 19 Appendix 2 Page APP 2-4 2. DOC 9859 4 th edition Ch. 9 /9.6.4		(Adopted from UAE GCAA References) Requirements for maintaining personnel trained and competent to perform their safety and compliance tasks				
Compliance and Performance Indicators		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
4.1.4	There is a process that evaluates the individual's competence and takes appropriate remedial action when necessary.					
4.1.5	The competence of trainers is defined and assessed and appropriate remedial action taken when necessary.					
Guidance	Present	Suitable		Operating		Effective
	A competency framework is defined for all personnel, including trainers.	There is a process in place to periodically assess the actual competency of personnel against the framework.		There is evidence of the process being used and being recorded.		The competence assessment program and process is routinely reviewed and improved. The competence assessment takes appropriate remedial action when necessary and feeds into the training program.

REFERENCE :	GTF-SMS-002ab	
TITLE :	CHECKLIST - AUDIT - SMS ASSESSMENT TOOL	

4.2 SAFETY COMMUNICATION

ICAO References		Local Requirements - <i>(Local Regulation Reference)</i> .				
1. Annex 19 Appendix 2 Page APP 2-4 2. DOC 9859 4 th edition Ch. 9 /9.6.5		(Adopted from UAE GCAA References) The organization shall develop, document and maintain a formal means for safety communication that: (a) ensures personnel are aware of the SMS to a degree commensurate with their positions in a timely manner; (b) conveys safety-critical information; (c) explains why particular safety actions are taken; and (d) explains why safety procedures are introduced or changed.				
Compliance and Performance Indicators		P	S	O	E	Remarks
Attribution: Material obtained is attributed to CASA as SMS Evaluation Tool and Guidance © Civil Aviation Safety Authority 2021.						
4.2.1	There is a process to determine what safety critical information needs to be communicated and how it is communicated throughout the organization to all personnel, as relevant. This includes contracted organizations and personnel where appropriate.					
Guidance	Present	Suitable		Operating		Effective
	There is a process to communicate safety critical information.	The process determined <i>what, when, and how</i> safety information needs to be communicated. The process includes contracted organizations and personnel where appropriate. The means of communication are adapted to the audience and the significance of what is being communicated.		Safety critical information is being identified and communicated throughout the organization to all personnel, as relevant, including contracted organizations and personnel where appropriate.		The organization analyses and communicates safety critical information effectively through a variety of methods as appropriate to maximize it being understood. Safety communication is assessed to determine how it is being used and understood and to improve it where appropriate.

APPENDIX 5.2F



ICAO MID

SAFETY

MID-RASP

MIDDLE EAST REGIONAL AVIATION SAFETY PLAN



Second Edition

2023-2025

MIDDLE EAST REGIONAL AVIATION SAFETY PLAN (MID-RASP)



SECOND EDITION 2023–2025

Executive Summary

The Global Aviation Safety Plan (GASP) presents the global strategy for the continuous improvement of aviation safety. The purpose of the GASP is to continually reduce fatalities, and the risk of fatalities, by guiding the development of a harmonized aviation safety strategy.

The GASP promotes the effective implementation of a State safety Programme (SSP) including National Aviation Safety Plan (NASP), a State's safety oversight system, and a risk-based approach to managing safety as well as a coordinated approach to collaboration between States, international organizations, and industry.

The vision of the GASP is to achieve and maintain the aspirational safety goal of zero fatalities in commercial operations by 2030 and beyond, which is consistent with the United Nations' *2030 Agenda for Sustainable Development*. The plan's mission is to continually enhance international aviation safety performance and resilience by providing a collaborative framework for States, regions and industry.

The Middle East Regional Aviation Safety Plan (MID-RASP) 2023-2025 Edition considers and supports the objectives and priorities of GASP 2023-2025 Edition. MID-RASP also emphasizes the importance of identifying and mitigating risks at MID region level. In addition, MID-RASP is to create a common focus on regional aviation safety issues as a continuation of the MID region work to improve aviation safety and to comply with ICAO standards and supports MID States and industry in implementing the GASP 2023-2025 Edition.

Furthermore, the States national aviation safety plan (NASPs) should be developed in alignment with the GASP and the MID-RASP. However, priority should be given to national safety concerns. Moreover, the NASP should be also aligned and coordinated with the MID-RASP (as appropriate) and with other efforts aimed at enhancing aviation safety.

MID-RASP provides a three-year plan for States in MID Region to strengthen its safety oversight capability and implement an effective safety management. This relates to the continuous reduction of regional operational risks and improvement in States' safety oversight and safety management capabilities. It adopts a risk-based approach to managing safety at regional-level through a coordinated approach and collaboration between States in the region, regional organizations and industry.

The RASG-MD is the governing body responsible for the development, implementation and monitoring of the MID-RASP, in collaboration with the ICAO MID Office, international and regional organizations and with the aviation industry. The MID-RASP is to be reviewed by the Safety Enhancement Implementation Group (SEIG) every year mainly to include new identified Safety Enhancement initiatives' (SEIs), review the existing SEIs, as well as their respective actions.

The MID Region's strategic approach to managing safety at the regional level is to address the region's operational risks and other safety issues in a timely manner. Therefore, the MID-RASP strategic approach would focus on organizational challenges/issues, regional operational safety risks, and emerging risks as indicated below.

- a. Organizational challenges/issues including the States 'safety oversight, safety management, aircraft accident and incident investigation, human factors and competence of personnel, and Cybersecurity.
- b. Regional operational safety risks, the focus would be on Regional high risks categories (R-HRC) identified in the GASP 2023-2025 Edition mainly the LOCI-I, CFIT, RE, RI, and MAC; and
- c. Emerging risks, the focus would be on COVID-19 pandemic outbreak, Civil drones

(Unmanned Aircraft Systems), GNSS outages, impact of security on safety, and 5G interference with Radar Altimeter frequency band.

MID Region safety indicators and targets were aligned with the 2023-2025 GASP goals and regional specific objectives and priorities. The RASG-MID would use the indicators listed in the MID Region Safety Performance Measurement & Monitoring (SPMM) to measure safety performance and monitor each regional safety target. Moreover, the RASG-MID would continuously monitor the implementation of the SEIs listed in the MID-RASP and measure safety performance of the regional civil aviation system, to ensure the intended results are achieved, using the MID Region SPMM.

The MID Region SPMM includes six (6) Goals in line with GASP 2023-2025 Edition. For each Goal established in the MID Region SPMM, identified SEI(s) be mapped to it including their respective actions. Thus, to address regional operational risks, organizational issues, and emerging risks; 24 SEIs and 61 safety actions have been identified, developed and proposed.

The MID-RASP provides guidance on how States should identify which top risks and key safety issues mentioned in the GASP and MID-RASP apply to their national context and then to be included in their NASPs. States should also add other safety issues which are unique to their operational context. Several MID-RASP SEIs which are intended for implementation by States at the national level are recommended for inclusion in their NASPs.

TABLE OF CONTENTS

Executive Summary

PART-I. PLANNING	8
1. INTRODUCTION.....	8
1.1 Objectives and Principles	8
1.2 Relationship between MID-RASP and GASP and other Plans	8
2. HOW MID-RASP IS STRUCTURED	11
3. HOW MID-RASP IS DEVELOPED AND MONITORED.....	12
4. OPERATIONAL CONTEXT	15
4.1 Worldwide perspective	15
4.2 Middle East Perspective	15
5. STRATEGIC PRIORITIES	17
5.1 Organizational Challenges/Issues.....	19
5.1.1 Strengthening of States' Safety Oversight Capabilities.....	19
5.1.2 Improve Regional Cooperation for the Provision of Accident & Incident Investigation	20
5.1.3 Sharing of Safety Recommendations related to Accidents and Serious Incidents.....	20
5.1.4 Improve Implementation of ELP Requirements.....	21
5.1.5 Enhance State Oversight on Dangerous Goods.....	21
5.1.6 Improve the Safety Management	21
5.1.7 Certification of International Aerodromes.....	23
5.1.8 Establishment of Runway Safety Teams at International Airports	23
5.1.9 Human Factors and Competence of Personnel	23
5.1.10 Cybersecurity Resilience	24
5.2 Regional Operational Safety Risks.....	24
5.2.1 Address Operational Safety Risks in Commercial Air Transport (CAT) Aeroplane Operations above 5,700 kgs.....	24
5.2.2 Aircraft Upset in Flight (Loss of Control-Inflight).....	25
5.2.3 Runway Excursion.....	25
5.2.4 Runway Incursion (RI).....	26
5.2.5 Controlled Flight into Terrain (CFIT).....	26
5.2.6 Mid-Air Collision (MAC).....	27
5.3 Emerging Risks	27
5.3.1 GNSS interference	27
5.3.2 COVID-19 Pandemic Outbreak- Safe return to operations	28
5.3.3 Ensure the safe operations of UAS	28
5.3.4 Management of security risks with safety impact.....	29
5.3.5 5G Operation on Radio Altimeter	29
PART-II. IMPLEMENTATION.....	31
6. SAFETY IMPLEMENTATION.....	31
6.1 Safety Monitoring and Implementation.....	31
6.2 Communication of Progress to RASG-MID and Regional Stakeholders	32

7.	SAFETY ACTIONS.....	32
7.1	Organizational Challenges/issues	33
7.1.1	Goal 2: Strengthen States' Safety Oversight Capabilities.....	33
7.1.2	Goal 3: Implementation of Effective States Safety Programme (SSP)....	44
7.1.3	Goal 4: Increase Collaboration at the Regional Level.....	47
7.1.4	Goal 5: Expand the Use of Industry Programmes and safety information sharing networks.....	50
7.1.5	Goal 6: Ensure the Appropriate Infrastructure is available to Support Safe Operations	51
7.2	Regional Operational Safety Risks.....	53
7.2.1	Goal 1: Achieve a continuous reduction in Operational Risks	53

Appendices:

Appendix A:	SEIG Term of References
Appendix B:	Identified safety issues as indicated in the 11 th ASR
Appendix C:	MID Region-Safety Performance Measurement &Monitoring (SPMM)
Appendix D:	Safety Actions- List of consolidated SEIs for follow up
Appendix E:	SEIs identified in MID-RASP and recommended to States for inclusion in their NASPs
Appendix F:	Definitions
Appendix G:	Abbreviations and acronyms

PART-I. PLANNING

1. INTRODUCTION

1.1 Objectives and Principles

The MID Regional Aviation Safety Plan (MID-RASP) presents the **strategic direction** for the **management of aviation safety** at the regional level. It constitutes the regional safety plan for MID Region, setting out the strategic priorities, main risks affecting the regional aviation system and the necessary actions to mitigate those risks to further improve aviation safety.

The purpose of this MID-RASP is to continually reduce fatalities, and the risk of accidents, through the development and implementation of regional SEIs. A safe aviation system contributes to the economic development of MID Region, the States which comprise it, and their industries. In addition, MID-RASP is to create a common focus on regional aviation safety issues as a continuation of the MID Region work to improve aviation safety and to comply with ICAO standards. This approach complements the existing system of developing safety regulations, complying with them and investigating accidents and serious incidents when they occur.

The MID-RASP promotes the effective implementation of a State safety Programme (SSP) and Safety Management System (SMS) including National Aviation Safety plan (NASP), State's safety oversight system, and a risk-based approach to managing safety as well as a coordinated approach to collaboration between States, international organization, and industry. All stakeholders are encouraged to support and implement the MID-RASP as the regional strategy for the continuous improvement of aviation safety.

The MID RASP allows the region to define the strategy for improving safety within a specified timeframe, through defined Safety Enhancement Initiatives (SEIs).

The MID-RASP establishes the first layer of priorities which is further complemented at national level by national safety plans and Programmes. It builds a network for action; thus, coordination and close collaboration are key to keeping it up to date and effective.

The MID-RASP Edition 2023-2025 covers the three-year period between 2023 and 2025 and will be updated on a yearly basis, as required, to cover subsequent three years' periods. It is a rolling 3-year plan.

The planning activity would be followed up by a reporting activity, in which progress on the actions is evaluated and also documented. This feedback loop ensures that the process to manage risks continuously improves and may contribute to the identification of new safety issues.

MID Region is committed to enhancing aviation safety, to the resourcing of supporting activities and to increasing collaboration at the regional level.

1.2 Relationship between MID-RASP and GASP and other Plans

Aviation's contribution towards the United Nations 2030 Agenda for Sustainable Development and in order to maximize the benefits of aviation, the priorities of the aviation sector should be integrated and reflected in State's economic and social development planning with an appropriately balanced development of transport modes, including multi-modal and urban planning initiatives. In addition, recognizing that air transport is a catalyst for sustainable development and that it represents an essential lifeline for Least Developed Countries (LDCs), and especially for Landlocked Developing Countries (LLDCs).

ICAO Business Plan takes into consideration all of the work mandated to be undertaken by ICAO, regardless of source of funding. The Business Plan sets out the Strategic Objectives and priorities to guide the activities of the Organization to support Members States in their attainment of a safe, secure, efficient, economically viable and environmentally responsible air transport network.

ICAO's global plans are essential in supporting safe, secure, efficient, economically viable and environmentally responsible air transportation. They provide a means to advance ICAO's Strategic Objectives. The ICAO global plans include: the GASP, the GANP and the Global Aviation Security Plan (GASeP).

The GASP presents the global strategy for the continuous improvement of aviation safety. The purpose of the GASP is to continually reduce fatalities, and the risk of fatalities, by guiding the development of a harmonized aviation safety.

The purpose of the Global Air Navigation Plan (GANP) is to drive the evolution of the global air navigation system to meet the ever-growing expectations of all sectors in the aviation community by equitably accommodating all airspace user operations in a safe, secure and cost-effective manner while reducing the aviation environmental impact. To this end, the GANP provides a series of operational improvements to increase capacity, efficiency, predictability and flexibility, while ensuring interoperability of systems and harmonization of procedures. The implementation of the GANP is enabled by promoting the effective implementation of safety oversight and a safety management approach to oversight, including SRM to permit innovation in a managed way.

The GASP complements the GANP by providing States and industry with the tools to implement a safety management approach through their SSP and SMS. The GANP, through the evolution of the system described in the conceptual roadmap and the operational improvements detailed in the technical frameworks, supports the goals within the GASP and the GASeP by enhancing safety and security of the air navigation system as reflected in the performance ambitions.

The GASP goals and targets support the GASeP by providing best practices and models that can be as effective in managing security as they are in safety management. These include effective oversight, organizational culture, risk management and assurance processes. The GASeP in turn supports the GASP's vision of zero fatalities.

MID-RASP considers and supports the objectives and priorities of GASP. The purpose of GASP is to continually reduce fatalities, and the risk of accidents, by guiding the development of a harmonized aviation safety strategy and the development and implementation of regional and national aviation safety plans. A safe aviation system contributes to the economic development of States and their industries. The GASP promotes the effective implementation of SSP and SMS including NASP, a State's safety oversight system, and a risk-based approach to managing safety as well as a coordinated approach to collaboration between States, international organizations, and industry. One of the GASP goals is for States to improve their effective safety oversight capabilities and to progress in the implementation of SSPs including NASPs. Thus, GASP calls for States to put in place robust and sustainable safety oversight systems that should progressively evolve into more sophisticated means of managing safety.

Assembly Resolution A40-1 also calls for each State to develop and implement a national aviation safety plan (NASP), in line with the GASP goals, targets and the global high-risk categories of occurrences (G-HRCs). The NASP should also be developed having close regard for the RASP, while acknowledging that each State may have its own, specific safety issues and priorities, including addressing significant safety concerns (SSCs).

In addition, to addressing systemic safety, GASP addresses Global high-risk categories (G-HRC) of occurrences, which are deemed global safety priorities. These categories were determined based on actual fatalities from past accidents, high fatality risk per accident or the number of accidents and incidents. The following G-HRCs have been identified for the 2023-2025 edition of the GASP: controlled flight into terrain (CFIT); Loss of control in flight (LOC-I); Mid-air collision (MAC); runway excursion (RE); and runway incursion (RI). The GASP G-HRCs are addressed in MID-RASP.

The MID-RASP considers the objectives and priorities of the GASP to enhance the level of safety in aviation and to better prepare the Member States for the ICAO Universal Safety Oversight Audit Programme (USOAP) audits and State Safety Programme Implementation Assessment (SSPIA) of their SSPs.

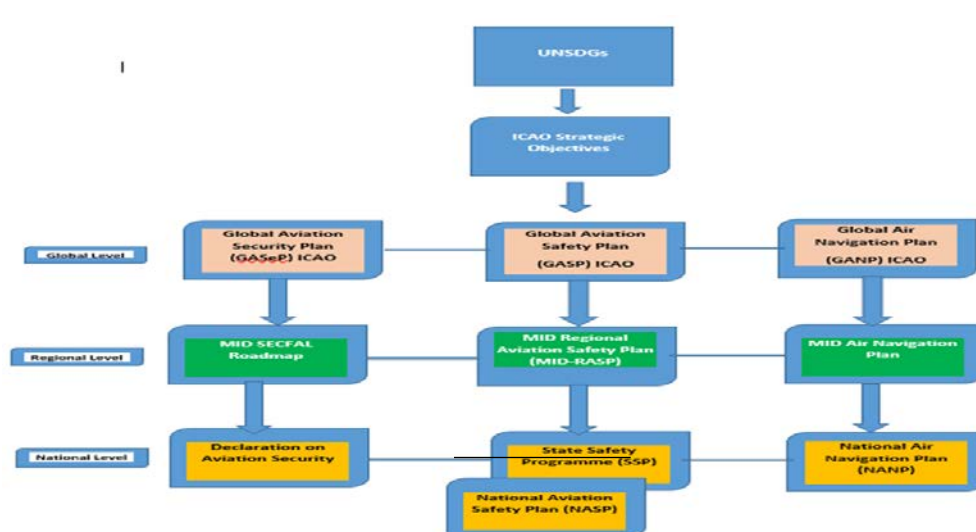
This MID-RASP edition 2023-2025 provides references to corresponding GASP 2023-2025 Safety Enhancement Initiatives (SEIs); covering organizational challenges, Regional operational risks, and emerging risks.

The 2023-2025 Edition of the GASP would set forth ICAO's Safety Strategy in support of the prioritization and continuous improvement of aviation. The plan guides the implementation of regional and national aviation safety plans.

The 2023-2025 Edition of the GASP includes a new set of goals, targets and indicators, in line with the United Nations' 2030 Agenda for Sustainable Development.

In respect of MID Region SPMM, the GASP provides the global strategic direction while the MID Region SPMM provides regional specific goals and support the region's strategic approach to managing safety at the regional level. Consequently, MID region safety indicators and targets were aligned with the 2023-2025 GASP goals and targets as relevant in the MID Region. Furthermore, the RASG-MID would continuously monitor the implementation of the identified SEIs in the MID-RASP and measure safety performance of the regional civil aviation system, to ensure the intended targets are achieved, using the MID Region safety performance measurement & monitoring to this plan. Moreover, MID safety performance measurement & monitoring Goals support the region's strategic approach to managing safety at the regional level. Therefore, for each Goal established in the MID Region SPMM identified SEI(s) is mapped to it including their respective actions.

The MID Region SPMM is included as an appendix and became an integral part of MID-RASP.



Graph 1: Relationship between MID-RASP and other Plans

2. HOW MID-RASP IS STRUCTURED

This MID-RASP presents the regional strategy for enhancing aviation safety for a period of three years. It is comprised of two parts and 7 chapters. The 2023-2025 MID- RASP Edition comprises two distinct parts:

- **Part I. Planning** provides an introduction, describes how the MID-RASP is developed and monitored and includes the safety priorities. It consists of **Chapters 1 to 5**.
- **Part II. Implementation** contains the safety performance measurement & monitoring and the detailed list of MID-RASP safety actions. It consists of **Chapters 6 and 7**.
- Both parts are supported by a number of appendices providing further details or assisting the reader.

Part-I. Planning

Part I provides an introductory explaining the main objective of this MID-RASP. Chapter 2, 3, and 4 explain how MID-RASP is structured, developed, monitored and presents the structure of the document. Chapter 5 presents safety priorities and the key actions taken as indicated below:

- 5.1 Organizational Challenges/issues
- 5.2 Regional operational safety risks
- 5.3 Emerging risks

Part-II. Implementation

Part II contains the safety performance measurement and monitoring and the detailed list of MID-RASP safety actions. It consists of Chapters 6 and 7.

Chapter 6 presents the MID Region safety indicators and targets.

In respect of **chapter 7**, it facilitates the identification of SEIs and their respective actions relevant for each Goal identified in the MID Region Safety performance measurement and monitoring as follows:

- Goal 1: Achieve a continuous reduction of operational safety risks;
- Goal 2: Strengthen States' safety oversight capabilities;
- Goal 3: Implement effective State safety Programmes (SSPs);
- Goal 4: Increase collaboration at the regional level;
- Goal 5: Expand the use of industry Programmes and safety information sharing networks ; and
- Goal 6: Ensure the appropriate infrastructure is available to support safe operations.

The MID Region SPMM includes six (6) Goals in line with GASP 2023-2025 Edition. For each Goal established in the MID Region SPMM, identified SEI(s) is mapped to it including their respective actions and the following information is provided:

Goal: Goal supports the region's strategic approach to managing safety at the regional level.

- **Name:** Goal #Number - SEI# Number: Description of the SEI
- **Target(s)/Metrics.** Targets which serve to fulfil their respective Regional Goal
- **Rationale** behind the safety issue (why it has been identified as an issue)
- **What it is to be achieved** (objective)
- **How we intend to monitor improvement** in the future
- **How we intend to achieve** the objective; here, the various actions contributing to mitigate

- the identified risk in that area are described
- **Actions:** The tasks required for the implementation of the SEI. The actions support the SEI and Targets of the Regional Goal
- **References:**
 - Indicates key existing global documents from which the SEI is adopted, if applicable.

Stakeholders: The entities/ stakeholders in the MID region, to which the Actions are addressed

Example Action 1: Description of the Action to be taken

Subtask(s) if needed to be added

Owner(s): Appointed Group/State(s)/Organization(s) to further develop details for implementation of the respective Action.

Priority: Low, Medium, High

Completion Date: The date in which the respective Action is expected to be implemented.

Status: new, ongoing, on hold, completed. (Provide also updated progress if any)

Example Action 2: Description of the Action to be taken

Subtask(s) if needed to be added

Owner(s): Appointed Group/State(s)/Organization(s) to further develop details for implementation of the respective Action

Priority: Low, Medium, High

Completion Date: The year(s) in which the respective Action is expected to be implemented

Status: new, ongoing, on hold, completed. (Provide also updated progress if any)

EXPECTED OUTPUT

Deliverable(s)

TIMELINE

Description of the Result to be achieved

The year in which the respective Target is expected to be achieved

3. HOW MID-RASP IS DEVELOPED AND MONITORED

The RASG-MD is the governing body responsible for the development, implementation and monitoring of the MID-RASP, in collaboration with the ICAO MID Office, international and regional organizations and with the aviation industry. The MID-RASP was developed in consultation with States, regional organizations, and other stakeholders in the region, and in alignment with the 2023-2025 of the GASP. If required, RASG-MID would seek the support of MIDANPIRG and RASFG-MID, other sub-groups, States, regional organizations, and industry to ensure the timely implementation of SEIs to address safety deficiencies and mitigate risks. Through close monitoring of the SEIs, SEIG would make adjustments to the MID-RASP and its initiatives, if needed, and update the MID-RASP document accordingly.

Furthermore, the MID-RASP is to be reviewed by SEIG every year mainly to include new identified SEIs, review the existing SEIs, and their respective actions. In addition, the MID-RASP is to be updated/endorsed by RASG-MID at least every three years and as deemed necessary.

The SEIG is established to assist RASG-MID to develop and monitor the implementation of SEIs as at **Appendix A** related to identified regional operational risks, organizational challenges, and emerged risks. In addition, the SEIG takes the lead and ensures that SEIs are implemented in a timely, effective and efficient manner in coordination with RASG-MID, MIDANPIRG, and RASFG-MID groups and sub-groups (ASRG, ASPIG, AIIG, ATM-SG,...etc), States, regional organizations, and industry.

As a first step towards establishing this system and to facilitate MID-RASP implementation, it is necessary to enhance the communication and flow of safety data and information, as well as coordination processes, among RASG-MID and its subsidiaries, States, and regional organizations. There is also the need to continue to enhance collaboration with MIDANPIRG through coordinated processes to sustain the collection and sharing of regional air traffic management (ATM) data and the sharing and resolution of safety issues. This, in turn, would support the implementation of Aviation System Block Upgrade (ASBUs) and ensure that their implementation accounts for and properly manages existing and emerging risks, e.g. approaches with vertical guidance (APV) to mitigate risks associated with CFIT and runway excursions.

The MID-RASP was developed with the aim of addressing the MID region's operational and other safety issues in a timely manner, and as applicable. It is expected that this approach would facilitate MID States' support and participation in the implementation of these SEIs and their respective actions at both the regional and national levels. The three-year period of the MID-RASP, i.e. 2023 to 2025, was selected to coincide with the GASP review period of the same duration, to ensure continued alignment with the latest global plans.

States should ensure that a NASP is maintained and regularly reviewed. The MID-RASP provides the identified safety priorities in the region and States should identify which top risks and key issues mentioned in the GASP and MID-RASP which apply to their national context and identify suitable mitigations actions within their NASP. States should also add/consider other safety issues which are unique to their operational context. Furthermore, States to establish a NASP taking into account the GASP and MID-RASP; and based on their operational safety needs.

The key contents of the MID-RASP were developed using an eight-step process recommended by the GASP to develop RASPs and NASPs, similar to the Plan-Do-Check-Act (PDCA) continuous improvement cycle, as follows:

- Step 1: Conduct self-evaluation;
- Step 2: Identify hazards and safety deficiencies;
- Step 3: Develop list of prioritized regional safety issues;
- Step 4 – Define goals, indicators, and targets
- Step 5: Perform gap analysis to identify SEIs;
- Step 6: Develop a list of prioritized SEIs;
- Step 7: Develop a Regional aviation safety plan; and
- Step 8: Monitor implementation

The MID-RASP has been developed in congruence with the GASP, and supports the GASP aspirational goal of zero fatalities by 2030 and its objectives, goals, targets and indicators.

- a. The MID-RASP structure adheres closely to GASP;
- b. A comprehensive gap analysis was undertaken to identify the existing gaps between the existing work by RASG-MID, and subsequently also compared with ICAO Manual: Doc 10131, 'Manual on the Development of Regional and National Aviation Safety Plans;
- c. The MID Region SPM is aligned with GASP 2023-2025 Edition, retained and included as an Appendix in the MID-RASP; and
- d. MID-RASP SEIs were selected taking into consideration relevant SEIs for the region in line with GASP 2023-2025 Edition as well as relevant work plan items of DCGA, RASG-MID, MIDANPIRG, and RASFG-MID meetings. Moreover, GASP SEIs for States and Industry (domestic) were not considered as these are more suitable to be included in the NASPs of the MID States.

The MID-RASP supersedes the previous work of the RASG-MID subsidiary bodies (RAST and SST) initiatives to elevate the commitment of the MID Region to improve its safety oversight capability, which relates to the continuous reduction of regional operational risks and improvement in safety

oversight capabilities and safety management of States. In particular, the MID-RASP serves to raise awareness of safety risks and consequences, to States, industry and relevant stakeholders to commit and provide resources including financial, staffing and technical expertise, to making improvements in safety management, oversight capability and operational safety performance. It also provides a basis to facilitate information sharing between relevant stakeholders who can take actions or provide support to address issues.

At the regional level, the MID-RASP commits RASG-MID to continue the following efforts as indicated below:

- a. Focus on the update and the development of the new regional SEIs to address the Regional High-Risk Categories (R-HRCs) of LOC-I, CFIT, MAC, RI and RE, and other priorities;
- b. Support States to strengthen safety oversight capabilities
- c. Assist States in the development and implementation of SSP and SMS including the development of NASPs;
- d. Promote regional government and industry collaboration for sharing safety information and best practices in safety management;
- e. Promote the effective implementation of AGA, with a focus on implementation of Aerodrome Certification including the SMS, runway safety Programmes including the establishment of Runway Safety Teams (RSTs) and Global reporting Format methodology (GRF);
- f. Support States in the development of Unmanned aircraft system (UAS) national regulations;
- g. Support States on COVID-19 pandemic activities to enable a safe and secure return to operations, the GNSS interference, the impact of security on safety, manage Cybersecurity risks; and 5G interference with Radar Altimeter frequency band.
- h. Support States to establish and activate the MENA RSOO;
- i. Provide continuous support for the MENA ARCM activities.
- j. Continue implementation support to States and industry, including the development of improved guidance materials as well as the organization of workshops and training to provide assistance and guidance to MID States; and
- k. Put in place a structure for the collection, analysis and sharing of safety and operational data in the region to support a comprehensive approach to risk management, and facilitate initiatives to develop regional data collection, and analysis.

States and industry are committed to the following efforts:

- a. Implement, as appropriate, the GASP SEIs and MID-RASP SEIs and their respective actions in strategic and timely manner;
- b. (For any States with SSCs), accord priority to the resolution of any SSCs identified by the ICAO USOAP CMA Programme. These should draw on the necessary resources available, including technical assistance from other States and Regional Programmes to resolve the SSCs promptly;
- c. Accord priority to the implementation of SSP and SMS;
- d. Use data-driven methodologies to identify R-HRCs and their safety issues, and implement collaborative solutions to reduce accident rates and fatalities in the Region, and likewise accord priority to the implementation of respective SEIs; and
- e. Consider various options to leverage ICAO-recognized industry assessment Programmes such as the IATA Operational Safety Audit (IOSA), IATA Safety Audit for Ground Operations (ISAGO), IATA Standard Safety Assessment Programme (ISSA), and ACI APEX Programme. These options range from recognition of such Programmes to encouraging registration by all applicable operators as a means to strengthen their safety management and compliance.

4. OPERATIONAL CONTEXT

4.1 Worldwide Perspective

After the year 2020 when the global economy experienced the worst crisis since the Great Depression as a consequence of the COVID-19 pandemic, the activity in 2021 rapidly recovered and the prospects for the following years are that this trend will continue. However, it is too soon to draw firm conclusions, considering the uncertainties on the evolution of certain threats (not only the pandemic, but also climate change, increasing public debts and geopolitical changes).

According to the last general IMF forecast available at (<https://www.imf.org/en/Publications/WEO/Issues/2021/10/12/world-economic-outlook-october-2021>), GDP fell by 3.3 % in 2020 and is expected to rebound by 5.9 % in 2021, to continue with a growth rate of 4.9 % in 2022. Behind these global figures quite diverse situations are found in national economies due to differences in the pace of vaccine roll-out and the capability of States to offer financial support. The pandemic also affected the job market, the employment conditions and other socio-economic factors. From a worldwide perspective, according to the International Labour Office, the unemployment rate grew by 1.1 point to 6.5 % in 2020, compared to 5.4 % in 2019, and will only slowly decrease to an expected 6.3 % in 2021 and 5.7 % in 2022. (https://www.ilo.org/wcmsp5/groups/public/-/-dgreports/-/-dcomm/-/-publ/documents/publication/wcms_795453.pdf). *Table 1.2 Employment-to-population ratio, unemployment rate.*

From a worldwide aviation perspective, large aeroplane commercial passenger flights, constituting the bulk of the aviation activity, showed an unprecedented drop in 2020 and started to recover in 2021. The closure of borders fundamentally contributed to this drop in traffic, hitting airline international traffic far more than domestic traffic. If the current positive trend of pandemic recovery continues, the domestic traffic in terms of number of airlines' commercial passengers would recover in 2022 in comparison with the 2019 level. International traffic would only recover in 2024.

4.2 Middle East Perspective

The Middle East Region has been, for years, at the forefront of aviation growth and reshaping the global long-haul markets by elevating its hub position for connecting Europe and Asia-Pacific, in line with the west to east shift of the geographical centre of gravity of air transport operations. Growth of the Region started to undergo a significant transition and slow down recently. Air transport supports 2.4 million jobs and USD 130 billion in GDP in the Middle East.

With the further movement of the air transport centre of gravity from West to East, the geographic position of the Gulf hubs will continue to offer a strategic advantage to several airlines in the Region. According to ICAO long-term traffic forecasts, total passenger traffic of the Middle East Region is expected to grow by around 4.6 per cent annually up to 2045, the second fastest growth among all Regions after Asia and Pacific. The Middle East is expected to be the fastest growing Region in terms of freight traffic growth, and is projected to grow at 5.4 per cent annually up to 2045. This increase will, in turn, drive growth in the economic output and jobs that are supported by air transport in the next decade. By 2036, it is forecasted that the impact of air transport and the tourism it facilitates in the Middle East will have grown to support 4.3 million jobs (78 per cent more than in 2016) and a USD 345 billion contribution to GDP (an increase of 166 per cent).

The Middle East has to contend with situations unique to the Region such as fluctuating oil revenues, regional conflict and overcrowded air space. In addition, airlines in this Region are now facing challenges to their business models.

The growth of air transport requires a high-performing aviation system including airlines, airports and ATM. The overall efficiency of the ATM system commensurate with the level of predicted traffic growth should be increased through improved airspace design and organization. Furthermore, this

Region is in need of political commitment to market liberalization. Although the Middle East is home to some of the world's largest hub airports, the relations between States are still mostly bound by bilateral air services agreements that limit market access to each other. (Source: *Aviation Benefits Report-2019*).

The economic and social situation in the Middle East is similar to the world outlook provided above. The COVID-19 pandemic has battered world-wide aviation in a way that could never have been imagined and we are still trying to assess the full extent of the impact that it will have on civil aviation in the longer term. While the pandemic is not yet over, there are signs at last that vaccination offers a viable way to reduce levels of infection and a basis to realistically plan for a full reopening. Throughout the pandemic, the ICAO MID Office has continued to work collaboratively with all stakeholders to ensure that the industry is equipped to resume the flight operations.

In addition, the MID-RPTF mechanisms continued to serve as a platform for coordination and cooperation amongst all stakeholders to support States with the implementation of the CART and HLCC recommendations as well as the recovery of aviation industry in the MID Region during the COVID-19 pandemic outbreak.

During 2021 the reduction in airline passenger flights due to COVID-19 continued, subsequently resulting also in lack of capacity to transport cargo in that aircraft. The same can be stated for the complexity of operations, ranging from quarantine measures imposed on flight crews, disruption in training and scheduling, and the need to transport cargo in the cabin.

Airlines continued to have a large portion of their aircraft grounded, leaving flight and cabin crew members with uncertainty about the return to normal operations.

However, the recovery during the summer of 2021 was faster than expected. This was a positive development but led to difficulties for operators to cope with the increased demand, adding complexity in the return to service of aircraft and flight crews.

Over the last five years, the global scheduled commercial international operations accounted for approximately 24.96 million departures in 2021, compared to 36.3 million departures in 2017. The MID Region shows a decrease in traffic volumes during 2021. Total scheduled commercial departures in 2021 accounted for approximately 806,274 estimated departures compared to 1.37 million departures in 2017. In terms of aircraft accidents, the MID Region had no accident during the year 2021. The 5-year average accident rate for 2017-2021 is 2.21, which is slightly below the global average rate (2.41) for the same period. The MID Region accident rate in 2020 is higher than the global accident rate, which is 2.14 accidents per million departures.

The MID Region had no fatal accident in 2021. However, the 5-year average fatal accident rate for 2017-2021 is 0.42, which is almost similar to the global average rate (0.41) for the same period. The MID Region had no fatal accidents in 2017, 2019, and 2021. However, two fatal accidents occurred in 2018 and 2020. The 2018 accident caused 66 fatalities and the year 2020 caused 176 fatalities.

In terms of Safety Management, the average EI for SSP foundation PQs for States in the MID Region is 76, 1%. Implementation of SSP is one of the main challenges faced by the State in the MID Region. The RASG-MID addresses the improvement of SSP implementation in the MID Region as one of the top SEIs. In connection with this, the RASG-MID/9 endorsed the Safety Management Implementation Team (SMIT) handbook to support MID States in the implementation of the SSP in an effective and efficient way.

Common challenges in MID Region include:

- a. The political/security situation in some States, the cross-national variation in Aviation development as well as the relatively small accreditation area, impede the provision of Technical assistance, implementation of Regional projects and the achievement of the Regional safety, air navigation and Security targets;

- b. The drastic reduction in traffic volumes due to the COVID-19 crisis and the new risks induced by its impacts;
- c. The lack of financial and human resources in some States, combined with the complexity of administrative arrangements for the approval of duty travel, political sensitivities, etc., affected the level of attendance to the activities organized by the ICAO MID Office as well as States' support to the MIDANPIRG, RASG-MID and the MID-RASFG Work Programmes and their subsidiary bodies;
- d. Low level of reporting by States (inputs to the MID-Air Navigation Report and MID Annual Safety Report, incidents, national plans, success stories, replies to State Letters, etc; and
- e. Resources constraints (financial and technical personnel) in the Regional Office, combined with a high rotation rate vs. necessary time for new staff/comers to cope with the way of doing business in ICAO considering the MID Region-specific challenges.

5. STRATEGIC PRIORITIES

The MID-RASP presents the safety priorities that were developed based on the ICAO GASP's including organizational challenges, operational safety risks, and emerging risks as well as region-specific issues identified by a safety risk assessment and published in MID Region Annual Safety Reports and RASG-MID activities. Additionally, the MID region's strategic approach to managing safety at the regional level is to address the region's operational issues and other safety issues in a timely manner. Therefore, the MID-RASP strategic approach would focus on organizational challenges/issues, regional operational safety risks, and emerging risks as indicated in graph 2 below.

- a. Organizational challenges/issues including the States 'safety oversight, safety management, aircraft accident and incident investigation, Human factors and competence of personnel, and Cybersecurity. In terms of human factors and competence of personnel, as new technologies emerge on the market and the complexity of the system continues increasing, it is of key importance to have the right competencies and adapt training methods to cope with new challenges. It is equally important for aviation personnel to take advantage of the safety opportunities presented by new technologies;
- b. In respect of regional operational safety risks, the focus would be on R-HRC identified in the GASP 2023-2025 Edition mainly the LOC-I, CFIT, RE, RI, and MAC; and
- c. Regarding the emerging risks, the focus would be on the COVID-19 crisis and the new risks induced by its impacts, Civil drones (Unmanned Aircraft Systems), Management of security risks with safety impact, and GNSS interference, and 5G interference with Radar altimeter band frequency.



Graph 2: Safety Priorities

Therefore, the MID-RASP adopts three focus areas approach:

First focus area involves enhancing existing regional mechanisms to strengthen effective safety oversight capabilities and improve the implementation of effective safety management, in particular to:

- a. Draft the MID-RASP 2023-20225 Edition and consider inputs from MID Annual Safety Report (MID ASR), MID Region safety management Roadmap, Runway Safety Go-Team; RASG-MID, MIDANPIRG, and RASFG-MID.
- b. enhance coordination and communication with regional organizations including ACAO, ACI, CANSO, IATA, and other regional mechanisms, MENA ARCM, especially MENA RSOO once activated;
- c. improve the scheduling and streamline the number of regional safety-related events including workshops, trainings, seminars; and
- d. improve communication and sharing of safety information between States, international organizations, and industry.

In addition to the varying levels of safety oversight capabilities in the MID Region, other regional safety issues and activities have been identified and selected for inclusion in the MID-RASP. These were derived from the RASG-MID reports, analysis of USOAP data, accident and incident investigation reports, safety oversight activities over recent years from MID States, as indicated below:

- a. Improve Regional Cooperation for the provision of Accident & Incident Investigation;
- b. Improve implementation of ELP requirements;
- c. Sharing of Safety Recommendations related to Accidents and Serious Incidents;
- d. Enhance State Oversight on Dangerous Goods;
- e. Need to manage the cybersecurity risks; and
- f. 5G interference with Radio altimeter frequency band.

Second focus area involves addressing effectively regional operational safety risks including specific operational risks stemming from the crisis as the vision of the GASP is to achieve and maintain the goal

of zero fatalities in commercial operations by 2030 and beyond.

Third focus area involves addressing the emerging safety risks that might impact safety in the future including recovering from the COVID-19 crisis without adversely affecting the high level of safety performance GNSS outages/vulnerability, civil drones to ensure safe operation of unmanned aircraft system (UAS), impact of security on safety, and 5G interference with Radar Altimeter frequency band. Additionally, for emerging risks, SEIs/safety actions would be developed and covered under the focus areas (organizational challenges and Regional operational safety risks).

5.1 Organizational Challenges/Issues

Organizational challenges are systemic issues which take into consideration the impact of organizational culture, and policies and procedures on the effectiveness of safety risk controls. Organizations include entities in a State, such as the civil aviation authorities (CAAs) and service providers, such as operators of aeroplanes, ATS providers and operators of aerodromes. Organizations should identify hazards in systemic issues and mitigate the associated risks to manage safety. A State's responsibilities for the management of safety comprise both safety oversight and safety management, collectively implemented through an SSP.

It is crucial that States' safety oversight capabilities and safety management, and aviation infrastructure should keep pace with these regional safety issues.

Therefore, for the triennium of 2023-2025, the MID Region should continue to focus its efforts in addressing the following top Regional organizational issues:

- a. Lower USOAP EI scores, especially States with EI below 60% as well as AIG, ANS, AGA, and OPS areas;
- b. Slow pace of SSP development & implementation including the NASP development, as well as understanding of newer safety management and performance based concepts;
- c. Slow pace of SMS acceptance and surveillance;
- d. Slow pace of developing Risk Management framework to support decision-making and deploy the resources needed to mitigate risks effectively;
- e. Improve Regional Cooperation for the Provision of Accident & Incident Investigation;
- f. Enhance State Oversight on Dangerous Goods;
- g. Support States related to Human factors and Competence of Personnel
- h. Support States to manage the cybersecurity risks;
- i. Management of security risks with safety impact;
- j. Slow pace of implementation of RASG-MID conclusion/ MID-RASP SEIs/safety actions and tools to mitigate identified safety risks and safety deficiencies;
- k. Insufficient resources and expertise to manage and collect safety data and safety information on a State level, and no formal mechanisms in place that allow for the sharing and benchmarking of information at the Regional level; and
- l. Increasing risks associated with airspace structure including ATS networks and associated airspaces to accommodate the traffic flow in safe and efficient manner.

5.1.1 Strengthening of States' Safety Oversight Capabilities

Safety oversight is defined as a function by means of which States ensure effective implementation of the safety-related SARPs and associated procedures contained in the Annexes to the Convention on International Civil Aviation and related ICAO documents. States have overall safety oversight responsibilities, which emphasize a State's commitment to safety in respect of the State's aviation activity. An individual State's responsibility for safety oversight is the foundation upon which a safe global air transport system is built. States that experience difficulties in carrying out safety oversight functions can impact the state of International Civil Aviation.

USOAP-CMA audits had identified that States inability to effectively oversee aviation operations which remains a global concern. In respect of MID Region, the regional average overall Effective Implementation (EI) (13 out of 15 States have been audited) is 74, 67 %, which is above the world average 68.68 % (as of 29 May 2022). Three (3) States are currently below EI 60%.

All eight areas have an EI above 60%. However, the areas of AIG, AGA and ANS still need more improvement. Regarding the Critical Elements (CEs), CE4 (Qualified technical personnel) improved and is above 60% (62.39%) EI, whereas CE8 (resolution of safety issues) is the only one below EI 60% (58. 89%) EI.

Moreover, the effective implementation in certification, surveillance, and resolution of safety concerns need to be improved.

Key Actions completed/planned
a. Conducted technical assistance and NCLB mission activities to States
b. Capacity building activities
c. Developed and implemented a specific NCLB plan of actions for prioritized States according to established criteria
d. Established MENA RSOO to assist States and start operations

5.1.2 Improve Regional Cooperation for the Provision of Accident & Incident Investigation

In respect of MID Region, the regional average overall Effective Implementation (EI) (13 out of 15 States have been audited) is 74.67 %, which is above the world average 68.68 % (as of 29 May 2022). Three (3) States are currently below EI 60%. Regarding the Critical Elements (CEs), CE4 (Qualified technical personnel) improved and is above 60% (60.08%) EI, whereas CE8 (resolution of safety issues) is the only one below EI 60% (59. 47%) EI. All eight areas have an EI above 60%. However, the area of AIG still need more improvement.

Key Actions completed/planned
a. AIG Strategy in the Provision of AIG Functions endorsed by the DGCA-MID/4
b. MENA AIG Regional Cooperation Mechanism (ARCM) endorsed by the DGCA meeting in Kuwait
c. Organized AIG capacity building activities
d. Draft MENA ARCM implementation action plan endorsed by the RSC/7
e. MENA ARCM Establishment and Activation

5.1.3 Sharing of Safety Recommendations related to Accidents and Serious Incidents

- a. The Safety recommendations are the utmost results of investigation or safety studies conducted by States. In accordance with the provisions of Annex 13, a State shall send to ICAO a copy of the Final Report on its investigations into accidents and serious incidents involving aircraft of a maximum mass of over 5,700 kgs.
- b. A safety recommendation is defined as a proposal by an accident investigation authority, based on information derived from an investigation. The intended purpose of a safety recommendation is the prevention of accidents or incidents, and the reduction of the consequences of such occurrences.

Key Actions completed/planned

- a. Establishment of an Ad-hoc Action Group championed by Saudi Arabia and UAE
- b. The Questionnaire on establishing safety recommendations platform developed and circulated to MENA ARCM Member States. The questionnaire analysis has been shared with MENA ARCM/2 meeting

5.1.4 Improve Implementation of ELP Requirements

The decision to address language proficiency requirements (LPRs) for pilots and air traffic controllers was first made by the 32nd Session of the ICAO Assembly in September 1998 as a direct response to several fatal accidents, including one that cost the lives of 349 persons, as well as to previous fatal accidents in which the lack of proficiency in English was identified as a contributing factor. The intent was to improve the level of language proficiency in aviation worldwide and reduce the communication breakdowns caused by a lack of language skills. LPRs have now moved beyond implementation (Assembly Resolution A38-8 refers), entering a phase of post implementation.

Key Actions completed/planned

- a. Development and dissemination the Questionnaire on ELP
- b. Analysis of the survey results and was reviewed by the RSC/7

5.1.5 Enhance State Oversight on Dangerous Goods

The data analysis results of the USOAP-CMA OPS area showed that Dangerous Goods is one of the unsatisfactory PQs in operations for some states in the region. The identified issues highlighted in the analysis report as indicated below:

- a. States have not implemented an effective system for safety oversight of the various entities involved in the transport of dangerous goods, including shippers, packers, cargo handling companies and air operators. Regarding the latter, some States, the authorities have not effectively reviewed the dangerous goods procedures of air operators, contained in the operations and ground handling manuals, mostly due to a lack of qualified dangerous goods inspectors.
- b. Some States have not kept records relating to dangerous goods-related approvals; and
- c. In addition, in some States, dangerous goods inspector procedures have not been established and implemented.

Safety actions have been planned to be taken during the year 2020 and 2021. However, due to the COVID-19 pandemic some of the ICAO MID Office work Programme activities have been postponed for 2022 including Dangerous Goods workshop.

Key Actions completed/planned

- a. Dangerous Goods webinar
- b. Dangerous Goods Capacity building activities

5.1.6 Improve the Safety Management

Despite the fact that the last years have clearly brought continued improvements in safety across every operational domain, the latest accidents and serious incidents and the massive worldwide impact of the COVID-19 pandemic on the aviation system underline the complex nature of aviation safety and the significance of addressing human and organizational factor aspects.

Effective safety management including robust risk management policies and processes are essential in dealing with the multiple impacts of the pandemic on the aviation system, both at authority and organization level. This is supported by ICAO Annex 19 on the reporting, analysis and follow-up of occurrences in civil aviation and when applicable, by flight data monitoring (FDM) requirements.

Therefore, States should build upon fundamental safety oversight systems to fully implement SSPs according to Annex 19, States shall require that applicable service providers under their authority implement an SMS. The SMS enables service providers to capture and transmit safety information which contributes to safety risk management. In this context, the role of the State evolves to include the establishment and achievement of safety performance targets as well as effective oversight of its service providers' SMS. Individual States should provide safety information derived from their SSPs to their respective RASGs to contribute to Regional safety risk management activities. The average EI for SSP foundation PQs for States in the MID Region is 76, 18%.

An SSP requires increased collaboration across operational domains to identify hazards and manage risks. Aviation authorities and organizations should anticipate new emerging threats and associated challenges by developing SRM principles.

Implementation of SSP is one of the main challenges faced by the State in the MID Region. The RASG-MID addresses the improvement of SSP implementation in the MID Region as one of the top Safety Enhancement Initiatives (SEIs). In connection with this, the RSC/7 endorsed the safety management Roadmap and established the Safety Management Implementation Team (SMIT). Furthermore, the RASG-MID/9 endorsed the SMIT handbook to support MID States in the implementation of the SSP in an effective and efficient way

ICAO launched SSP Implementation Assessments (SSPIAs) phase 2 under the USOAP CMA. The assessments are based on a qualitative assessment of a State's progress in implementing a State Safety Programme (SSP), using SSP-related PQs.

The PQs are reflective of Annex 19- Safety Management and the Safety Management Manual (Doc 9859).

Unlike the USOAP CMA's audit activities, SSPIAs are linked to applicable SSP components rather than critical elements (CEs). The SSP components are:

1. State safety policy, objectives and resources;
2. State safety risk management;
3. State safety assurance; and
4. State safety promotion

The SSP assessment covers 8 areas as indicated below:

1. SSP general aspects (GEN);
2. safety data analysis general aspects (SDA);
3. personnel licensing and training (PEL);
4. aircraft operations (OPS);
5. airworthiness of aircraft (AIR), approved maintenance organization (AMO) aspects only;
6. air navigation services(ANS), air traffic services provider (ATSP) aspects only;
7. aerodromes and ground aids (AGA); and
8. aircraft accident and incident investigation (AIG).

In 2020, ICAO developed guidance supporting the determination of maturity levels for each SSP-related PQ. The SSP-related PQs, complemented by the maturity level matrices for each of the SSP audit areas, are available in the CMA Library of the USOAP CMA Online Framework (OLF) at www.soa.icao.int (restricted access). These matrices describe the level of progress for each element of the SSP, which can be described as:

- Not present and not planned;
- Not present but being worked on;
- Present; or
- Present and effective.

ICAO will use the SSP maturity level matrices for the scheduled SSPIAs under Phase 2, which will begin in 2021. This phase of assessments will utilize the maturity level matrices to provide a more detailed, quantitative measurement of a State's progress in the implementation and maintenance of its SSP. Two assessment missions have been planned for the year 2022.

Key Actions completed/planned
a. Conducted continuously SSP/SMS capacity building activities
b. Development of the MID Region Safety Management Implementation Roadmap
c. Establishment of the Safety Management Implementation Team (SMIT) and SMIT Handbook endorsed by RASG-MID/9
d. Establishment the MENA RSOO to support States in the expeditious implementation of SSP
e. Guidance material development
f. Technical Assistance missions

5.1.7 Certification of International Aerodromes

All eight areas have an EI above 60%. In respect of the Critical Elements (CEs), CE4 (Qualified technical personnel) improved and is above 60% (60.08%) EI, whereas CE8 (resolution of safety issues) is the only one below EI 60% (59.47%) EI. However, the areas of AGA still need more improvement.

Key Actions completed/ planned
a. Conducted Aerodrome Safety Management Workshops
b. Wildlife hazard Management and Control Workshop
c. RSA on Wildlife Management and Control Regulatory Framework & Guidance Material.
d. Certification of Annex 14 training courses
e. GRF training courses

5.1.8 Establishment of Runway Safety Teams at International Airports

All eight areas have an EI above 60%. In terms of the Critical Elements (CEs), CE4 (Qualified technical personnel) improved and is above 60% (60.08%) EI, whereas CE8 (resolution of safety issues) is the only one below EI 60% (59.47%) EI. However, the areas of AGA still need more improvement

Key Actions completed/planned
a. Runway Safety Go-Team Missions
b. Support States to implement the Global Reporting Format Methodology through capacity building activities

5.1.9 Human Factors and Competence of Personnel

As the aviation system changes, it is imperative to ensure that human factors and the impact on human performance are taken into account, both at service provider and regulatory levels.

Human factors and human performance are terms that are sometimes used interchangeably. While both human factors and human performance examine the capabilities, limitations and tendencies of human beings, they have different emphases:

- Human Factors (HF) – this term focusses on why human beings function in the way that they do. The term incorporates both mental processes and physical ones, and the

interdependency between the two.

- Human Performance (HP) – the output of human factors is human performance. This term focusses on how people do the things that they do.

As new technologies emerge on the market and the complexity of the system continues increasing, it is of key importance to have the right competencies and adapt training methods to cope with new challenges. CRM has been identified in the MID ASR as most important human factors issue in the domain of commercial air transport and safety actions would be identified and developed. In addition, Team Resource Management (TRM) was introduced into ATC following the success achieved with Crew Resource Management (CRM) in the airline community enhancing teamwork practices. The practice is applied within virtually every airline with training given to pilots and other operational staff. Within the last decade in ATM there have been numerous advances in widespread acceptance of SMS under the guidance of ICAO. ICAO has now mandated the use of SMS Manual Doc 9859 to standardize the approach to safety. TRM as defined by ICAO is an integral component of SMS under human factor

Key Actions completed/planned
a. CRM and TRM workshops/webinars
b. FRMS workshops/webinars

5.1.10 Cybersecurity Resilience

The global civil aviation ecosystem is accelerating towards more digitalization. This implies that any exchange of information within any digital workflow of the aviation community needs to be resilient to information security threats which have consequences on the safety of flight or the availability of airspace and beyond. Aware of the complexity of the aviation system and of the need to manage the cybersecurity risk the MID Region needs to consider and address information security risks in a comprehensive and standardized manner across all aviation domains. In addition, it is essential that the aviation industry and civil aviation authorities share knowledge and learn from experience to ensure systems are secure from individuals/organizations with malicious intent.

Key Actions completed/planned
a. Cybersecurity symposium/workshops
b. Development of MID Region Cybersecurity Action Plan

5.2 Regional Operational Safety Risks

Operational safety risks arise during the delivery of a service or the conduct of an activity (e.g. operation of an aircraft, airports or of air traffic control). Operational interactions between people and technology, as well as the operational context in which aviation activities are carried out are taken into consideration to identify expected performance limitations and hazards. The RASG-MID utilizes available safety data and information to determine the region's operational safety risks which include G-HRCs and additional regional operational safety risks.

5.2.1 Address Operational Safety Risks in Commercial Air Transport (CAT) Aeroplane Operations above 5,700 kgs

In terms of an aircraft accident, the MID Region had no accident during the year 2021. The 5-year average accident rate for 2017-2021 is 2.21, which is slightly below the global average rate (2.41) for the same period. The MID Region accident rate in 2020 is higher than the global accident rate, which is 2.14 accidents per million departures.

The MID Region had no fatal accident in 2021. However, the 5-year average fatal accident rate for 2017-2021 is 0.42, which is almost similar to the global average rate (0.41) for the same period. The MID Region had no fatal accidents in 2017, 2019, and 2021. However, two fatal accidents occurred in 2018 and 2020. The 2018 accident caused 66 fatalities and the year 2020 caused 176 fatalities.

The GASP 2023-2025 Edition identifies the G-HRCs as LOC-I, CFIT, MAC, RE and RI. In the MID Region in 2017-2021 the topmost frequent accidents related to the loss of control-inflight and runway safety, which includes RE and ARC during Landing. In terms of fatality risk, the fatal accidents for the period 2017- 2021 were attributed to LOC-I.

Therefore, for the triennium of 2023-2025, the MID Region should continue to focus its efforts on mitigating and minimizing occurrences related to the R-HRCs for this time period, namely:

1. Loss of Control-In Flight (LOC-I);
2. Runway Safety (RS); mainly (RE and ARC during landing);
3. Runway Incursion (RI);
4. Controlled Flight into Terrain (CFIT); and
5. Mid-Air Collision (MAC).

MAC is established as a top risk for the MID region based on the existing data driven approach used to determine the R-HRCs though there is no fatal accident during the last five years. Therefore, there is a need for the MID region to build up its capability to collect and analyze safety data pertaining to MAC.

In addition, safety issues have been identified in the MID ASR and need to be considered by the States while developing their NASP as well as the industry as indicated at **Appendix B**.

5.2.2 Aircraft Upset in Flight (Loss of Control-Inflight)

Aircraft upset or loss of control inflight is the most common accident outcome for fatal accidents in CAT aero plane operations. It includes uncontrolled collisions with terrain, but also occurrences where the aircraft deviated from the intended flight path or intended aircraft flight parameters, regardless of whether the flight crew realized the deviation and whether it was possible to recover or not. It also includes the triggering of stall warning and envelope protections. During 2017-2021 aircraft upset, or loss of control contributed to one fatal accident involving MID Region aeroplane.

Key Actions completed/Planned
a. Organized and promoted training provisions on recovery from upset scenarios (UPRT workshops)
b. Assistance to States to implement the SSP/SMS through workshops/trainings
c. Development and publication of RSAs related to the LOC-I Airplane States Awareness (ASA) – Low Speed Alerting Standard Operating Procedures Effectiveness and Adherence Airplane States Awareness (ASA) –Training –Flight Crew training (Approach to stall & Up set recovery) Verification and Validation
d. Construction, approval and implementation of RNAV(GNSS) / RNP-AR procedures to all runways not currently served by precision approach procedure
e. Develop guidance material/share best practices on Ground Handling Service Provider Certification Process
f. Guidance material on flight crew proficiency
g. Advisory Circular: Mode Awareness and Energy State Management Aspects of Flight Deck Automation

5.2.3 Runway Excursion

Runway excursion covers materialized runway excursions, both at high and low speed, and occurrences where the flight crew had difficulties in maintaining the directional control of the aircraft or of the braking action during landing, where the landing occurred long, fast, off-centred or hard, or where the aircraft had technical problems with the landing gear (not locked, not extended or collapsed) during

landing. During the period 2017-2021, Runway Excursions and abnormal runway contact accidents and serious incidents mainly occurred in the landing phase of flight.

Key Actions completed/planned	
a.	Conduct of assistance missions by the Runway Safety Go-Team (RST)
b.	Establishment of a MID-FPP to support states on the effective implementation of the PBN procedures
c.	Promoted operational improvements and safety enhancements associated with the implementation of ASBU modules, e.g. PBN, CDO. Implementation of Performance-Based Navigation (PBN); particularly Approaches with Vertical Guidance (APV)
d.	Assistance to States to implement the SSP/SMS
e.	RSA on Wildlife Management and Control Regulatory Framework & Guidance Material
f.	Support States to implement the Global Reporting Format (GRF) Methodology through Webinar/ Workshops/Training
g.	Guidance material on un-Stabilized Approach
h.	MID Region Action Plan/Milestones on the Global Reporting Format (GRF) Implementation.

5.2.4 Runway Incursion (RI)

A Runway Incursions refers to the incorrect presence of an aircraft, vehicle or person on an active runway or in its areas of protection. Their accident outcome is runway collisions. While there were no fatal accidents or accidents involving MID States operators in the last years involving runway collision, the risk of the reported occurrence demonstrated to be very real. In addition to this, MID States should provide further data analysis regarding runway incursion to identify the root causes and associated safety issues.

Key Actions completed/planned	
a.	Conduct of assistance missions by the Runway Safety Go-Team (RST)
b.	Assistance to States to implement the SSP/SMS

5.2.5 Controlled Flight into Terrain (CFIT)

It comprises those situations where the aircraft collides or nearly collides with terrain while the flight crew has control of the aircraft. It also includes occurrences, which are the direct precursors of a fatal outcome, such as descending below weather minima, undue clearance below radar minima, etc. There was no fatal accident involving MID States operators during this period. This key risk area has been raised by some MID States and in other parts of the world that make it an area of concern. However, additional data is needed for further analysis to identify the underlying safety issues.

Key Actions completed/planned	
a.	Establishment of MID-FPP to support states on the effective implementation of the PBN procedures
b.	Promoted operational improvements and safety enhancements associated with the implementation of ASBU modules; e.g., PBN, CDO, CCO. Implementation of Performance-Based Navigation (PBN); particularly Approaches with Vertical Guidance (APV)
c.	Assistance to States to implement PBN routes for en-route and terminal airspace through meeting and workshops/seminars
d.	Assistance to States to implement the SSP/SMS

e. Development and publication of RSAs
f. Construction, approval and implementation of RNAV (GNSS) / RNP-AR procedures to all runways not currently served by precision approach procedure
g. Guidance for designing RNP Approach

5.2.6 Mid-Air Collision (MAC)

Refers to the potential collision of two aircraft in the air. It includes direct precursors such as separation minima infringements, genuine TCAS resolution advisories or airspace infringements. Although there have been no aero-plane mid-air collision accidents in recent years within the MID States. This key risk area has been raised by some MID States specifically in the context of the collision risk posed by military aircraft operating in Gulf area over the high seas which are not subject to any coordination with related FIRs for airborne operation. This is one specific safety issue that is a main priority in this key risk area. However, additional data is needed for further analysis to identify the underlying safety issues.

Key Actions completed/planned
a. Assistance to States to implement the SSP/SMS
b. Establishment of Near Mid-Air Collision (NMAC) Group to carry out further analyses of the reported NMAC incidents and provide feedback to the ATM SG and ASRG.
c. Conduct workshop to implement Civil-Military cooperation
d. Conduct seminar on raising awareness among stakeholders related to the potential risk of MAC over high seas

5.3 Emerging Risks

Emerging safety issues are risks that might impact Safety in the future. These may include a possible new technology, a potential public policy, a new concept, a business model or idea that, while perhaps an outlier today, could mature and develop into a critical mainstream issue in the future or become a major trend in its own right. Therefore, for the triennium of 2023-2025, the MID Region should continue to focus its efforts on mitigating and minimizing the safety impact of emerging risks for this time period, namely:

- a. Support States on establishing the UAS regulatory framework.
- b. Decrease the GNSS interference impact.
- c. support on maintaining collectively the pre-pandemic high aviation safety level throughout the recovery phase and improving safety post-recovery due to the drastic reduction in traffic volumes due to the COVID-19 crisis and the new risks induced by its impacts.
- d. Management of security risks with safety impact.
- e. 5G interference with Radio Altimeter frequency band.

The emerging risks SEIs and safety actions will be covered under organizational issues and operational safety risk SEIs.

5.3.1 GNSS interference

GNSS interference, including intentional and unintentional signal interference, has been identified as a major safety issue.

Flight Data Exchange analysis showed that the majority of GPS Signal Lost was detected within or in vicinity of Turkish airspace (Ankara FIR and Istanbul FIR), and in Eastern Mediterranean area. Compared to previous analysis, the identified hot spots have been expanded into entire Anatolian peninsula, including Istanbul FIR.

The GNSS interference SEI /safety actions covered under CFIT SEI.

Key Actions completed/t planned
a. RSA on GNSS vulnerability has been developed and published
b. Safety data analysis shared by IATA
c. Raise awareness on the potential impact of GNSS interference on the aviation during the Civil-Mil Workshop
d. Urge States to follow the reporting procedure agreed by MIDANPIRG Conclusion 19/4 when needed

5.3.2 COVID-19 Pandemic Outbreak- Safe return to operations

It was noted that the rapidly evolving COVID-19 crisis heavily affected all aspects of civil aviation. The urgent need to coordinate all efforts to reduce the risks of the spread of COVID-19 by air transport and to protect the health of air travellers and aviation personnel, while maintaining essential aviation transport operations and ensuring an orderly return to normal operations in due course was underlined. The COVID-19 pandemic resulted in an extreme reduction in operations that began in late March 2020. Recovering from this crisis without adversely affecting the high level of safety performance is proposed as a strategic priority.

In addition to the specific operational risks stemming from the crisis, there are currently a substantial number of exemptions and extensions granted; however, the use of flexibility provisions is diminishing. The aviation safety issues arising as a result of the pandemic have been identified and those safety issues that were considered to constitute the highest risk to the aviation system were assessed and resulted in a number of safety interventions and the publication of guidance material including ICAO CART documents to support stakeholders with the management of the specific risks posed by the crisis. The UAS SEIs /safety actions covered under MAC SEI.

Key Actions completed/planned
a. Establishment of MID Region Recovery Plan Task Force (MID-RPTF) to assist in developing regional restart and recovery planning
b. MID-RPTF activities
c. Conduct of teleconferences with DGCAs and Regional international organization
d. Development of MID CART Regional Implementation Roadmap
e. Continuous communication and coordination with MID States;
f. Development of a COVID-19 web page to communicate to States and all stakeholders the guidance material issued by ICAO, WHO, international organizations, States best practices and
g. Deployment of iPacks
h. Capacity building activities

5.3.3 Ensure the safe operations of UAS (drones)

The number of drones at the global level has increased. Available evidence demonstrates an increase of drones coming into close proximity with manned aviation (both aeroplanes and helicopters) and the need to mitigate the associated risk. The civil aviation authority is responsible for, inter alia, ensuring aviation safety and protecting the public from aviation hazards. Operators of aircraft, whether manned or unmanned, are likewise responsible for operating safely. The rapid rise of UAS raises new challenges that were not considered in historic aviation regulatory frameworks. Before devising any regulatory framework for UAS operations, the regulator should understand and assess the UAS situation in its State.

UA operations will involve stakeholders' familiar with aviation as well as many who are not. It is important to include these stakeholders from the beginning when developing the UAS regulations. Their early involvement will ensure that the regulations appropriately address the needs of these groups while also serving to educate them on expectations and what is feasible.

Therefore, safety actions would be developed to support States to develop their national regulations in order to ensure safe operation of UAS.

Key Actions completed/planned
a. UAS iPack deployment
b. Drones symposium
c. Conduct survey on States UAS regulatory framework

5.3.4 Management of security risks with safety impact

The crash of flight MH17 immediately raised the question why the aero plane was flying over an area where there was an ongoing armed conflict. Similar events had occurred in the MID region. Thus, military or terrorist conflicts may occur in any State at any time and pose risks to civil aviation. This is why it's important for governments, aircraft operators, and other airspace users such as air navigation service providers (ANSPs), to work together to share the most up-to-date conflict zone risk-based information possible to assure the safety of civilian flights.

Furthermore, flying over or nearby conflict zones is related to both security and safety management and requires an integrated risk management process, as proposed by ICAO in the second edition of the Risk Assessment Manual for Civil Aircraft Operations Over or Near Conflict Zones (Doc 10084) as an activity for further development. Several steps have to be taken, as part of the continuous risk assessment cycle including: the collection of information and intelligence; the subsequent threat analysis; the security risk assessment; the hazard identification; the safety risk assessment; the determination of the acceptable risk level and lastly information sharing. Each mitigating action should be accompanied with the identification of (new) hazards as a result of unintended consequences of the risk assessment mitigating actions.

The crash of flight MH17 shows, safety and security are intertwined. To manage the risks related to flying over conflict zones and other risks at the interface of safety and security as good as possible, closer cooperation between both worlds is necessary.

Key Actions taken/planned
a- Circulate ICAO Doc 10084 Risk Assessment Manual for Civil Aircraft Operations Over or Near Conflict Zones
b- Organize seminar/Symposium to exchange experiences and good practices on assessing the risks and sharing of information related to the overflying of conflict zones in coordination with RASFG-MID and MIDANPIRG
c- Encourage States to issue NOTAMs to share threats information emanated from conflict zones within their airspaces.

5.3.5 5G Operation on Radio Altimeter

Radar altimeters (RA), operating at 4.2-4.4 GHz, are the only sensors onboard a civil aircraft which provide a direct measurement of the clearance height of the aircraft over the terrain or other obstacles (i.e. the Above Ground Level - AGL - information).

The RA systems' input is required and used by many aircraft systems when AGL is below 2500 ft. Any failures or interruptions of these sensors can therefore lead to incidents with catastrophic outcome, potentially resulting in multiple fatalities. The radar altimeters also play a crucial role in providing

situational awareness to the flight crew. The measurements from the radar altimeters are also used by Automatic Flight Guidance and Control Systems (AFGCS) during instrument approaches, and to control the display of information from other systems, such as Predictive Wind Shear (PWS), the Engine-Indicating and Crew-Alerting System (EICAS), and Electronic Centralized Aircraft Monitoring (ECAM) systems, to the flight crew.

There is a major risk that 5G telecommunications systems in the 3.7–3.98 GHz band will cause harmful interference to radar altimeters on all types of civil aircraft- including commercial transport airplanes; business, regional, and general aviation airplanes; and both transport and general aviation helicopters. If there is no proper mitigation, this risk has the potential for broad impacts to aviation operations in the United States as well as in other regions where the 5G network is being implemented next to the 4.2-4.4 GHz frequency band.

List of potential equipment failures:

Auto land functions, EICAS/ECAM, False or missing GPWS alert, Unreliable instrument Indications, and Abnormal behaviors in Automatic Flight Systems.

The 5G interference with Radar Altimeter SEIs/safety actions covered under CFIT SEI.

Key Actions taken/planned	
a-	Develop a guidance material on safeguarding measures to protect Radio Altimeter from potential harmful interference from 5G Operation
b-	Conduct a Webinar addressing the matter to raise awareness and promote the guidance material developed by the RADALT AG.

PART-II. IMPLEMENTATION

6. SAFETY IMPLEMENTATION

6.1 Safety Monitoring and Implementation

This section presents an outline of the safety performance indicators reflecting the MID Region safety strategic priorities in the area of safety. The RASG-MID would use the indicators listed in the MID Region SPMM at **Appendix C** to measure safety performance and monitor each regional safety target. Furthermore, the MID Region SPMM includes six (6) Goals in line with GASP 2023-2025 Edition.

The RASG-MID would continuously monitor the implementation of the identified SEIs in the MID-RASP and measure safety performance of the regional civil aviation system, to ensure the intended targets are achieved, using the MID Region SPMM to this plan. Therefore, for each Goal established in the MID Region SPMM, identified SEI(s) be mapped to it including their respective actions.

MID region safety indicators and targets were aligned with the 2023-2025 GASP goals and targets as relevant in the MID Region. A MID Region Annual safety report would be annually published to provide stakeholders with relevant up-to-date information on the progress made in achieving the regional safety goals and targets, as well as the implementation status/progress of the SEIs.

In the event that the regional safety goals and targets are not met, the causes would be addressed and presented to stakeholders. If RASG-MID identifies critical operational safety risks, reasonable measures would be taken to mitigate them as soon as practicable, possibly leading to an earlier revision of the MID-RASP by SEIG.

The monitoring of safety performance and its enhancement is achieved through identification of relevant Goals and Safety Indicators, taking into consideration the GASP 2023-2025 and regional specific objectives and priorities, as well as the adoption and attainment of Safety Targets with a specific timeframe.

The MID Region Safety performance measurement and monitoring includes the following Goals:

Aspirational Goal: Zero fatality by 2030, the GASP aspirational goal of ‘zero fatalities in commercial operations by 2030 and beyond’.

Goal 1: Achieve a Continuous Reduction of Operational Safety Risks: This is related to 2023-2025 GASP Goal 1. This is aligned with the high-level ICAO safety metrics, thereby facilitating comparison of MID Region performance with global averages. Indicators related to risk areas are identified through the MID Region risk assessment methodology and described in the MID Region ASR. These ‘operational’ safety indicators would continue to be monitored through the MID Region ASR.

Goal 2: Strengthen States’ safety oversight capabilities: This is related to 2023-2025 GASP Goal 2. The Monitoring will be based on the available data published through USOAP-CMA (OLF) and iSTARS. The Regional average overall Effective Implementation (EI) in the MID Region (13 out of 15 States have been audited) is 74.67 %, which is above the world average 68.68% (as of 29 May 2022). Three (3) States are currently below EI 60%. The objective is aligned with the 2023-2025 GASP requiring all States to improve their score for the effective implementation (EI) of the critical elements (CEs) of the State’s safety oversight system (with focus on priority PQs) as follows: a) by 2024 -75 per cent; b) by 2026 – 85 per cent EI score; c) by 2030 EI Score – 95 per cent EI score.

Goal 3: Implement effective State safety Programmes (SSPs): This is related to 2023-2025 GASP. Related indicators will mainly be based on data available through ICAO iSTARS and USOAP-CMA (OLF). Feedback provided by Member States and Regional organizations would also be considered.

MID Office will in addition collect relevant documentation and information from States (SSP and NASP). The objective is aligned with the 2023-2025 GASP requiring all States to implement the foundation of an SSP by 2023, all States to publish a national aviation safety plan (NASP) by 2024, all States to work towards an effective SSP with maturity levels – Present by 2025, and Present and Effective by 2028.

Goal 4: Increase Collaboration at the Regional Level: This is related to 2023-2025 GASP. Related indicators will mainly be based on data available through ICAO iSTARS and USOAP-CMA (OLF). Feedback provided by Member States would be also considered. The objective is aligned with the 2023-2025 GASP requiring all States to achieve a positive safety oversight margin, and an effective SSP, to actively lead RASGs' safety risk management activities, by 2025.

Goal 5: Expand the use of Industry Programmes and safety information sharing networks: This is related to 2023-2025 GASP. Related indicators will mainly be collected from IATA and other international and regional organizations. Feedback provided by Member States would also be considered. The objective is aligned with the 2023-2025 GASP requiring all States that do not expect to meet GASP Goals 2 and 3 to seek assistance to strengthen their safety oversight capabilities or facilitate SSP implementation, all States to contribute information on operational safety risks, including SSP safety performance indicators regional aviation safety group (RASG) by 2025, and all regions to publish an updated regional aviation safety plan (RASP), in line with the 2023–2025 edition of GASP by 2023.

Goal 6: Ensure the appropriate infrastructure is available to support safe operations: This is related to 2023-2025 GASP Goal 6. Related indicators will mainly be based on data available through ICAO iSTARS. Feedback provided by Member States would also be considered. The objective is aligned with the 2023-2025 GASP requiring all States to implement the air navigation and airport core infrastructure including aerodrome safety by 2025.

6.2 Communication of Progress to RASG-MID and Regional Stakeholders

A MID Region Annual safety report would be annually published to provide stakeholders with relevant up-to-date information on the progress made in achieving the regional safety goals and targets, as well as the implementation status of the SEIs. In addition, the abovementioned information would culminate in a report on progress of implementation of the MID-RASP SEIs and their respective actions as well as in achieving the regional safety goals and targets; would be presented at every SEIG and RASG-MID meetings as well as safety seminars. The progress report should cover at least the following aspects:

- a. Brief overview of the overall implementation of the MID-RASP;
- b. Analysis on delay/ challenges encountered in implementation of SEIs and their respective actions; and
- c. If regional safety goals and targets are not met, causes would be addressed and presented to relevant stakeholders.

7 SAFETY ACTIONS

This chapter addresses system-wide problems that affect aviation as a whole including the SEIs and their respective actions. In most scenarios, these problems are related to organizational processes and procedures, regional operational safety risks, and emerging risks. The safety actions in this chapter are driven principally by the need to maintain or increase the current level of safety in the aviation sector for the region.

This chapter also facilitates the identification of SEIs and their respective actions relevant for each Goal established in the MID Region Safety performance measurement and monitoring as follows:

- **Goal 1:** Achieve a continuous reduction of operational safety risks.
- **Goal 2:** strengthen States safety oversight capabilities.
- **Goal 3:** Implementation of effective State safety Programmes.
- **Goal 4:** Increase collaboration at the regional level.
- **Goal 5:** Expand the use of industry Programmes and safety information sharing networks.
- **Goal 6:** Ensure the appropriate infrastructure is available to support safe operations.

7.1 Organizational Challenges/issues

7.1.1 Goal 2: Strengthen States' Safety Oversight Capabilities

The States safety oversight capabilities remains an issue mainly for AIG, AGA, ANS, and OPS areas. The lack of effective oversight remains an issue and the difficulties experienced by some authorities in properly discharging their oversight responsibilities is a concern also in the light of the size, scope and complexity of the aviation industry that some of them oversee.

Furthermore, while a number of CAAs have reached a suitable and stable level of maturity, certain continue to underperform and/or struggle in achieving sustainable improvements. Most notably, while progress has been noted in the implementation of Authorities' management systems, effective oversight of undertakings' safety management systems continues to be an area of concern in several domains.

7.1.1.1 G2-SEI-01: Strengthening States' Safety Oversight Capabilities

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

The CEs are essentially the safety defense tools of the State Safety Oversight system needed for the effective and sustainable implementation of a safety-related policy and associated procedures. The effective implementation of the CEs is an indication of a State's capability for safety oversight. States must establish CE-1 through CE-5 prior to the implementation of CE-6 through CE-8 in order to provide effective safety oversight and safety management. An individual State's responsibility for safety oversight is the foundation upon which a safe global air transport system is built. States that experience difficulties in carrying out safety oversight functions can impact the state of International Civil Aviation.

States should work to continually improve their effective implementation of the eight CEs of the State's safety oversight system in all relevant areas, as appropriate to their aviation system complexity. Through collaborative efforts, the level of effective implementation of the CEs of a State's safety oversight system can increase, particularly in those States where a State faces shortages of human, financial or technical resources.

The below elements are considered enablers of a robust safety oversight system, expected to be in place according to the requirements in force:

1. ability and determination to conduct effective oversight;
2. ability to identify risks through a process to collect and analyze data;
3. ability to mitigate the identified risks in an effective way, implying measurement of performance and leading to continuous improvement;
4. willingness and possibility to exchange information and cooperate with other CAAs;
5. ability to ensure the availability of adequate personnel, where 'adequate' includes the notion of sufficient training and proper qualification; and
6. focus on the implementation of effective management systems in industry, wherever required by the regulations in force.

What we want to achieve:

A robust oversight system across MID Region, where each CAA is able to properly discharge its oversight responsibilities, with particular care to exchange of information and cooperation with other

CAAs and to the implementation of management systems in all organizations, as well as to ensure the availability of adequate personnel in CAAs. In addition, to Support MID Region States' civil aviation authorities to Strengthen States' Safety Oversight Capabilities and increase progressively the USOAP-CMA EI results.

How we monitor improvement:

Significant increase of the number of States with an EI above 60% and implementing risk-based oversight.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1-A2-A3-A4-A5-A6-A7
A1- Conduct Capacity Building Activities to promote effective implementation of SARPs,
A2- Conduct technical assistance activities and NCLB missions to States with a focus on ANS, AGA, AIG, and OPS areas.
A3- Develop and implement a specific NCLB plan of actions for prioritized States
A4- Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course on Aerodrome Inspection) (Action addressed under G6-SEI-01 A5)
A5- Develop guidance material to assist MID Region States in the issuance of exemptions related to temporary deviations from standards
A6- Develop guidance material to support States for the conduct of remote surveillance
A7- Develop guidance material on the enhancement of understanding the concept of judicial enforcement for aviation inspectors

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 "Strengthen States' safety oversight capabilities"

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-1: Consistent implementation of ICAO SARPs at the national level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-4 & GASP SEI-10: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.
- GASP SEI-5: Provision of the Regional safety information to ICAO by asking States to complete, submit and update all relevant documents and records.

Phase 2 — Implementation of a Safety Oversight System

- GASP SEI-6: Continued implementation of and compliance with ICAO SARPs at the Regional level.
- GASP SEI-8: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.
- GASP SEI-9: Continued provision of the primary source of Regional safety information to ICAO by asking States to update all relevant documents and records as progress is made.

Stakeholders: RASG-MID, MIDANPIRG, States, international organizations, and industry

Action 1: Conduct Capacity Building Activities to promote effective implementation of SARPs

Owner: ICAO, States, international organizations, and industry

Priority: Medium

Completion date: 2025

Status: Ongoing

Action 2: Conduct technical assistance and NCLB missions to States with focus on ANS, AGA, AIG, and OPS areas

Owner: ICAO

Priority: High

Completion date: 2025

Status: Ongoing

Action 3: Develop and implement a specific NCLB plan of actions for prioritized States

Owner: ICAO and concerned States

Priority: High

Completion date: 2025

Status: Ongoing

Action 4: Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course on Aerodrome Inspection) (Action addressed under G6-SEI-01 A5)

Owner: Qatar and ICAO

Priority: Medium

Completion date: 2025

Status: New

A5- Develop guidance material to assist MID Region States in the issuance of exemptions related to temporary deviations from standards

Owner: Qatar supported by Iran, Sudan, UAE, and IATA

Priority: Medium

Completion date: 2025

Status: New

A6- Develop guidance material to support States for the conduct of remote surveillance

Owner: Qatar supported by Iran, Jordan, Saudi Arabia, Sudan, UAE, and ACAO

Priority: Medium

Completion date: 2025

Status: New

A7- Develop guidance material on the enhancement of understanding the concept of judicial enforcement for aviation inspectors

Owner: Qatar supported by Saudi Arabia and UAE

Priority: Medium

Completion date:	2025
Status:	New
EXPECTED OUTPUT	
Deliverable(s)	Timeline
MID States to improve their score for the effective implementation (EI)	2025

7.1.1.2 G2-SEI-02: Improve Regional Cooperation for the Provision of Accident & Incident Investigation

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

States should work to continually improve their effective implementation of the CEs of the State's safety oversight system in the area of AIG. Through collaborative efforts and joining the MENA ARCM, the level of effective implementation of the CEs of a State's AIG can increase, particularly in those States where a State faces shortages of human, financial or technical resources.

What we want to achieve:

MID Region States to Strengthen States' Safety Oversight Capabilities and increase progressively the USOAP-CMA EI results in the area of AIG.

How we monitor improvement:

Increase of the number of States with an EI above 60% for AIG area and then establishing an independent aircraft accident and incident investigation authority.

How we want to achieve it:

Actions: A1-A2
A1- Support of MENA ARCM activities
A2- Conduct AIG Capacity Building Activities.

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 "Strengthen States' safety oversight capabilities"

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-2: Establishment of an independent regional accident and incident investigation process, consistent with Annex 13.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-4: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.

Stakeholders: RASG-MID, States, international organization, and industry

Action 1: Support of MENA ARCM activities

Owner: ICAO, ACAO, and MENA ARCM Member States

Priority: High

Completion date: 2025

Status: Ongoing

Action 2: Conduct AIG Capacity Building Activities

Owner: ICAO, States, international organizations, and industry

Priority: Medium

Completion date: 2025

Status: Ongoing

EXPECTED OUTPUT

Deliverable(s)

Timeline

MID States to improve their score for the effective implementation (EI) especially the area of AIG 2025

7.1.1.3 G2-SEI-03: Sharing of Safety Recommendations related to Accidents and Serious Incidents

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

States should work to continually improve their effective implementation of the CEs of the State's safety oversight system in the area of AIG. Through collaborative efforts, the level of effective implementation of the CEs of a State's AIG can increase, particularly in those States where a State faces shortages of human, financial or technical resources.

What we want to achieve:

MID Region States' civil aviation authorities to Strengthen States' Safety Oversight Capabilities and increase progressively the USOAP-CMA EI results in the area of AIG. In addition, the prevention of accidents or incidents, and the reduction of the consequences of such occurrences.

How we monitor improvement:

Increase of the number of States with an EI above 60% for AIG area and establishing an independent aircraft accident and incident investigation authority.

How we want to achieve it:

Action: A1

A1- Establishing a Platform for Sharing Safety Recommendations for MENA ARCM Member States

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 "Strengthen States' safety oversight capabilities"

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities
- GASP SEI-4: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner

Stakeholders: RASG-MID, States, and international organization

Action 1: Development of platform on sharing safety recommendations

Owner: ICAO, ACAO, and MENA ARCM Member

Priority: Low

Completion date: 2025

Status: On-hold

EXPECTED OUTPUT

Deliverable(s)	Timeline
Improve MID States the effective implementation (EI) in the area of AIG	2025

7.1.1.4 G2-SEI-04: Enhance State Oversight on Dangerous Goods

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

States should work to continually improve their effective implementation of the eight CEs of the State's safety oversight system in the area of OPS.

What we want to achieve:

States to implement an effective system for safety oversight of the various entities involved in the transport of dangerous goods. In addition, MID Region States' to Strengthen States' Safety Oversight Capabilities and increase progressively the USOAP-CMA EI results in the area of OPS and enhance the state oversight on Dangerous Goods

How we monitor improvement:

Increase of the number of States with an EI above 60% for OPS area and then to Strengthen States' Safety Oversight Capabilities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1

A1- Conduct Dangerous Goods (DG) capacity building activities including Lithium batteries fires/smoke risks in cabin

A2- Develop guidance material on carriage and transport of Lithium batteries

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 "Strengthen States' safety oversight capabilities" and ICAO Annex 18 "Safe Transport of Dangerous Goods by Air".

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

GASP SEI-1: Consistent implementation of ICAO SARPs at the national level

Phase 2 — Implementation of a Safety Oversight System

GASP SEI-6: Continued implementation of and compliance with ICAO SARPs at the Regional level

Stakeholders: RASG-MID, States, international organizations, and industry

Action 1- Conduct Dangerous Goods (DG) capacity building activities including Lithium batteries fires/smoke risks in cabin

Owner: ICAO, States, international organizations, and industry.

Priority: Medium

Completion date: 2025

Status: Ongoing

Action 2: Develop guidance material on carriage and transport of Lithium batteries

Owner: IATA

Priority: Medium

Completion Date: 2025

Status: Ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
MID States to improve their score for the effective implementation (EI) especially the area of OPS	2025

7.1.1.5 G2-SEI-05: Human factors and Competence of Personnel

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

Human factors and competence of personnel are strategic priorities in the region. Human factors and the impact on human performance, as well as medical fitness are strategic priorities. As new technologies and/or operating concepts emerge on the market and the complexity of the system continues increasing, it is of key importance to properly address human factors and human performance, in terms of both limitations and its contribution to delivering safety, as part of the safety management implementation. CRM has been identified in the MID ASR as most important human factors issue in the domain of commercial air transport Aeroplanes above 5700 kgs. The safety actions related to competence of personnel mainly English language proficiency would be further developed in the future.

The main objectives of TRM for operational staff are the development of attitudes and behaviour, which will contribute to enhanced teamwork skills and performance in order to reduce teamwork failures as contributory factors in ATM related incidents and accidents. The benefits of TRM are considered to be enhanced Threat and Error Management capabilities, continuity and stability of teamwork, task efficiency, sense of working as a part of a larger and more efficient team, increased job satisfaction; and improved use of staff resources.

In addition, the safety action identified currently related to aviation personnel is also focusing on fatigue risk management (FRMS) by COVID-19 to mitigate safety issues in all domains such as personal readiness, flight crew perception or crew resource management (CRM) and communication, which play a role in improving safety across all aviation domains.

What we want to achieve:

Ensure continuous improvement in safety management activities as related to human factors and human performance.

How we monitor improvement:

Improvement in aviation personnel competence at all levels and then to Strengthen States' Safety Oversight Capabilities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1-A2-A3-A4
A1- Advisory Circular: Crew Resource Management Training Programme (CRM). (Action addressed under G1-SEI-04:CFIT)
A2- Conduct Crew Resource Management capacity building activities
A3- Organize Team Resource Management capacity building activities.
A4- FRMS capacity building activities

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 "Strengthen States' safety oversight capabilities". ICAO Human Performance Manual (ICAO Doc 10151) and ICAO Safety Management Manual (ICAO Doc 9859).

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

GASP SEI-1: Consistent implementation of ICAO SARPs at the national level

Stakeholders: RASG-MID, States, industry, international organizations

Action 2: Organize Crew Resource Management capacity building activities

Owner: ICAO, States, international organizations, and industry.

Priority: Medium

Completion date: 2023

Status: ongoing

Action 3: Organize Team Resource Management capacity building activities

Owner: ICAO, States, international organizations, and industry

Priority: Medium

Completion Date: 2023

Status: ongoing

Action 4: FRMS capacity building activities

Owner: ICAO, States, international organizations, and industry

Priority: Medium

Completion Date: 2025

Status: ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
MID States to improve their score for the effective implementation (EI) and mitigate contributing factors to accidents and incidents	2025

7.1.1.6 G2-SEI-06: Management of security risks with safety impact

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale:

The safety action in this area is aimed at mitigating the security related safety risks. The safety action in this area also include the mitigation of the risks posed by flying over zones where an armed conflict exists. Managing the impact of security on safety is a strategic priority in MID region.

What we want to achieve:

Increase safety by managing the impact of security on safety and mitigating related safety risks.

How we monitor improvement:

Continuous assessment and mitigation of security threats.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1

Action 1- Organize seminar/Symposium/workshop to exchange experiences and good practices on assessing the risks and sharing of information related to the overflying of conflict zones in coordination with RASFG-MID and MIDANPIRG

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 “Strengthen States’ safety oversight capabilities”. ICAO Annex 17.

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-1: Consistent implementation of ICAO SARPs at the national level

Stakeholders: RASG-MID, RASFG-MID, MIDANPIRG, States, international organizations, industry

Action 1- Organize seminar/Symposium/workshop to exchange experiences and good practices on assessing risks and sharing of information related to the overflying of conflict zones in coordination with RASFG-MID and MIDANPIRG

Owner: ICAO

Priority: High

Completion date: 2023

Status: Ongoing

EXPECTED OUTPUT

Deliverable(s)

mitigate contributing factors to accidents and incidents

Timeline

2025

7.1.1.7 G2-SEI-07: Managing cybersecurity risks

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale:

The safety action in this area is aimed at mitigating the cybersecurity related safety risks. Assess the safety impact of cybersecurity threats to aviation users, support the development of mitigations and specific Training actions, identify and mitigate the vulnerabilities of aviation products and identify the required changes to aviation standards.

What we want to achieve:

Increase safety by managing the impact of cybersecurity on safety and mitigating related safety risks.

How we monitor improvement:

Continuous assessment and mitigation of cybersecurity threats.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1-A2-A3
A1- Develop a Regional Action Plan to bridge the gap between ICAO Cyber Security Action plan and the implementation level of Cyber Resilience in the MID Region
A2- Conduct activities on Cyber Security and Resilience- (Jointly ANS and AVSEC)
A3- Develop a MID Region Cybersecurity Action Plan.

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 “Strengthen States’ safety oversight capabilities”. ICAO Annex 17.

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-1: Consistent implementation of ICAO SARPs at the national level

Stakeholders: RASG-MID, RASFG-MID, MIDANPIRG, States, international organizations, industry	
Action 1- Develop a Regional Action Plan to bridge the gap between ICAO Cyber Security Action plan and the implementation level of Cyber Resilience in the MID Region	
Owner:	ANS Cyber SeC Action group
Priority:	Medium
Completion date:	2025
Status:	New
Action 2- Conduct activities on Cyber Security and Resilience	
Owner:	ICAO
Priority:	Medium
Completion date:	2025
Status:	New
Action 3: Develop a MID Region Cybersecurity Action Plan	
Owner:	Cybersecurity Security Ad-hoc Group
Priority:	Medium
Completion date:	2025
Status:	New

EXPECTED OUTPUT

Deliverable(s)	Timeline
mitigate contributing factors to accidents and incidents	2025

7.1.1.8 G2-SEI-08: Impact of COVID-19 pandemic- Safe return to operations

Target/Metrics: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale:

States should manage a dedicated safety promotion campaign in support of safe return to operations. The safety action in this area is aimed at mitigating the COVID-19 pandemic related safety risks. The safety action in this area would focus on continuous support to the MID-RPTF and sharing of guidance material/best practices to mitigate the risks stemmed from the pandemic.

What we want to achieve:

Increase safety by managing the impact of COVID-19 pandemic on safety and mitigating related safety risks.

How we monitor improvement:

Continuous assessment and mitigation of COVID-19 pandemic induced safety risks.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions: A1-A2
A1- Continued support to the aviation industry through MID-RPTF meetings/Activities, as needed
A2- Sharing of guidance material/best practices

References: ICAO SARPs and guidance documents and 2023-2025 GASP Goal 2 “Strengthen States’ safety oversight capabilities”.

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI-1: Consistent implementation of ICAO SARPs at the national level

Stakeholders: RASG-MID, RASFG-MID, MIDANPIRG, States, international organizations, industry	
Action 1- Continued support to the aviation industry through MID-RPTF Activities, as needed	
Owner:	States, international organizations, and industry
Priority:	High
Completion date:	2025
Status:	Ongoing
Action 2: Sharing of guidance material/best practices	
Owner:	States, international organizations, and industry
Priority:	High
Completion date:	2025

Status:	Ongoing
EXPECTED OUTPUT	
Deliverable(s)	Timeline
mitigate contributing factors/safety issues to accidents and incidents 2025	

7.1.2 Goal 3: Implementation of Effective States Safety Programme (SSP)

7.1.2.1 G3-SEI-01: Implement an effective Safety Management

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

Management of safety in a systematic and proactive way enables authorities and organizations to set up management systems that take into consideration potential hazards and associated risks before aviation accidents occur. This global move is at the core of ICAO Annex 19. This safety area would enable further work to improve reporting processes, occurrence investigation at organizational level, and also the continued development of integrated data collection taxonomies.

What we want to achieve:

MID Region States to implement SSP and consequently their services providers to implement SMS. In addition, work with authorities and organizations to implement safety management.

How we monitor improvement:

ICAO Annex 19 framework requiring safety management is in place across all aviation domains, and organizations and authorities are able to demonstrate compliance.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

States to give priority to the work on SSPs

In the implementation and maintenance of the SSP, States should in particular:

- ensure effective implementation of the Annex 19 Requirements and address deficiencies in oversight capabilities, as a prerequisite for effective SSP implementation;
- ensure effective coordination between State authorities having a role in safety management;
- ensure that inspectors have the right competencies to support the evolution towards risk- and performance based oversight;
- ensure that policies and procedures are in place for risk- and performance based oversight, including a description of how an SMS is accepted and regularly monitored;
- establish policies and procedures for safety data collection, analysis, exchange and protection;
- establish a process to determine safety performance indicators at State level addressing outcomes and processes;
- ensure that an approved SSP document is made available and shared with other States; and
- ensure that the SSP is regularly reviewed and that SSP effectiveness is regularly assessed;
- ensure that the specific safety risks induced by COVID-19 be assessed and be included in the State risk picture.

SMS Assessment

States should make use of the available tools to support risk- and performance-based oversight. States also should regularly monitor status of compliance with SMS requirements of their industry.

SMS international cooperation

States should promote the common understanding of safety management and human factors principles and requirements in different countries, share lessons learned and encourage progress and harmonization, through active participation in the RASG-MID and other safety groups and fora.

FDM precursors of main operational safety risks

States in partnership with industry, other regional and international organizations should complete the good practice documentation which supports the inclusion of main operational safety risks such as RE, RI, LOC-I, CFIT and MAC into operators' FDM Programmes.

States to set up a regular dialogue with their national aircraft operators on flight data monitoring (FDM) Programmes

States to set up a regular dialogue with their national aircraft operators on flight data monitoring (FDM) Programmes, with the objectives of:

- promoting the operational safety benefits of FDM,
- fostering an open dialogue on FDM Programmes that takes place in the framework of just culture,
- encouraging operators to include and further develop FDM events relevant for the prevention of REs, MACs, CFIT and LOC-I, or other issues identified by the SSP

Actions: A1-A2
A1- Conduct SSP/SMS capacity building activities
A2- Conduct technical assistance missions by SMIT

References: ICAO Annex 19 and GASP 2023-2025 Goal 3 "Implement effective State Safety Programmes"

Component 2 — State Safety Programme

- GASP SEI-10: Start of promotion of SSP implementation at the regional level.
- GASP SEI-11: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes for SSP implementation.
- GASP SEI-12: Strategic collaboration with key aviation stakeholders to support SSP implementation.
- GASP SEI-13: Start of SSP implementation at the national level.
- GASP SEI-14: Regional allocation of resources to support continued development of the proactive use of risk modelling capabilities.
- GASP SEI-15: Regional collaboration with key aviation stakeholders to support the proactive use of risk modelling.
- GASP SEI-16: Advancement of safety risk management at the regional level.

Component 2 — State Safety Programme

GASP SEI-7: Strategic collaboration with key aviation stakeholders to complete SSP implementation

Stakeholders: RASG-MID, States, industry, international organizations	
Action 1- Conduct SSP/SMS training courses and workshops	
Owner:	ICAO, supported by organizations, and industry
Priority:	High
Completion Date:	2025
Status:	ongoing

Action 2- Conduct technical assistance missions by SMIT**Owner:** ICAO and SMIT Team**Priority:** High**Completion Date:** 2025**Status:** New**EXPECTED OUTPUT**

Deliverable(s)	Timeline
MID States to implement the foundation of an SSP	2023
MID States to implement an effective SSP	2025

7.1.2.2 G3-SEI-02: NASP Development & Implementation

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

States should ensure that a NASP is maintained and regularly reviewed. The MID-RASP provides the identified safety priorities in the Region and States should identify which top risks and key issues mentioned in the GASP and MID-RASP; which apply to their national context, and identify suitable mitigation actions within their NASP. States should also add/consider others which are unique to their operational context.

What we want to achieve:

MID Region States to develop NASP. Successful implementation of the NASP actions would require the commitment of resources from stakeholders within State, availability of data to effectively monitor the achievement of NASP Targets, and proper project governance. In addition to the actions, NASP shall also consider how to measure their effectiveness.

How we monitor improvement:

ICAO GASP requiring States to develop NASP and region to develop RASP.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

States to establish and maintain a National Aviation Safety Plan (NASP)

States should ensure that a NASP is maintained and regularly reviewed. NASP should:

- describe how the plan is developed and endorsed, including collaboration with different entities within the State, with industry and other stakeholders;
- include safety objectives, goals, indicators and targets in line with in line with GASP as well as regional safety plan;
- identify the main safety risks at national level in addition to the ones identified in MID-RASP as applicable to the State;
- include series of SEIs to address safety issues; and
- Reflect the GASP and MID-RASP SEIs as applicable to the State.

Actions: A1-A2**A1-** Conduct NASPs workshops & technical assistance missions**A2-** NASP iPacks deployment

References: ICAO Annex 19 and GASP 2023-2025 Goal 3 “Implement effective State Safety Programmes”

Component 2 — State Safety Programme

- GASP SEI-10: Start of promotion of SSP implementation at the Regional level.
- GASP SEI-11: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes for SSP implementation.
- GASP SEI-12: Strategic collaboration with key aviation stakeholders to support SSP implementation.
- GASP SEI-13: Start of SSP implementation at the national level.
- GASP SEI-14: Regional allocation of resources to support continued development of the proactive use of risk modelling capabilities.
- GASP SEI-15: Regional collaboration with key aviation stakeholders to support the proactive use of risk modelling.
- GASP SEI-16: Advancement of safety risk management at the Regional level.

Component 2 — State Safety Programme

GASP SEI-7: Strategic collaboration with key aviation stakeholders to complete SSP implementation

Stakeholders: RASG-MID, States, industry, international organizations

Action 1- Conduct NASPs workshops & technical assistance missions

Owner: ICAO

Priority: High

Completion Date: 2025

Status: Ongoing

Action 2- NASP iPacks deployment

Owner: ICAO and States

Priority: High

Completion Date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
MID States to develop and implement NASP	2025

7.1.3 Goal 4: Increase Collaboration at the Regional Level

7.1.3.1 G4-SEI-01: Development and Implementation of MID-RASP

Target: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale: The RASG-MD is the governing body responsible for the development, implementation and monitoring of the MID-RASP, in collaboration with the ICAO MID Office, international and regional organizations and with the aviation industry. The MID-RASP is to be reviewed by the Safety Enhancement Implementation Group (SEIG) every year mainly to include new identified Safety Enhancement initiatives' (SEIs), review the existing SEIs, as well as their respective actions.

What we want to achieve:

States, international organization, and industry to increase collaboration at the regional level so that to enhance safety.

How we monitor improvement:

MID region to publish an updated regional aviation safety plan (MID-RASP), in line with the 2023–2025 edition of GASP.

How we want to achieve it: This SEIs included in MID-RASP to be considered by States for inclusion in their NASPs.

References: GASP 2023-2025 Goal 4 “Increase collaboration at the Regional level”

Action: A1

A1- Development and Implementation of MID-RASP 2023-2025 Edition

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI- SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-5: Provision of the Regional safety information to ICAO by asking States to complete, submit and update all relevant documents and records.

Phase 2 — Implementation of a Safety Oversight System

GASP SEI-9: Continued provision of the primary source of Regional safety information to ICAO by asking States to update all relevant documents and records as progress is made.

Stakeholders: RASG-MID, MIDANPIRG, RASFG-MID, States, International organizations, and industry.

Action 1: Development and Implementation of MID-RASP 2023-2025 Edition

Owner: SEIG

Priority: High

Completion date: 2025

Status: Ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
To manage and enhance safety at the regional	2025

7.1.3.2 G4-SEI-02: Enhance collaboration between States, international organizations, and industry

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale: cooperation and collaboration among all stakeholders through conducting MID RCM meetings and agreeing on joint activities to avoid duplication of effort.

What we want to achieve:

States, international organizations, and industry to increase collaboration at the regional level so that to enhance safety.

How we monitor improvement: Reinforce efficient and effective cooperation and collaboration with all stakeholders, avoiding duplication and optimizing the allocation of resources at the regional level.

How we want to achieve it: Joint Programme activities

References: GASP 2023-2025 Goal 4 “Increase collaboration at the Regional level”

Actions: A1-A2
A1- Develop and agree on joint work activities through MID-RCM meetings
A2- Support the establishment of MENA RSOO and its activities

Component 1 — State Safety Oversight (SSO) System

Phase 1 — Establishment of a Safety Oversight Framework

- GASP SEI- SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-5: Provision of the Regional safety information to ICAO by asking States to complete, submit and update all relevant documents and records.

Phase 2 — Implementation of a Safety Oversight System

GASP SEI-9: Continued provision of the primary source of Regional safety information to ICAO by asking States to update all relevant documents and records as progress is made.

Stakeholders: RASG-MID, MIDANPIRG, RASFG-MID, States, international organizations, and industry.

Action 1: Develop and agree on joint work activities through MID RCMs

Owner: ICAO, States, international organizations, industry

Priority: High

Completion date: 2025

Status: New

Action 2: Support the establishment of MENA RSOO and its activities

Owner: ICAO and States

Priority: Medium

Completion date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
To increase States USOAP EI and SSP level of maturity.	2025

7.2.1 Goal 5: Expand the Use of Industry Programmes and safety information sharing networks

7.1.4.1 G5-SEI-01: Promote the Use of industry Programmes

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

What we want to achieve:

Work with authorities and organizations to increase the number of service providers participating in the corresponding ICAO recognized industry assessment Programmes.

How we monitor improvement:

Increase the number of service providers participating in the corresponding ICAO recognized industry assessment Programmes. The RASG-MID, IATA, and ACI will give feedback on the effectiveness of the activities.

How we want to achieve it:

Actions:	A1-A2
A1-	Encourage IATA's IOSA and ISAGO registrations through safety promotion
A2-	Encourage the implementation of ACI Airport Excellence (APEX) in Safety Programme
References: This is related to 2023-2025 GASP Goal 5 "Expand the use of industry Programmes and safety information sharing networks"	

Component 1 — State Safety Oversight (SSO) System

GASP SEI-1 — Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.

Stakeholders: RASG-MID, States, industry, international organizations	
Action 1: Encourage IATA's IOSA and ISAGO registrations through safety promotion	
Owner:	IATA
Priority:	Medium
Completion Date:	2025
Status:	Ongoing
Action 2: Encourage the implementation of ACI Airport Excellence (APEX) in Safety Programme	
Owner:	ICAO and ACI
Priority:	medium
Completion Date:	2025
Status:	ongoing
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Increase the number of service providers participating in ICAO recognized industry assessment Programmes and maintain recurrent APEX Missions in the region:	2025

7.2.1 Goal 6: Ensure the Appropriate Infrastructure is available to Support Safe Operations

7.1.1.1 G6-SEI-01: Certification of International Aerodromes

Target/Metrics: The safety targets of this goal are indicated in the MID Region safety strategy at Appendix C.

Rationale:

Many International Airports are yet to be fully certified and many that are certified are facing challenges to apply the Standards and Recommended Practices (SARPs) as laid out in ICAO Annex 14- Aerodromes and the ICAO Manual on Certification of Aerodromes (Doc 9774).

What we want to achieve:

MID Region States to improve international aerodromes infrastructures and ensure continuous improvement.

How we monitor improvement:

The number of certified international airports. The RASG-MID, members States, and partners would provide feedback on the effectiveness of the activities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions:	A1-A2-A3-A4-A5-A6
A1-	Support States on the implementation of the ICAO Annex 14 requirements to achieve compliance with regards to Aerodrome Design and Operations, through Workshops/Trainings
A2-	Enhance capacity building for States CAAs and Airport operators related to aerodromes certification through Workshops/Training
A3 –	Deployment of iPack on Aerodrome Re-Start
A4 -	Support States in implementing aerodrome oversight/inspection mechanism through capacity building activities on Aerodrome Oversight
A5 –	Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course + OJT)
A6 –	Conduct a Wildlife Hazard Management Control capacity building Activities

References: ICAO SARPs and guidance documents and 2023-2025 GASP. This is related to 2023-2025 GASP Goal 6 “Ensure the appropriate infrastructure is available to support safe operations”

Component 1 — State Safety Oversight (SSO) System

- GASP SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-4: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.

Stakeholders: RASG-MID, States, industry, International organizations

Action 1: Support States on the implementation of the ICAO Annex 14 requirements to achieve compliance with regards to Aerodrome Design and Operations, through capacity building activities

Owner: ICAO and ACI.

Priority: High

Completion Date: 2025

Status: Ongoing

Action 2: Enhance capacity building for States CAAs and Airport operators related to aerodromes certification through capacity building activities

Owner: ICAO and ACI

Priority:	High
Completion date:	2025
Status	ongoing
Action 3: Deployment of iPack on Aerodrome Re-Start	
Owner:	ICAO
Priority:	Medium
Completion Date:	2025
Status:	Ongoing
A4: Support States in implementing aerodrome oversight/inspection mechanism through capacity building activities on Aerodrome Oversight	
Owner:	ICAO and FAA
Priority:	Medium
Completion Date:	2025
Status:	New
A5: Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course + OJT)	
Owner:	TBD
Priority:	Medium
Completion Date:	2025
Status:	New
A6: Conduct a Wildlife Hazard Management Control capacity building Activities	
Owner:	ICAO, ACAO, WBA
Priority:	Medium
Completion Date:	2025
Status:	New
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Increase the number of Certificated International Aerodromes	2025

7.1.5.2 G6-SEI-02: Establish Runway Safety Team (RST) at International Aerodromes

Target: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale:

Many States have difficulties on the development of the Runway Safety Programme and the establishment of Runway Safety Teams (RSTs) at airports as an effective means to reduce runway related accidents and incidents.

What we want to achieve:

MID Region States' civil aviation authorities to establish an effective RSTs at their aerodromes which would significantly reduce the runway safety related risks.

How we monitor improvement:

Number of the RSTs established at international aerodromes and number of the RST missions

conducted. The RASG-MID, members States, and partners will give feedback on the effectiveness of the activities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs.

Actions:	A1-A2
A1-	Conduct of assistance missions by the Runway Safety Go-Team (RST)
A2-	Support States to implement the Global Reporting Format Methodology through capacity building activities: (Action addressed under G1-SEI-02: Runway Excursion)

References: ICAO SARPs and guidance documents and 2023-2025 GASP. This is related to 2023-2025 GASP Goal 6 “Ensure the appropriate infrastructure is available to support safe operations”.

Component 1 — State Safety Oversight (SSO) System

- GASP SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.
- GASP SEI-4: Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner.

Stakeholders: RASG-MID, States, industry, international organizations	
Action 1: Conduct of assistance missions by the Runway Safety Go-Team (RST)	
Owner:	ICAO, RSP (Runway Safety Programme Partners)
Priority:	High
Completion date:	2025
Status:	Ongoing
Action 2: Support States to implement the Global Reporting Format Methodology through capacity building. (Action addressed under G1-SEI-02: Runway Excursion)	
Owner:	ICAO, ACI and Aircraft Manufactures
Priority:	High
Completion Date:	2025
Status:	Ongoing
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Increase the number of establishment RST at international aerodromes	
2025	

7.2 Regional Operational Safety Risks

7.2.1 Goal 1: Achieve a continuous reduction in Operational Risks

7.2.1.1 G1-SEI-01: Aircraft upset in flight (LOC-I)

Target: The safety targets of this goal are indicated in the MID Region safety strategy at **Appendix C**.

Rationale:

Loss of control usually occurs because the aircraft enters a flight regime which is outside its normal

envelope, usually, but not always, at a high rate, thereby introducing an element of surprise for the flight crew involved. Prevention of loss of control is a strategic priority. In addition, Aircraft upset or loss of control is the key risk area with the highest risk related to fatal accidents in CAT aeroplane operations having a maximum take-off weight above 5700 kg. It includes uncontrolled collisions with terrain, but also occurrences where the aircraft deviated from the intended flight path or intended aircraft flight parameters, regardless of whether the flight crew realized the deviation and whether it was possible to recover or not. It also includes the triggering of stall warning and envelope protections.

During 2017-2021 Aircraft upset or Loss of control contributed to one accident and counted for around 27% of fatalities. During the year 2018, the LOC-I occurred during En-route phase of flight.

What we want to achieve:

Increase safety by continuously assessing and improving risk controls to mitigate the risk of loss of control.

How we monitor improvement:

Continuous monitoring of safety issues identified in the MID Region annual safety report for CAT aeroplane above 5,700 kgs.

How we want to achieve it:

States should set up a regular dialogue with their national aircraft operators on flight data monitoring (FDM) Programmes, with the objectives of: promoting the operational safety benefits of FDM, fostering an open dialogue on FDM Programmes that takes place in the framework of just culture, encouraging operators to include and further develop FDM events relevant for the prevention of LOC-I, or other issues identified by the SSP.

States to include LOC-I in national SSPs: LOC-I should be addressed by the States on their SSPs and included in NASPs. This should include as a minimum agreeing a set of actions and measuring their effectiveness.

Actions:	A1-A2-A3
A1-	Guidance material on flight crew proficiency
A2-	Advisory Circular: Mode Awareness and Energy State Management Aspects of Flight Deck Automation
A3-	Conduct Upset Recovery Workshops/Webinars
A4-	Develop guidancematreial on the air cargo safety

References:

- GASP 2023-2025 Goal 1 “Achieve a Continuous Reduction of Operational Safety Risks”.
- GASP SEIs (States, Region, and industry) – Mitigate contributing factors to LOC-I accidents and incidents.

Stakeholders: RASG-MID, States, industry, international organizations/associations	
Action 1: Guidance material on flight crew proficiency	
Owner	IATA and Aircraft manufacturers
Priority:	Medium
Completion Date:	2025
Status:	Ongoing
Action 2: Advisory Circular: Mode Awareness and Energy State Management Aspects of Flight Deck Automation	

Owner:	IATA and Aircraft manufacturers. Supported by KSA
Priority:	High
Completion Date:	2025
Status:	ongoing
Action 3: Conduct Upset Recovery workshop/Webinar	
Owner:	ICAO, IATA, Industry.
Priority:	High
Completion Date:	2025
Status:	Ongoing
A4- Develop guidance material on the air cargo safety	
Owner:	Oman
Priority:	Medium
Completion Date:	2025
Status:	New
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Mitigate contributing factors to LOC-I accidents and incidents	2025

7.2.1.2 G1-SEI-02: Runway Safety- Runway Excursion

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

Runway excursion covers materialized runway excursions, both at high and low speed, and occurrences where the flight crew had difficulties in maintaining the directional control of the aircraft or of the braking action during landing, where the landing occurred long, fast, off-centred or hard, or where the aircraft had technical problems with the landing gear (not locked, not extended or collapsed) during landing. During 2017-2020, Runway Excursions and abnormal runway contact accidents and serious incidents mainly occurred in the landing phase of flights.

What we want to achieve:

Increase safety by continuously assessing and improving risk controls to mitigate the risk of RE.

How we monitor improvement:

Continuous monitoring of safety issues identified in the MID Region annual safety report for CAT aeroplane above 5,700 kgs.

How we want to achieve it:

States to set up a regular dialogue with their national aircraft operators on flight data monitoring (FDM) Programmes, with the objectives of: promoting the operational safety benefits of FDM, fostering an open dialogue on FDM Programmes that takes place in the framework of just culture, encouraging operators to include and further develop FDM events relevant for the prevention of REs.

States to include Runway Excursions in national SSPs: REs should be addressed by the States on their SSPs and included in NASPs in close cooperation with the aircraft operators, air traffic control,

and airport operators. This should include as a minimum agreeing a set of actions and measuring their effectiveness.

Actions:	A1-A2
A1-	Support States to implement the Global Reporting Format (GRF) Methodology through capacity building activities
A2-	MID Region Action Plan/Milestones on the Global Reporting Format (GRF) Implementation

References:

- GASP 2023-2025 Goal 1 “Achieve a Continuous Reduction of Operational Safety Risks”.
- GASP SEIs (States, Region, and industry) – Mitigate contributing factors to RE accidents and incidents.

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations/associations	
Action 1: Support States to implement the Global Reporting Format (GRF) Methodology through capacity building activities (Reference: G3-SEI-02)	
Owner:	ICAO, ACI, and Aircraft Manufactures
Priority:	Medium
Completion Date:	2025
Status:	Ongoing
Action 2: MID Region Action Plan/Milestones on the Global Reporting Format (GRF) Implementation	
Owner:	ICAO
Priority:	High
Completion Date:	2025
Status:	ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to RE accidents and incidents	2025

7.2.1.3 G1-SEI-03: Runway Safety- Runway Incursion

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

Collision on runway covers collisions between an aircraft and another object (other aircraft, vehicles, etc.) or person that occur on a runway of an aerodrome or other predesignated landing area; it does not include collisions with birds or wildlife. While there were no fatal accident or accident involving MID States operators in the last years involving runway collision, the risk of the reported occurrence demonstrated to be very real.

What we want to achieve:

Increase safety by continuously assessing and improving risk controls to mitigate the risk of RI.

How we monitor improvement:

Continuous monitoring of safety issues identified in the MID Region annual safety report for CAT aeroplane above 5,700 kgs.

How we want to achieve it:

States to include Runway Incursions in national SSPs: RIs should be addressed by the States on their SSPs and included in NASPs in close cooperation with the aircraft operators, air traffic control, and airport operators. This should include as a minimum agreeing a set of actions and measuring their effectiveness.

Action:	A1
A1- Conduct Capacity Building Activities on the Advanced Surface Movement Guidance and Control System (A-SMGCS) Implementation	

References:

- GASP 2023/2025 Goal 1 “Achieve a Continuous Reduction of Operational Safety Risks”.
- GASP SEIs (States, Region, and industry) – Mitigate contributing factors to RI accidents and incidents.

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: Conduct Capacity Building Activities on the Advanced Surface Movement Guidance and Control System (A-SMGCS) Implementation

Owner: ICAO

Priority: High

Completion Date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to RI accidents and incidents	2025

7.2.1.4 G1-SEI-4: Controlled Flight into Terrain (CFIT)**7.2.1.4.1 G1-SEI-4A1- Controlled Flight into Terrain (CFIT)**

Target: The safety targets of this goal are indicated in the MID Region SPM at **Appendix C**.

Rationale:

It comprises those situations where the aircraft collides or nearly collides with terrain while the flight crew has control of the aircraft. It also includes occurrences, which are the direct precursors of a fatal outcome, such as descending below weather minima, undue clearance below radar minima, etc. There was no fatal accident involving MID States operators during this period. This key risk area has been raised by some MID States and in other parts of the world that make it an area of concern.

What we want to achieve:

Increase safety by continuously assessing and improving risk controls to mitigate the risk of CFIT.

How we monitor improvement:

Continuous monitoring of safety issues identified in the MID Region annual safety report for CAT aeroplane above 5,700 kgs.

How we want to achieve it:

States to set up a regular dialogue with their national aircraft operators on flight data monitoring (FDM) Programmes, with the objectives of: promoting the operational safety benefits of FDM, fostering an open dialogue on FDM Programmes that takes place in the framework of just culture,

encouraging operators to include and further develop FDM events relevant for the prevention of CFIT or other issues identified by the SSP.

States to include CFITs in national SSPs: CFIT should be addressed by the States on their SSPs and included in NASPs. This should include as a minimum agreeing a set of actions and measuring their effectiveness.

Actions: A1-A2-A3
A1- Advisory Circular: Instrument Approach Procedures Using Continuous Descent Final Approach Techniques
A2- Guidance for designing RNP Approach
A3- Advisory Circular: Crew Resource Management Training Programme (CRM)

References:

- GASP 2023-2025 Goal 1 “Achieve a Continuous Reduction of Operational Safety Risks”.
- GASP SEIs (States, Region, and industry) – Mitigate contributing factors to CFIT accidents and incidents.

Stakeholders: ICAO, RASG-MID, MIDANPIRG States, industry, international organizations	
Action 1: Advisory Circular: Guidance for Operators on Training Programme on the use of GPWS	
Owner:	IATA and Aircraft manufacturers
Priority:	Medium
Completion Date:	2025
Status:	ongoing
Action 2- Guidance for designing RNP Approach	
Owner:	ICAO AND MID-FPP
Priority:	Medium
Completion Date:	2025
Status:	New
Action 3: Advisory Circular: Crew Resource Management Training Programme (CRM)	
Owner:	IATA and Aircraft manufacturers
Priority:	High
Completion Date:	2025
Status:	ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to CFIT accidents and incidents	2025

7.2.1.4.2 G1-SEI-4A2- 5G Operation on Radio Altimeter

Stakeholders: ICAO, RASG-MID, MIDANPIRG, RASFG-MID States, industry, international organizations	
Action 1: Develop a guidance material on safeguarding measures to protect Radio Altimeter from potential harmful interference from 5G Operation	
Owner:	Radio Altimeter action group (RADALT AG)

Priority: Medium

Completion Date: 2025

Status: New

Action 2: Conduct a Webinar addressing the matter to raise awareness and promote the guidance material developed by the RADALT AG

Owner: ICAO and RADALT AG

Priority: Medium

Completion Date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to CFIT accidents and incidents including LOC-I	2025

7.2.1.5 G1-SEI-05: Airborne Conflict (Mid-Air Collisions)

7.2.1.5.1 G1-SEI-05A1: Loss of separation/TCAS RA

Target: The safety targets of this goal are indicated in the MID Region SPMM at **Appendix C**.

Rationale:

Airborne collision includes all occurrences involving actual or potential airborne collisions between aircraft, while both aircraft are airborne, and between aircraft and other airborne objects. This also includes all separation-related occurrences caused by either air traffic control (ATC) or cockpit crew, AIRPROX reports and genuine ACAS alerts. It includes direct precursors such as separation minima infringements, genuine TCAS resolution advisories or airspace infringements.

Although there have been no aeroplane mid-air collision accident in recent years within the MID States, this risk area has been raised by some MID States specifically in the context of the collision risk posed by military aircraft operating in Gulf area over the high seas which are not subject to any coordination with related FIRs for airborne operation. This is one specific safety issue that is a main priority in this key risk area.

States must have due regard for the safety of civil aircraft and must have established respective regulations for national State aircraft.

Some States had reported an increase in incidents involving close encounters between civil and military aircraft and more particularly an increase in non-cooperative international military traffic over the high-sea waters. The States could consider the following recommendations:

1. Fully apply the ICAO Manual on Civil-Military Cooperation in Air Traffic Management (Doc 10088);
2. Closely coordinate to develop, harmonize and publish operational requirements and instructions for State aircraft to ensure that 'due regard' for civil aircraft is always maintained;
3. Support the development and harmonization of civil/military coordination procedures for ATM at MID Region level and beyond if possible; and
4. Report relevant occurrences.

What we want to achieve:

Increase safety by continuously assessing and improving risk controls to mitigate the risk of MAC.

How we monitor improvement:

Continuous monitoring of safety issues identified in the MID Region Annual Safety Report for CAT aeroplane above 5,700 kgs.

How we want to achieve it:

States to include MACs in national SSPs: MACs should be addressed by the States on their SSPs and included NASPs. This should include as a minimum agreeing a set of actions and measuring their effectiveness.

States to reinforce the appropriate reactions of flight crew in response to an airborne collision avoidance system (ACAS) resolution advisories (RA), which would help to mitigate the risk of mid-air collisions by providing safety promotion material and clear messages to pilots on the need to follow the instructions of the ACAS in high-risk situations.

Actions:	A1-A2
A1-	Conduct workshop to implement Civil-Military cooperation
A2-	Conduct seminar on raising awareness among stakeholders related to the potential risk of MAC over high seas

References:

- GASP 2023-2025 Goal 1 "Achieve a Continuous Reduction of Operational Safety Risks".
- GASP SEIs (States, Region, and industry) – Mitigate contributing factors to MAC accidents and incidents.
- ICAO Doc 10088 'Manual on Civil/Military Cooperation in Air Traffic Management'

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: Conduct workshop to implement Civil-Military cooperation

Owner: ICAO, IATA, and States

Priority: High

Completion Date: 2025

Status: Ongoing

Action 2: Conduct seminar on raising awareness among stakeholders related to the potential risk of MAC over high seas

Owner: ICAO and States

Priority: High

Completion Date: 2025

Status: Ongoing

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to MAC accidents and NMAC incidents	2025

7.2.1.5.2 G1-SEI-05A2: GNSS Interference

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: Raise awareness on the potential impact of GNSS interference on the aviation during the Civil-Mil Workshop.

Owner:	ICAO and IATA
Priority:	Medium
Completion Date:	2025
Status:	New
Action 2: Urge States to follow the reporting procedure agreed by MIDANPIRG Conclusion 19/4 when needed.	
Owner:	ICAO
Priority:	Medium
Completion Date:	2025
Status:	New
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Mitigate contributing factors to MAC accidents and NMAC incidents	2025

7.2.1.5.3 G1-SEI-05A3: Ensure the Safe Operations of UAS (drones)

Target: The safety targets of this goal are indicated in the MID Region SPMM at Appendix C.

Rationale:

The civilian use of UAS has markedly increased in recent years. Research and development into the civilian applications of unmanned aircraft (UA) is a dynamic and rapidly evolving area. Control and guidance systems are now available that enable these aircraft to perform a variety of tasks that were previously unachievable, unreasonably expensive, or involved too much personal risk. As a result, UA have an increasing presence in controlled and uncontrolled airspace. In addition, available evidence demonstrates an increase of drones coming into close proximity with manned aviation (both aeroplanes and helicopters) and the need to mitigate the associated risk. In connection with this, some States in the region developed their national regulations to ensure safe operations of UAS. However, there are currently some States in the region are unable to develop their national regulations to ensure safe operations of UAS. Therefore, guidance material to be developed to assist states' CAA personnel in the implementation and oversight of UAS operations and to mitigate the risk of the MAC. When available, the guidance material would serve as an example for consideration by MID States to create, add, or amend, future or existing national UAS guidance material by the respective CAA.

What we want to achieve:

MID Region States' civil aviation authorities to develop national regulations to ensure safe operations of UAS and to create growth while maintaining a high and uniform level of safety.

How we monitor improvement:

Increase of number of states established national regulations to ensure safe operations of UAS. The RASG-MID, members States, and partners would give feedback on the effectiveness of the activities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs

Actions:	A1-A2-A3
A1- UAS iPack deployment	

A2- Organize symposium
A3- Conduct survey on States UAS regulatory framework

References: ICAO SARPs and guidance documents and 2023-2025 GASP. This is related to 2023-2025 GASP Goal 1. “Achieve a Continuous Reduction of Operational Safety Risks”

Component 1 — State Safety Oversight (SSO) System

- GASP SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: UAS iPack Deployment

Owner: ICAO

Priority: High

Completion date: 2025

Status: New

Action 2: Organize symposium related to drones (UAS)

Owner: ICAO, ACAO. Supported by FAA

Priority: Medium

Completion date: 2023

Status: Ongoing

Action 3- Conduct survey on States UAS regulatory framework

Owner: ICAO and States

Priority: Medium

Completion date: 2023

Status: New

EXPECTED OUTPUT

Deliverable(s)

Timeline

Ensure the safe operations of UAS to mitigate the risk of MID-Air Collision (MAC).

2025

7.2.1.5.2 G1-SEI-05A2: GNSS Interference

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: Raise awareness on the potential impact of GNSS interference on the aviation during the Civil-Mil Workshop.

Owner: ICAO and IATA

Priority: Medium

Completion Date: 2025

Status:	New
Action 2: Urge States to follow the reporting procedure agreed by MIDANPIRG Conclusion 19/4 when needed.	
Owner:	ICAO
Priority:	Medium
Completion Date:	2025
Status:	New
EXPECTED OUTPUT	
Deliverable(s)	Timeline
Mitigate contributing factors to MAC accidents and NMAC incidents	2025

7.2.1.5.3- G1-SEI-05A3: Ensure the Safe Operations of UAS (drones)

Target: The safety targets of this goal are indicated in the MID Region SPM at Appendix C.

Rationale:

The civilian use of UAS has markedly increased in recent years. Research and development into the civilian applications of unmanned aircraft (UA) is a dynamic and rapidly evolving area. Control and guidance systems are now available that enable these aircraft to perform a variety of tasks that were previously unachievable, unreasonably expensive, or involved too much personal risk. As a result, UA have an increasing presence in controlled and uncontrolled airspace. In addition, available evidence demonstrates an increase of drones coming into close proximity with manned aviation (both aeroplanes and helicopters) and the need to mitigate the associated risk. In connection with this, some States in the region developed their national regulations to ensure safe operations of UAS. However, there are currently some States in the region are unable to develop their national regulations to ensure safe operations of UAS. Therefore, guidance material to be developed to assist states' CAA personnel in the implementation and oversight of UAS operations and to mitigate the risk of the MAC.

When available, the guidance material would serve as an example for consideration by MID States to create, add, or amend, future or existing national UAS guidance material by the respective CAA.

What we want to achieve:

MID Region States' civil aviation authorities to develop national regulations to ensure safe operations of UAS and to create growth while maintaining a high and uniform level of safety.

How we monitor improvement:

Increase of number of states established national regulations to ensure safe operations of UAS. The RASG-MID, members States, and partners would give feedback on the effectiveness of the activities.

How we want to achieve it: This SEI should be considered by States for inclusion in their NASPs

Actions:	A1-A2-A3
A1- UAS iPack deployment	
A2- Organize symposium	
A3- Conduct survey on States UAS regulatory framework	

References: ICAO SARPs and guidance documents and 2023-2025 GASP. This is related to 2023-2025 GASP Goal 1. "Achieve a Continuous Reduction of Operational Safety Risks"

Component 1 — State Safety Oversight (SSO) System

- GASP SEI-1: Consistent implementation of ICAO SARPs at the Regional level.
- GASP SEI-3: Regional safety enhancement initiatives to support consistent coordination of Regional Programmes in establishing adequate safety oversight capabilities.

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: UAS iPack Deployment

Owner: ICAO

Priority: High

Completion date: 2025

Status: New

Action 2: Organize symposium related to drones (UAS)

Owner: ICAO, ACAO. Supported by FAA

Priority: Medium

Completion date: 2023

Status: Ongoing

Action 3- Conduct survey on States UAS regulatory framework

Owner: ICAO and States

Priority: Medium

Completion date: 2023

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
Ensure the safe operations of UAS to mitigate the risk of MID Air Collision (MAC)	2025

7.2.1.5.4 G1-SEI-05A4: Expansion of ATS route Networks

Stakeholders: RASG-MID, MIDANPIRG, States, industry, international organizations

Action 1: Conduct gap analysis to identify current ATS route networks gaps

Owner: ICAO and States

Priority: Medium

Completion Date: 2025

Status: New

Action 2: Establishment of parallel unidirectional ATS routes (De-confliction)

Owner: ICAO and States

Priority: Medium

Completion Date: 2025

Status: New

EXPECTED OUTPUT

Deliverable(s)	Timeline
Mitigate contributing factors to MAC accidents and NMAC incidents	2025

Appendix A- SEIG TORs

SAFETY ENHANCEMENT INITIATIVE GROUP (SEIG)

TERMS OF REFERENCE

1. PURPOSE OF THE SEIG TO:

- 1.1 Support the RASG-MID in the development/update of the MID Regional Aviation Safety Plan (MID-RASP) and the monitoring of the implementation of Safety Enhancement Initiatives (SEIs) related to identified safety issues.
- 1.2 Assist in the development, implementation and review of SEIs to reduce aviation safety risks. These SEIs could be established based on the analysis of regional data, based on ICAO initiatives or the initiatives of other relevant organizations or based on the risks and issues identified through the USOAP audits process.
- 1.3 Recommend safety mitigations to the RASG-MID related to identified safety issues which would reduce aviation risks.

1.4 In order to meet its Terms of Reference, the SEIG shall:

- a. follow-up the updates of the Global Aviation Safety Plan (GASP) and support the development, update and implementation of the MID Regional Aviation Safety Plan (MID-RASP) at the regional level and provide feedback to the RASG-MID;
- b. identify and develop the SEIs, which are aligned with the regional priorities and targets, for implementation within the MID Region. The focus of these SEIs is to effectively and economically mitigate the safety risks identified by the ASRG;
- c. identify difficulties, challenges and deficiencies related to the implementation of each SEI and propose mitigation measures;
- d. identify assistance Programmes such as, but not limited to, workshops, seminars and capacity building activities to improve the level of implementation of the approved SEIs by the RASG-MID;
- e. share expertise and experience and provide recommended actions for each SEI, in a prioritized manner based on best practices;
- f. monitor the status of achieving related safety objectives and targets included in the MID Region Safety Strategy;
- g. identify areas of concern to aviation safety that may be unique to the region, and develop data and mitigations to address those concerns;
- h. work closely with States and stakeholders to ensure that SEIs and mitigation measures are implemented through a coordinated effort;
- i. propose input to the RASG-MID for the development of the RASG-MID Annual Work Programme; and

- j. Coordinate with relevant RASG-MID, MIDANPIRG and MID-RASFG subsidiary bodies issues with common interest.

2. COMPOSITION

The SEIG is composed of Members designated by the MID States and Partners.

3. ROLES AND RESPONSIBILITIES

- SEIG Chairpersons: – Coordinate SEIG activities and provide overall guidance and leadership;
- ICAO: Support; and
- Partners: collaborate in the development of materials as requested by the SEIG, and provide technical expertise and support, as required.

4. MEETINGS ARRANGEMENTS

- The Chairperson, in close co-operation with the Secretary, shall make all necessary arrangements for the most efficient working of the SEIG. The SEIG shall at all times conduct its activities in the most efficient manner possible with a minimum of formality and paper work (paperless meetings). Permanent contact shall be maintained between the Chairperson, Secretary and Members of the SEIG to advance the work. Best advantage should be taken of modern communications facilities, particularly video-conferencing (Virtual Meetings) and e-mails.
- Face-to-face meetings will be conducted when it is necessary to do so.

Appendix B- Identified safety issues as indicated in the 11th MID ASR

Potential Accident Outcome							
Safety Issues	CFIT	LOC-I	MAC	GCOL	RE/ARC	Injury Damage inflight	Injury Damage on Ground
Monitoring of flight paremeters and automation modes	X	X			X		
Adverse Convective weather	X	X			X	X	
Un-stabilized Approach		X			X		X
Flight planning and preparation	X	X	X	X	X		
Crew Resource Management	X	X	X	X	X		
Handling of technical failure	X	X		X	X		X
Handling and execution of GOA	X	X			X		
Loss of separation in flight/ and/or airspace/TCAS RA			X			X	
Experience, training and competence of Flight Crews	X	X	X		X		
Deconfliction between IFR and VFR traffic			X				
Inappropriate flight control inputs		X			X		
Fatigue	X	X					
Entry of aircraft performance data		X					
Contained engine Failure/Power Plant Malfunctions		X			X	X	
Birdstrike/Engine Bird ingestion		X			X		
Fire/Smoke-non impact		X				X	
Wake Vortex		X				X	
Deviation from pitch or roll attitude	X	X			X		
Security Risks with impact on Safety		X					
Tail/Cross wind/Winds hear		X			X		X

Potential Accident Outcome							
Safety Issues	CFIT	LOC-I	MAC	GCOL	RE/ARC	Injury Damage inflight	Injury Damage on Ground
Runway Incursion				X	X		X
Maintenance events	X	X				X	
Contaminated runway/Poor braking action					X		X
Clear Air Turbulence (CAT) and Mountain Waves		X				X	

Appendix C-MID Region-Safety Performance Measurement &Monitoring (SPMM)

Aspirational Goal: Zero Fatality by 2030

Goal 1: Achieve a Continuous Reduction of Operational Safety Risks

Safety Indicator	Safety Target	Timeline
Number of accidents per million departures	Regional average rate of accidents to be in line with the global average rate	2025
Number of fatal accidents per million departures	Regional average rate of fatal accidents to be in line with the global average rate	2025
Number of fatalities per million departures	Number of fatalities per billion passengers carried (fatality rate) to be in line with the global average rate	2025
Number of Runway Excursion accidents per million departures	Regional average rate of Runway Excursion accidents to be below the global average rate	2025
Number of Runway Incursion accidents per million departures	Regional average rate of Runway Incursion accidents to be below the global average rate	2025
Number of LOC-I related accidents per million departures	Regional average rate of LOC-I related accidents to be below the global rate	2025
Number of CFIT related accidents per million departures	Regional average rate of CFIT related accidents to be below the global rate	2025
Number of Mid Air Collision (accidents)	Regional average Mid Air Collision accident	2025

Goal 2: Strengthen States' Safety Oversight Capabilities

Safety Indicator	Safety Target	Timeline
USOAP-CMA Effective Implementation (EI) results: a. Regional average EI b. Number of audited States with an overall EI over 60% c. Regional average EI by area d. Regional average EI by CE e. Regional average EI of PPQs	a. Regional average EI to be above 80% : b. All MID audited States to be above 60% EI c. Regional average EI for each area to be above 70% d. Regional average EI for each CE to be above 70% e. Regional average EI PPQs above 75% :	a. 2023-2025 b. 2023-2025 c. 2023-2025 d. 2023-2025 e. 2023-2025

Goal 3: Implement effective State safety Programmes (SSPs)

Safety Indicator	Safety Target	Timeline
Regional Average SSP Foundation	85%	2023- 2025
Number of States having an SSP that is present*	At least 4 States	2023- 2025
Number of States that have developed and published a national aviation safety plan (NASP)	All States	2023- 2025
Number of States that require applicable service providers under their authority to implement an SMS	All States	2023- 2025

*: The term “present” is based on the maturity levels established in the ICAO SSP Implementation Assessment (SSPIA).

Goal 4: Increase Collaboration at the Regional Level

Safety Indicator	Safety Target	Timeline
Percentage of safety enhancement initiatives (SEIs)/Safety Actions completed	80%	2023-2025
Number of States seeking/receiving assistance, to strengthen their Safety Oversight capabilities through NCLB MID Strategy/Technical assistance	States with SSC as a first priority All States as a second priority having EI below 80%	2023-2025
Number of States seeking assistance to facilitate SSP & NASP implementation through NCLB MID Strategy/Technical assistance	All States	2023-2025
Number of States sharing safety information including operational safety risks and emerging issues to support the development of MID ASR	All States	2023-2025

Goal 5: Expand the use of Industry Programmes and safety information sharing networks

Safety Indicator	Safety Target	Timeline
Use of the IATA Operational Safety Audit (IOSA), to complement safety oversight activities.	a. Maintain at least 60% of eligible MID airlines to be certified IATA-IOSA at all times. b. All MID States with an EI of at least 60% use the IATA Operational Safety Audit (IOSA) to complement their safety oversight activities.	a. 2023-2025 b. 2023- 2025
Use of the IATA Safety Audit for Ground Operations (ISAGO) certification, as a percentage of all Ground Handling service providers	The IATA Ground Handling Manual (IGOM) endorsed as a reference for ground handling safety standards by all MID States. Pursue at least 25% increase in ISAGO registration	2023-2025
Coordinate the ACI Airport Excellence (APEX) in Safety Programme	At least 2 ACI APEX in Safety to be conducted for 2 Airports of the Region per year	2023-2025
Number of States that have established Safety data collection and processing system (SDCPS)	At least 12 States	2023-2025
Number of MID RASP developed in consultation with industry	MID-RASP 2023-2025	2023

Goal 6: Ensure Appropriate Infrastructure is available to Support Safe Operations

Safety Indicator	Safety Target	Timeline
Percentage of Certified International Aerodromes*	65%	2023-2025
Percentage of Runway Safety Team (RST) effectively implemented at International Aerodromes*	80%	2023-2025
Percentage of Global reporting Format (GRF) Plans implemented for International Aerodromes*	75%	2023-2025

*: International Aerodromes included in the MID ANP (Aerodromes Operations: AOP Table I-I)

Appendix D: Safety Actions- Consolidated List of SEIs with their respective Actions for follow up- Draft

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
Regional Operational Safety Risks					
Goal 1: Achieve a Continuous Reduction in Operational Risks					
G1-SEI-01:	Aircraft Upset in Flight (LOC-I)	A1- Guidance material on flight crew proficiency	IATA and Aircraft manufacturers/industry	To be supported by Airbus	2025
		A2- Advisory Circular: Mode Awareness and Energy State Management Aspects of Flight Deck Automation	IATA and Aircraft manufacturers/industry.	To be supported by Airbus	2025
		A3- Conduct Upset Recovery capacity building activities	UPRT Workshop. Airbus, ICAO, Kuwait		2025
		A4- Develop guidance material on the air cargo safety	Oman		2025
G1-SEI-02:	Runway Safety- Runway Excursion	A1- Support States to implement the Global Reporting Format (GRF) Methodology through capacity building activities.	ICAO and ACI		2025
		A2- MID Region Action Plan/Milestones on the Global Reporting Format (GRF) Implementation.	ICAO		2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
G1-SEI-03:	Runway Safety- Runway Incursion	A1- Conduct Capacity Building Activities on the Advanced Surface Movement Guidance and Control System (A-SMGCS) Implementation	ICAO	To be supported by Euro-Control, FAA	2023
G1-SEI-04A1:	Controlled Flight into Terrain (CFIT)	A1- Advisory Circular: Instrument Approach Procedures Using Continuous Descent Final Approach Techniques.	IATA and Aircraft manufacturers		2025
		A2- Guidance for designing RNP Approach	ICAO and MID FPP		2025
		A3- Advisory Circular: Crew Resource Management Training Programme (CRM)	IATA and Aircraft manufacturers		2025
G1-SEI-04A2	5G Operations on Radar Altimeter	A1- Develop a guidance material on safeguarding measures to protect Radio Altimeter from potential harmful interference from 5G Operation	Radio Altimeter Action Group (RADALT AG)	To be supported by Boeing	2025
		A2- Conduct a Webinar addressing the matter to raise awareness and promote the guidance material developed by the RADALT AG	ICAO and RADALT AG	To be supported by Airbus & Boeing	2025
G1-SEI-05B1:	MAC- Loss of Separation	A1- Conduct workshop to implement Civil-Military cooperation	ICAO, States, and International Organizations		2025
		A2- Conduct seminar on raising awareness among stakeholders related to the potential risk of MAC over high seas	ICAO, States, and international organizations		2025
G1-SEI-05B2:	GNSS Interference	A1: Raise awareness on the potential impact of GNSS interference on the aviation during the Civil-Mil Workshop	ICAO and IATA		2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
		A2- Urge States to follow the reporting procedure agreed by MIDANPIRG Conclusion 19/4 when needed	ICAO		2025
G1-SEI-05B3:	Ensure the Safe Operations of UAS (Drones)	A1- UAS iPack deployment	ICAO and States		2025
		A2- Organize symposium on Drones related subjects	ICAO and ACAO	Supported FAA and Boeing	2023
		A3- Conduct survey on States UAS regulatory framework	ICAO and States		2025
G1-SEI-05B4:	Expansion of ATS route Networks	A1- Conduct gap analysis to identify current ATS route networks gaps	ICAO and States		2025
		A2- Establishment of parallel unidirectional ATS routes (De-confliction)	ICAO and States		2025
Organizational Challenges/issues					
Goal 2: Strengthen States’ Safety Oversight Capabilities					
G2-SEI-01:	Strengthening of States' Safety Oversight Capabilities	A1- Conduct Capacity Building Activities to promote effective implementation of SARPs	ICAO, States, International Organizations, and Industry	“Inspectors training” to be Supported by Airbus.	2025
		A2- Conduct technical assistance and NCLB missions to States , with focus on states with EI<80% as well as ANS, AIG, AGA, and OPS areas	ICAO and States		2025
		A3- Develop and implement a specific NCLB plan of actions.	ICAO, States, International Organizations, and Industry		2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
		A4 - Conduct a Capacity Building Activity for Aerodrome Inspectors (Training Course on Aerodrome Inspection) (Action addressed under G6-SEI-01 A5)	States (Qatar) and ICAO		2025
		A5 - Develop guidance material to assist MID Region States in the issuance of exemptions related to temporary deviations from standards	Qatar	supported by Iran, Sudan, UAE, ACAO, and IATA	2025
		A6 - Develop guidance material to support States for the conduct of remote surveillance	Qatar	supported by Iran, Jordan, Saudi Arabia, Sudan, UAE, and ACAO	2025
		A7 - Develop guidance material on the enhancement of understanding the concept of judicial enforcement for aviation inspectors	Qatar	supported by Saudi Arabia and UAE	2025
G2-SEI-03:	Sharing of Safety Recommendations related to Accidents and Serious Incidents	A1 - Establishing a Platform for Sharing Safety Recommendations for MENA ARCM Member States	ICAO, ACAO, and MENA ARCM Member States	On-hold	2025
G2-SEI-04:	Enhance State Oversight on Dangerous Goods	A1 - Dangerous Goods (DG) capacity building activities including Lithium batteries fire/smoke risk in cabin	ICAO, States, International Organizations, And Industry		2025
		A2 - Develop guidance material on carriage and transport of Lithium batteries	IATA, States, International Organizations, And Industry		2025
G2-SEI-05:	Human factors and Competence of Personnel	A1 - Advisory Circular: Crew Resource Management Training Programme (CRM). (Action addressed under G1-SEI-04: CFIT).	IATA and Industry		2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
		A2- Organize Crew Resource Management Capacity building activities	ICAO & Jordan, States, International Organizations, and Industry	CBTA and EBT to be supported by Airbus and FAA	2025
		A3- Organize Team Resource Management Capacity building activities	ICAO & Jordan States, International Organizations, and Industry	FAA	2025
		A4- Conduct Fatigue Risk Management and Mental Health Best Practices Capacity building activities	ICAO & Jordan States, International Organizations, and Industry	To be supported by Airbus	20225
G2-SEI-06:	Impact of security on safety	A1- Organize seminar/Symposium/Workshop to exchange experiences and good practices on assessing the risks and sharing of information related to the overflying of conflict zones in coordination with RASFG-MID and MIDANPIRG.	ICAO		2025
		A2- Risk management on conflict zone workshop	ICAO/ACAO		2023
G2-SEI-07:	Managing cybersecurity risks	A1- Develop a Regional Action Plan to bridge the gap between ICAO Cyber Security Action plan and the implementation level of Cyber Resilience in the MID Region	ANS Cyber SeC Action Group		2025
		A2- Conduct activities on Cyber Security and Resilience- (Jointly ANS and AVSEC)	ICAO	To be supported by Boeing	2025

SEI Code	SEI Name	Actions	Owner(s)	Status/Progress	Completion Date
		A3- Develop a MID Region Cybersecurity Action Plan	Cybersecurity Security Ad-hoc Group		2025
G2-SEI-08:	Impact of COVID-19 pandemic- Safe return to operations	A1- Continued support to the aviation industry through MID-RPTF meetings/Activities, as needed	ICAO, States, International Organizations, and Industry		2025
		A2- Sharing of guidance material/best practices	ICAO, States, International Organizations, and Industry	To be support by Airbus	2025
Goal 3: Implementation of Effective States Safety Programme (SSP)					
G3-SEI-01:	Implement an effective Safety Management	A1- Conduct ICAO SSP/SMS Capacity building activities	SSP workshops for States. SMS & Flight Data analysis workshop for airlines. Airbus, ACAO and ICAO. 2023		2025
		A2- Conduct Technical Assistance missions by SMIT	ICAO and States		2025
G3-SEI-02:	NASP Development & Implementation	A1- Conduct NASPs workshops & technical assistance missions	ICAO		2025
		A2- NASP iPacks deployment	ICAO		2025
Goal 4: Increase Collaboration at the Regional Level					
G4-SEI-01:	Development and Implementation of	A1- Development and Implementation of MID-RASP 2023-2025 Edition	ICAO & SEIG		2023

	MID-RASP				
G4-SEI-02:	Enhance collaboration between States, international organizations, and industry	A1- Develop and agree on joint work activities through MID-RCM meetings	ICAO, States, Regional Groups, International Organizations, and Industry		2025
		A2- Support the establishment of MENA RSOO and its activities	ICAO and States		2025

Goal 5: Expand the Use of Industry Programmes and Safety Information Sharing Networks

G5-SEI-01:	Promote the Use of industry Programmes	A1- Encourage IATA's IOSA and ISAGO registrations through safety promotion	IATA		2025
		A2- Encourage the implementation of ACI Airport Excellence (APEX) in Safety Programme	ICAO and ACI		2025

Goal 6: Ensure the Appropriate Infrastructure is available to Support Safe Operations

G6-SEI-01:	Certification of International Aerodromes	A1- Support States on the implementation of the ICAO Annex 14 requirements to achieve compliance with regards to Aerodrome Design and Operations, through capacity building activities.	ICAO and ACI		2025
		A2- Enhance capacity building for States CAAs and Airport operators related to Aerodromes Certification through capacity building activities.	ICAO and ACI		2025
		A3 - Deployment of iPack on Aerodrome Re-Start	ICAO and States		2025
		A4 - Support States in implementing aerodrome oversight/inspection mechanism through capacity building activities on Aerodrome Oversight	ICAO	Supported by FAA	2025
		A5 – Conduct a Capacity Building Activity for Aerodrome Inspectors	States (Qatar) and ICAO		2025

		(Training Course on Aerodrome Inspection)			
		A6 – Conduct a Wildlife Hazard Management Control capacity building Activities	ICAO, ACAO, WBA	Supported by International Organizations	2025
G6-SEI-02:	Establish Runway Safety Team (RST) at International Aerodromes	A1- Conduct Runway Safety Go-Team (RST) assistance missions	ICAO	Supported RSP (Runway Safety Programme Partners)	2025
		A2: Support States to implement the Global Reporting Format Methodology through capacity building activities: (Action addressed under G1-SEI-02: Runway Excursion).	ICAO and ACI		2025

Appendix E:

SEIs identified in MID-RASP may be considered by States for inclusion in their NASPs, as appropriate

SEI Code	SEI name
Organizational Challenges	
Goal 2: Strengthen States' Safety Oversight Capabilities	
G2-SEI-01:	Strengthening of States' Safety Oversight Capabilities
G2-SEI-04:	Enhance State Oversight on Dangerous Goods
G2-SEI-05:	Human factors and Competence of Personnel
G2-SEI-06:	Impact of security on safety
G2-SEI-07:	Managing cybersecurity risks
G2-SEI-08:	Impact of COVID-19 pandemic- Safe return to operations
Goal 3: Implementation of Effective States Safety Programme (SSP)	
G3-SEI-01:	Implement safety management
G3-SEI-02:	NASP Development & Implementation
Goal 6: Ensure the Appropriate Infrastructure is available to Support Safe Operations	
G6-SEI-01:	Certification of International Aerodromes
G6-SEI-02:	Establish Runway Safety Team (RST) at International Aerodromes
Regional Operational Safety Risks	
Goal 1: Achieve a continuous reduction in Operational Risks	
G1-SEI-01:	Aircraft upset in flight (LOC-I)
G1-SEI-02:	Runway Excursion (RE)
G1-SEI-03:	Runway Incursion (RI)
G1-SEI-4A1:	Controlled Flight Into Terrain (CFIT)
G1-SEI-04A2:	5G operations on Radar Altimeter
G1-SEI-05A1:	MAC- Loss of separation/TCAS RA
G1-SEI-05A2:	GNSS Interference
G1-SEI-05A3:	Ensure the Safe Operations of UAS (drones)

Appendix F: Definitions

Accident Investigation Authority. The authority designated by a State as responsible for aircraft accident and incident investigations within the context of Annex 13.

Audit Area. One of eight audit areas pertaining to the Universal Safety Oversight Audit Programme (USOAP), i.e. primary aviation legislation and civil aviation regulations (LEG), civil aviation organization (ORG); personnel licensing and training (PEL); aircraft operations (OPS); airworthiness of aircraft (AIR); aircraft accident and incident investigation (AIG); air navigation services (ANS); and aerodromes and ground aids (AGA).

Contributing Factors. Actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences of the accident or incident. the identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability.

Critical Elements (CEs). The critical elements of a safety oversight system encompass the whole spectrum of civil aviation activities. They are the building blocks upon which an effective safety oversight system is based. The level of effective implementation of the CEs is an indication of a State's capability for safety oversight.

Effective Implementation (EI). A measure of the State's safety oversight capability, calculated for each critical element, each audit area or as an overall measure. The EI is expressed as a percentage.

Operator. The person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Safety. The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.

Safety Audit. A USOAP CMA audit that a State requests and pays for (on a cost recovery basis). The State determines the scope and date of a safety audit. Also see definition of audit.

Safety Data. A defined set of facts or set of safety values collected from various aviation related sources, which is used to maintain or improve safety.

Note: such safety data is collected from proactive or reactive safety-related activities, including but not limited to:

- a. accident or incident investigations;
- b. safety reporting;
- c. continuing airworthiness reporting;
- d. operational performance monitoring;
- e. inspections, audits, surveys; or
- f. safety studies and reviews.

Safety Enhancement: initiative (SEI). One or more actions to eliminate or mitigate risks associated with contributing factors to a safety occurrence or to address an identified safety deficiency. There are two main types of SEIs to address safety risks and issues at the Regional level.

Safety Information. Safety data processed, organized or analyzed in a given context so as to make it useful for safety management purposes.

Safety Management System (SMS). A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

Safety Oversight. A function performed by a State to ensure that individuals and organizations performing an aviation activity comply with safety-related national laws and regulations.

Safety Performance. A State or a service provider's safety achievement as defined by its safety performance targets and safety performance indicators.

Safety Performance Indicator. A data-based parameter used for monitoring and assessing safety performance.

Safety Performance Target. The State or service provider's planned or intended target for a safety performance indicator over a given period that aligns with the safety objectives.

Safety Risk. The predicted probability and severity of the consequences or outcomes of a hazard.

Significant Safety Concern (SSC). Occurs when the State allows the holder of an authorization or approval to exercise the privileges attached to it, although the minimum requirements established by the State and by the Standards set forth in the Annexes to the Convention are not met, resulting in an immediate safety risk to International Civil Aviation.

State Safety Programme (SSP). An integrated set of regulations and activities aimed at improving safety.

Appendix G: Abbreviations and Acronyms

AIIA:	Accident and Incident Investigation Authority
ACI:	Airports Council International
ADRM:	Aerodrome
AGA:	Aerodrome and Ground Aids
AIG:	Aircraft Accident and Incident Investigation
ALAR:	Approach and Landing Reduction
ANS:	Air Navigation Services
ANSP:	Air Navigation Service Provider
APV:	Approaches with Vertical Guidance
ARC:	Abnormal Runway Contact
ASBU:	Aviation System Block Upgrade
ASR:	Annual Safety Report
ATM:	Air Traffic Management
ATS:	Air Traffic Services
BIRD:	Bird Strike
CAA:	Civil Aviation Authority
CASI:	Civil Aviation Safety Inspectors
CAST:	Commercial Aviation Safety Team
CE:	Critical Element
CFIT:	Controlled Flight into Terrain
CICTT:	CAST/ICAO Common Taxonomy Team
CMA:	Continuous Monitoring Approach
CRM:	Crew Resource Management
CAST:	US Commercial Aviation Safety Team
DGCA:	Conference of Directors General of Civil Aviation
EI:	Effective Implementation
FDAP:	Flight Data Analysis Programme
FIR:	Flight Information Region
F-NI:	Fire/ Smoke (Non-Impact)
GADSS:	Global Aeronautical Distress and Safety System
GANP:	Global Air Navigation Plan
GASeP:	Global Aviation Security Plan
GASOS:	Global Aviation Safety Oversight System
GASP:	Global Aviation Safety Plan
GASP-SG:	Global Aviation Safety Plan Study Group
GEN:	General Aspects
GPWS:	Ground Proximity Warning System
G- HRC:	Global-High Risk Categories of Occurrences
IATA:	International Air Transport Association
ICAO:	International Civil Aviation Organization
IFALPA:	International Federation of Airline Pilots' Associations
IOSA:	IATA Operational Safety Audit
ISAGO:	IATA Safety Audit for Ground Operations
iSTARS:	Integrated Safety Trend Analysis and Reporting System
LOC-I:	Loss of Control In-flight
MAC:	AIRPROX/ TCAS alert/ loss of separation/ near miss collisions/ mid-air collisions
MTOW:	Maximum Take-Off Weight

NASP:	National Aviation Safety Plan
NCLB:	No Country Left Behind
NDP:	National Development Plan
OAG:	Official Airline Guide
OPS:	Flight Operations (USOAP Audit Area)
ORG:	Civil Aviation Organization (USOAP Audit Area)
PDCA:	Plan-Do-Check-Act methodology
RAMP:	Ground Handling
RASG:	Regional Aviation Safety Group
RASP:	Regional Aviation Safety Plan
RE:	Runway Excursion (departure or landing)
RI:	Runway Incursion
RS:	Runway Safety
RSOO:	Regional Safety Oversight Organization
RST:	Runway Safety Team
RTC:	ICAO Regional Training Centre of Excellence
SAFE:	ICAO Safety Fund
SARPs:	Standards and Recommended Practices
SCF-NP:	System/Component Failure or Malfunction – Non-power plant
SCF-PP:	System/Component Failure or Malfunction - Power plant
SDCPS:	Safety Data Collection and Processing System
SEI:	Safety Enhancement Initiatives
SISG:	ICAO's Safety Indicator Study Group
SMS:	Safety Management Systems
SPI:	Safety Performance Indicator
SSC:	Significant Safety Concern
SSO:	State Safety Oversight
SSP:	State Safety Programme
SRP:	Safety Reporting and Programme
TCAS:	Traffic Collision and Avoidance System
TOR:	Terms of Reference
UAS:	Unmanned Aircraft Systems
UNK:	Unknown or Undetermined
UPRT:	Upset Prevention and Recovery Training
USOAP:	Universal Safety Oversight Audit Programme
USOS:	Undershoot/ Overshoot

-END-

CREDITS

The RASG-MID thanks **Mr. Mohamed Chakib** for developing the MID-RASP 2023-2025 Edition.



ICAO MID

International Civil Aviation Organization
Middle East Office
Cairo International Airport
Cairo 11776, EGYPT

Tel.: +20 2 22674840/41/45/46

Fax: +20 2 22674843

Email: icaomid@icao.int

www.icao.int/mid



APPENDIX 5.2G
State SSP information Collection
State name:

State Comments	
<u>SSP Establishment:</u> 1. State formally designated the authority in charge of coordinating the implementation and maintenance of the SSP 2. State established SSP coordination group/s at the State level, chaired by the designated authority in charge of coordinating the SSP implementation and maintenance. 3. State published high-level national strategic document (e.g. SSP main document) that lays out the State's methodology, practices and activities to support the implementation of its SSP, including all SSP components.	
<u>SMS Acceptance:</u> 1. State has promulgated regulatory requirements to implement SMS acceptable to the State, in accordance with ICAO provisions 2. Number of service providers (specify service providers) under CAA required to develop and implement an SMS. <u>Service Providers:</u> a. <i>Approved training organization</i>	

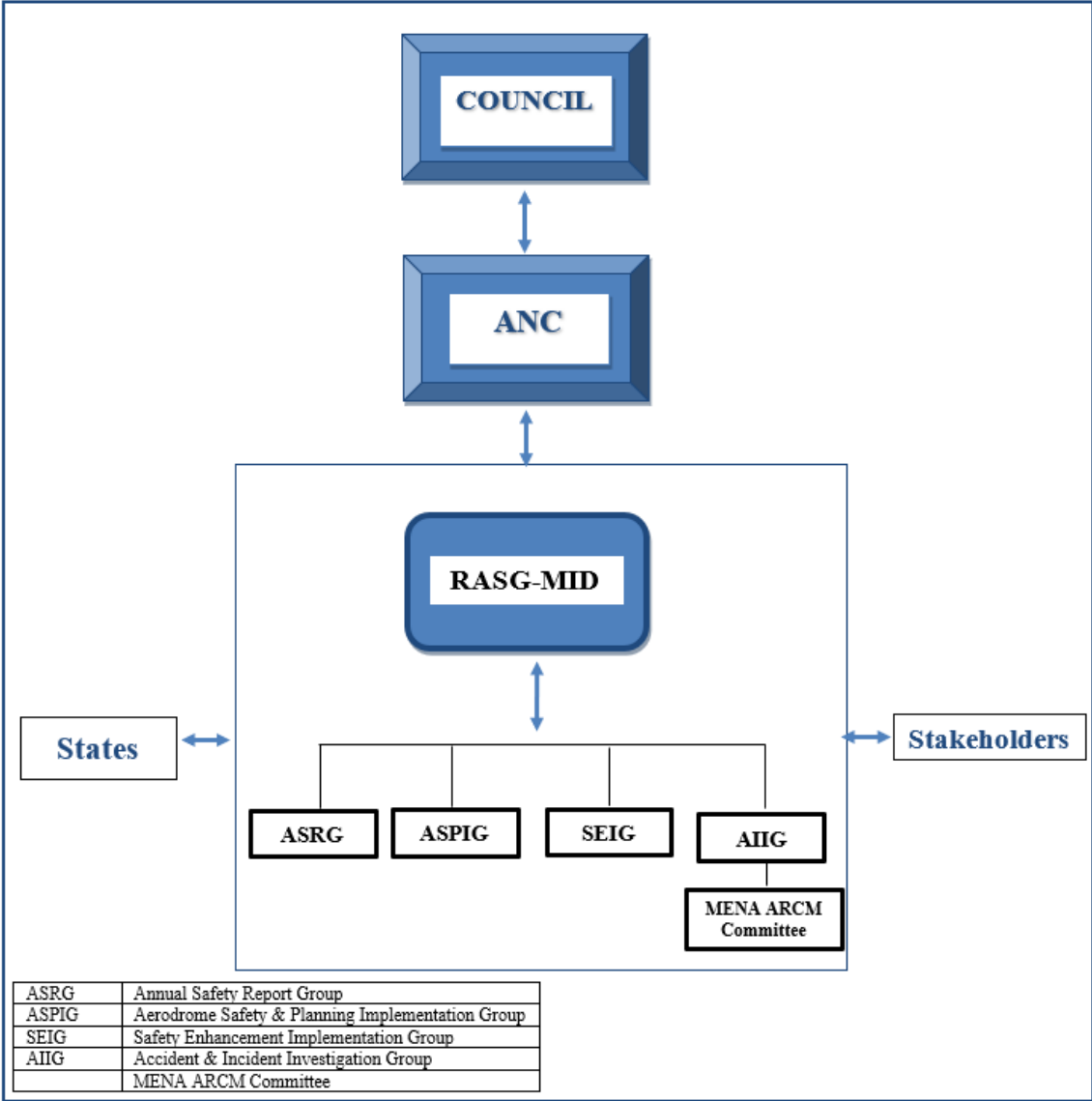
State Comments	
b. <i>Certified operator of aeroplanes or helicopters authorized to conduct international commercial air transport</i> c. <i>Approved maintenance organization</i> d. <i>Organization responsible for the manufacture of aircraft, engines or propellers</i> e. <i>ATS provider</i> f. <i>Operator of a certified aerodrome</i> 3. Number of service providers (specify service providers) developed and implemented SMS and/or with SMS Acceptance. <u>Service Providers:</u> a. <i>Approved training organization</i> b. <i>Certified operator of aeroplanes or helicopters authorized to conduct international commercial air transport</i> c. <i>Approved maintenance organization</i> d. <i>Organization responsible for the manufacture of aircraft, engines or propellers</i> e. <i>ATS provider</i> f. <i>Operator of a certified aerodrome</i>	
<u>Safety Data Collection and processing System (SDCPS) Establishment:</u> 1. State established the SDCPS to support safety data analysis at the State level 2. State established a State-level Mandatory & voluntary reporting systems 3. State established Legislative provisions to protect safety data, safety information and related sources.	

5.2G-3

State Comments	
<u>State established and developed SSP Documentation:</u> 1. SSP implementation plan 2. State safety Policy & objectives 3. State safety performance indicators 4. SSP Coordination Group meeting structure 5. Process involved in developing the NASP 6. State safety risk management methodology /Framework 7. The processes and procedures for oversight of SMS 8. The means for safety promotion both internally and externally 9. SSP related training programme	
<u>State challenges to develop and implement SSP</u> 1. Regulatory 2. Technical 3. Resources including Financial 4. Training and Others	

APPENDIX 5.5A

RASG-MID
ORGANIZATIONAL STRUCTURE



MID Region Air Navigation Systems Performance Based Framework/Template

Column

- (1) ICAO defined 11 Key Performance Areas. *Include the list of KPAs and its definition.*
- (2) Performance Objectives. These objectives have been selected from the catalogue of performance objectives.
- (3) Scope of each KPA
- (4) KPIs based on the ICAO list of KPIs
- (5) The Baseline of each KPI
- (6) The target of the KPI
- (7) Selected ASBU elements /operational improvements for each operational environment.
- (8) Target Implementation date

Scope/ Applicability	KPA & Focus Area	Performance Objective	KPI/ Variant	KPI Baseline	KPI Target	Operational Improvement/ enabler(s) (ASBU & Non ASBU)	Target Date
1	2	3	4	5	6	7	8

**TABLE GEN II-1 - HOMOGENEOUS ATM AREAS AND/OR MAJOR TRAFFIC FLOWS
IDENTIFIED IN THE MID REGION**

Column		EXPLANATION OF TABLE
1	Area of routing (AR)	Sequential number of area of routing
2	Homogeneous Areas and/or Traffic flows/routing areas	Brief description and/or name
3	FIRs involved	List of FIRs concerned
4	Type of area covered	Brief description of type of area, examples: Oceanic or Continental High or low density Oceanic en-route or Continental en-route
5	Remarks	Homogeneous ATM Area and/or Major Traffic Flow and Region(s) concerned

Area of routing (AR)	Homogeneous Areas and/or Traffic flows/routing areas	FIRs involved	Type of area covered	Remarks
1	2	3	4	5
AR1	Asia and Europe, Asia and the Middle East, Europe and the Middle East, via the northern Arabian Peninsula and Eastern Mediterranean	Amman, Bahrain, Beirut, Damascus, <u>Doha</u> , Emirates, Jeddah, Kuwait, Muscat	Continental high density	Mainly intraregional and MID to/from ASIA and EUR. Some overflying EUR/ASIA traffic
AR2	Libya, Egypt and the southern Arabian Peninsula to/from Europe, Africa, Asia and North Africa	Bahrain, Cairo, <u>Doha</u> , Emirates, Jeddah, Muscat, Sana'a, Tripoli	Remote continental and oceanic low density (but seasonally high density)	Major traffic flow mainly landing and departing the MID region. Some EUR/AFI traffic and North Africa
AR3	Asia and Europe, Asia and the Middle East, Europe and the Middle East, north of the Gulf	Emirates, Teheran	Continental high density	Major traffic flow ASIA/EUR
AR4	Gulf, Asia (Indian subcontinent) to/from North of Europe	Baghdad, Bahrain, <u>Doha</u> , Emirates, Kuwait, Muscat	Continental high density	MID to/from Asia and EUR
AR5	Gulf Area to/from Eastern, Central and West Africa	Bahrain, <u>Doha</u> , Emirates, Jeddah, Khartoum, Muscat	Continental low density (Seasonal high density)	Traffic flow Intraregional. Seasonal pilgrim flights to/from, East, Central, and West AFI

TABLE CNS II-3 - ATS DIRECT SPEECH CIRCUITS PLAN**EXPLANATION OF THE TABLE**

<i>Column</i>	
1 and 2	Circuit terminal stations are listed alphabetically by the Terminal I.
3	A — indicates ATS requirement for the establishment of voice communication within 15 seconds. D — indicates requirements for instantaneous communications.
4	Type of service specified: LTF — landline telephone (landline, cable, UHF, VHF, satellite). RTF — radiotelephone.
5	Type of circuits; Direct (DIR) or Switched (SW). D — indicates a direct circuit connecting Terminals I and II. S — indicates that a direct circuit does not exist and that the connection is established via switching at the switching centre(s) indicated in column 6. IDD — International direct dialling by public switch telephone network <i>Note 1.— Number of D and/or S circuits between Terminals I and II are indicated by numerical prefix, i.e. 2 D/S means 2 direct circuits and one switched circuit.</i> <i>Note 2.— Pending the implementation of proper ATS voice circuits, and provided that aeronautical operational requirements are met, IDD services may be used for the ATS voice communications in low traffic areas.</i>
6	Location of switching centre(s). Alternate routing location, if available, is indicated in brackets.
7	Remarks

ATS REQUIREMENTS FOR SPEECH COMMUNICATIONS			CIRCUIT			REMARKS
TERMINAL I	TERMINAL II	TYPE	SERVICE	DIR/SW	TO BE SWITCHED VIA	
1	2	3	4	5	6	7
BAHRAIN						
Bahrain	Emirates ACC	A	LTF	DIR		4 LINES
	Dammam	A	LTF	DIR		2 LINES
	Doha	A	LTF	DIR		4 LINES
	Jeddah	A	LTF	DIR		2 LINES
	Kuwait	A	LTF	DIR		1 LINES
	Riyadh	A	LTF	DIR		1 LINES
	Tehran	A	LTF	DIR		1 LINES
EGYPT						
Cairo	Amman	A	LTF	DIR		1LINE
	Athens	A	LTF	DIR		2LINES
	Jeddah	A	LTF	DIR		2LINES
	Khartoum	A	LTF			1LINE
	Nicosia	A	LTF	DIR		1LINE
	Tel Aviv	A	LTF	DIR		1LINE
	Tripoli	A	LTF	DIR		1LINE

ATS REQUIREMENTS FOR SPEECH COMMUNICATIONS			CIRCUIT			REMARKS
TERMINAL I	TERMINAL II	TYPE	SERVICE	DIR/SW	TO BE SWITCHED VIA	
1	2	3	4	5	6	7
IRAN (ISLAMIC REPUBLIC OF)						
Abadan	Basrah Shiraz	A A	LTF LTF	DIR		
Shiraz	Abadan Basrah Doha Karachi Kuwait Tehran	A A A A A A	LTF LTF LTF LTF LTF LTF	DIR DIR DIR DIR DIR DIR		
Tehran	Emirates ACC Ankara Ashgabat Baghdad Bahrain Baku Basrah Doha Kabul Karachi Kuwait Muscat Shiraz Yerevan/Zvartn ots	A A A A A A A A A A A A A A A	LTF LTF LTF LTF LTF LTF LTF LTF LTF LTF LTF LTF LTF LTF	DIR DIR DIR DIR DIR DIR DIR DIR DIR DIR DIR DIR DIR DIR		11
IRAQ						
Baghdad	Amman Ankara Basrah Damascus Jeddah Kuwait Mosul Tehran	A A A A A A A A	LTF SAT LTF LTF LTF LTF LTF			
Basrah	Abadan Baghdad Kuwait Shiraz Tehran	A A A A A	LTF LTF LTF LTF LTF			
Mosul	Baghdad	A	LTF			
JORDAN						
Amman	Baghdad Cairo Damascus	A A A	LTF LTF LTF			

ATS REQUIREMENTS FOR SPEECH COMMUNICATIONS			CIRCUIT			REMARKS
TERMINAL I	TERMINAL II	TYPE	SERVICE	DIR/SW	TO BE SWITCHED VIA	
1	2	3	4	5	6	7
	Jeddah Tel Aviv	A A	LTF LTF			
KUWAIT Kuwait	Baghdad Bahrain Basrah Jeddah Shiraz Tehran	A A A A A A	LTF LTF LTF LTF LTF LTF	DIR DIR DIR DIR		
LEBANON Beirut	Ankara Damascus Nicosia	A A A	LTF LTF LTF	DIR DIR DIR		
LIBYA Tripoli	Cairo Malta Khartoum					
OMAN Muscat Salalah	Emirates ACC Mumbai Jeddah Karachi Salalah Sana'a Tehran Muscat	A A A A A A A A	LTF LTF LTF LTF LTF LTF LTF LTF	DIR DIR DIR DIR DIR DIR DIR DIR		
QATAR Doha	Emirates ACC Bahrain Jeddah Riyadh Dammam	A A A A A	LTF LTF LTF LTF LTF	DIR DIR DIR DIR DIR	~~Via Bahrain~~	1I + 1
SAUDI ARABIA						

ATS REQUIREMENTS FOR SPEECH COMMUNICATIONS			CIRCUIT			REMARKS
TERMINAL I	TERMINAL II	TYPE	SERVICE	DIR/SW	TO BE SWITCHED VIA	
1	2	3	4	5	6	7
Dammam	Bahrain Jeddah Riyadh	A A A	LTF LTF LTF	DIR DIR DIR		
Jeddah	Addis Ababa Amman Asmara Baghdad Bahrain Cairo Dammam Khartoum Kuwait Muscat Riyadh Sana'a	A A A A A A A A A A A A A	LTF LTF LTF LTF LTF LTF LTF LTF LTF LTF LTF LTF LTF	DIR DIR DIR DIR DIR DIR DIR SW	Via Bahrain	
Riyadh	Bahrain Jeddah Dammam	A A A	LTF LTF LTF	DIR DIR DIR		
SUDAN Khartoum	 Cairo Jeddah	 A A	 LTF LTF			
SYRIAN ARAB REPUBLIC Damascus	 Amman Ankara Baghdad Beirut Nicosia	 A A A A A	 LTF LTF LTF LTF LTF	 DIR		
UNITED ARAB EMIRATES Emirates ACC	 Abu Dhabi Al Ain Bahrain Doha Dubai Muscat Tehran	 A A A A A A A	 LTF LTF LTF LTF LTF LTF LTF	 DIR SW DIR DIR DIR DIR DIR		21
Abu Dhabi	Emirates ACC Al Ain	A A	LTF LTF	SW DIR		21 21

ATS REQUIREMENTS FOR SPEECH COMMUNICATIONS			CIRCUIT			REMARKS
TERMINAL I	TERMINAL II	TYPE	SERVICE	DIR/SW	TO BE SWITCHED VIA	
1	2	3	4	5	6	7
Al Ain	Dubai	A	LTF	SW		21
	Emirates ACC	A	LTF	SW		21
	Abu Dhabi	A	LTF	DIR		21
	Dubai	A	LTF	SW		21
Dubai	Emirates ACC	A	LTF	DIR		2I + 1
	Abu Dhabi	A	LTF	DIR		2I
	Al Ain	A	LTF	SW		1I
	Fujairah	A	LTF	DIR		1I
	Ras Al Khaimah	A	LTF	DIR		1I
	Sharjah	A	LTF	DIR		3I
	Sharjah					
Fujairah	Ras Al Khaimah	A	LTF	DIR		1I
	Emirates ACC	A	LTF	DIR		1I
Ras Al Khaimah	Dubai	A	LTF	DIR		1I
Sharjah	Dubai	A	LTF	DIR		3I
YEMEN						
Aden	Djibouti	A	LTF			
	Sana'a	A	LTF			
Mukalla	Aden	A	LTF			
	Sana'a	A	LTF			
Sana'a	Aden	A	LTF			
	Addis Ababa	A	LTF			
	Asmara	A	LTF			
	Mumbai	A	LTF			
	Djibouti	A	LTF			
	Jeddah	A	LTF			
	Mogadishu	A	LTF	DIR	Via Bahrain	
	Muscat	A	LTF			
	Riyan	A	LTF			

TABLE ATM II-MID-2 – MID SSR CODE ALLOCATION LIST

Code	AMMAN	BAGHDAD	BAHRAIN	BEIRUT	CAIRO	DAMASCUS	<u>Doha</u> EMIRATES	JEDDAH	KHARTOUM	KUWAIT	MUSCAT	SAN'A	TEHRAN	TRIPOLI
0001-0077 ²														
0101-0177 ¹									T					
0200-0277 ¹								D						
0300-0377 ²														
0400-0477 ²	D						D							
0500-0577 ¹							T							
0600-0677 ¹					D		D			D				
0700-0777 ¹	T													
1001-1077 ¹		T												
1101-1177 ¹	D						D						D	
1200-1277 ¹			D						D					
1300-1377 ¹		D					D							D
1400-1477 ¹										T				
1500-1577 ¹													D	
1600-1677 ¹					T									
1700-1777 ¹							T							
2001-2077 ³														T
2100-2177 ¹			D											
2200-2277 ¹			T											
2300-2377 ¹					D									
2400-2477 ¹	D													
2500-2577 ¹				D				D						
2600-2677 ¹			T											
2700-2777 ¹			D		D									
3000-3077 ¹						D		D						
3100-3177 ¹								T						
3200-3277 ¹			T											
3300-3377 ¹					T									
3400-3477 ¹							T							
3500-3577 ¹								D						
3600-3677 ¹													T	
3700-3777 ¹										D		D		
4000-4077 ¹											T			
4100-4177 ¹								D					D	
4200-4277 ¹								T						
4300-4377 ¹				T										
4400-4477 ¹			T											
4500-4577 ¹								T						
4600-4677 ¹									D		D			
4700-4777 ¹											T			

Code	AMMAN	BAGHDAD	BAHRAIN	BEIRUT	CAIRO	DAMASCUS	<u>Doha</u> EMIRATES	JEDDAH	KHARTOUM	KUWAIT	MUSCAT	SANA'A	TEHRAN	TRIPOLI
5000-5077 ¹								D						
5100-5177 ¹													T	
5200-5277 ¹								T						
5300-5377 ³														
5400-5477 ¹													T	
5500-5577 ³														
5600-5677 ¹								D					D	
5700-5777 ¹						T								
6000-6077 ¹							D		D					
6100-6177 ¹							D					D		
6200-6277 ¹							T							
6300-6377 ¹								D					D	
6400-6477 ³														
6500-6577 ¹											D			
6600-6677 ¹											D			
6700-6777 ²														
7001-7077 ¹												T		
7100-7177 ²														
7200-7277 ¹		T												
7300-7377 ¹					T									
7400-7477 ¹		D												
7501-7577 ²														
7613-7677 ²														
7701-7775 ²														

T: codes allocated for Transit use

D: codes allocated for Domestic use

 ¹ Series allocated to the MID Region and Assigned to MID States

 ² MID Region SSR Reserve List for Domestic use

 ³ MID Region SSR Reserve List for Transit use

TABLE MET II-1 - METEOROLOGICAL WATCH OFFICES

EXPLANATION OF THE TABLE

Column

- 1 Name of the State where meteorological service is required
- 2 Name of the flight information region (FIR) or control area (CTA) where meteorological service is required
Note: The name is extracted from the ICAO Location Indicators (Doc 7910) updated quarterly. If a State wishes to change the name appearing in Doc 7910 and this table, ICAO should be notified officially.
- 3 ICAO location indicator of the FIR or CTA
- 4 Name of the meteorological watch office (MWO) responsible for the provision of meteorological service for the FIR or CTA
Note: The name is extracted from the ICAO Location Indicators (Doc 7910) updated quarterly. If a State wishes to change the name appearing in Doc 7910 and this table, ICAO should be notified officially.
- 5 ICAO location indicator of the responsible MWO
- 6 Requirement for SIGMET information (excluding for volcanic ash and for tropical cyclones) to be provided by the MWO for the FIR or CTA concerned, where:
Y – Yes, required
N – No, not required
- 7 Requirement for SIGMET information for volcanic ash to be provided by the MWO for the FIR or CTA concerned, where:
Y – Yes, required
N – No, not required
- 8 Requirement for SIGMET information for tropical cyclone to be provided by the MWO for the FIR or CTA concerned, where:
Y – Yes, required
N – No, not required
- 9 Requirement for AIRMET information to be provided by the MWO for the FIR or CTA concerned, where:
Y – Yes, required
N – No, not required

State	FIR or CTA Where Meteorological Service is Required		Responsible Meteorological Watch Office		Meteorological Service To Be Provided			
	Name	ICAO Location Indicator	Name	ICAO Location Indicator	SIGMET (WS)	SIGMET (WV)	SIGMET (WC)	AIRMET (WA)
1	2	3	4	5	6	7	8	9
BAHRAIN	BAHRAIN FIR	OB BB	BAHRAIN INTL	OB BI	Y	Y	Y	
EGYPT	CAIRO FIR	HE CC	CAIRO INTL	HE CA	Y	Y		Y
IRAN (ISLAMIC REPUBLIC OF)	TEHRAN FIR	OI IX	TEHRAN/ MEHRABAD INTL	OI II	Y	Y	Y	
IRAQ	BAGHDAD FIR	OR BB	BAGHDAD INTL	OR BI	Y	Y		
JORDAN	AMMAN FIR	OJ AC	AMMAN/QUEEN ALIA	OJ AI	Y	Y		
KUWAIT	KUWAIT FIR	OK AC	KUWAIT INTL	OK BK	Y	Y	Y	
LEBANON	BEIRUT FIR	OL BB	BEIRUT/BEIRUT INTL	OL BA	Y	Y		
LIBYA	TRIPOLI FIR	HL LL*	TRIPOLI/TRIPOLI INTL	HL LT	Y	Y		
OMAN	MUSCAT FIR	OO MM	MUSCAT/MUSCAT INTL	OO MS	Y	Y	Y	
<u>Qatar</u>	<u>Doha FIR</u>	<u>OTBD</u>	<u>DOHA</u>	<u>OTHH</u>	<u>Y</u>	<u>Y</u>		
SAUDI ARABIA	JEDDAH FIR	OE JD	JEDDAH/KING ABDULAZIZ INTL	OE JN	Y	Y	Y	
SUDAN	KHARTOUM FIR	HS SS	KHARTOUM	HS SS	Y	Y		
SYRAIN ARAB REPUBLIC	DAMASCUS FIR	OS DI	DAMASCUS INTL	OS DI	Y	Y		
UNITED ARAB EMIRATES	EMIRATES FIR	OM AE	ABU DHABI INTL	OM AA	Y	Y	Y	
YEMEN	SANAA' FIR	OY SN	SANAA' INTL	OY SN	Y	Y	Y	

TABLE SAR II-1 - RESCUE COORDINATION CENTRES (RCCs) AND RESCUE SUB CENTRES (RSCs) IN THE MID REGION

EXPLANATION OF THE TABLE

Column

- 1 State
- 2 Name of the Rescue Coordination Centre (RCC) and Rescue Sub-centre (RSC).
- 3 SAR points of contact (SPOC). Name of the SPOC.
- 4 Remarks. Supplementary information such as the type of RCC (e.g. maritime or aviation or joint).

RCC and Rescue Units		SPOC	Remarks
1	2	3	4
BAHRAIN			
RCC	BAHRAIN RCC	RCC ATC Bahrain	
RSC	Qatar	DJRCC	
EGYPT			
RCC	CAIRO RCC	SAR Centre	
RSC	Alexandria		
	El Aries		
	Hurghada		
	Luxor		
	M. Matruh		
	Ras-Banas		
IRAN			
RCC	TEHRAN RCC	RCC Tehran	
RSC	Bandar Abbass		
	Bushahr		
	Esfahan		
	Kerman		
	Kermanshah		
	Mashhad		
	Tabriz		
	Zahedan		
IRAQ			
RCC	BAGHDAD RCC	CENTAF-AUAB CAOC JSRC	
RSC	Kirkuk		
	Shaibah		
	Basrah		
JORDAN			
RCC	AMMAN RCC	RCC ATC Amman	
RSC	-		
KUWAIT			
RCC	KUWAIT RCC	RCC ATC Kuwait	
RSC	-		
LEBANON			
RCC	BEIRUT RCC	RCC Beirut	
RSC	Tripoli		
LIBYA			
RCC	TRIPOLI RCC	CAA	
RSC	Marsa Brega		
	Sirte		
	Tobruk		

RCC and Rescue Units		SPOC	Remarks
1	2	3	4
OMAN			
RCC	MUSCAT RCC	RCC Muscat Air Force	
RSC	Salalah		
<u>Qatar</u>			
<u>RCC</u>	<u>Doha RCC</u>		
SAUDI ARABIA			
RCC	JEDDAH RCC	SAMCC	
RSC	Dammam		
SUDAN			
RCC	KHARTOUM RCC	ACC Khartoum	
RSC	El Obeid		
	Juba		
	Port Sudan		
SYRIA			
RCC	DAMASCUS RCC	RCC ATC	
RSC	Damascus		
	Latakia		
UAE			
RCC	ABU DHABI RCC	AEMCC	
RSC	Abu Dhabi		
	Dubai		
YEMEN			
RCC	SANA'A RCC	RCC Sanaa	
RSC	Aden		
	Hodeidah		
	Riyan		

APPENDIX 6.2A

NOTAM TEMPLATE FOR GNSS INTERFERENCE

Item Q – Qualifier: the following qualifiers shall be mentioned in item Q:

Qualifier FIR: This Item shall contain the ICAO location indicator of the FIR within which the flights may be impacted by the RFI. If more than one FIR of the same country is impacted, the ICAO nationality letters of that country (e.g. OE) should be followed by ‘XX’.

Qualifier NOTAM CODE: the following NOTAM code qualifiers (second and third letter) shall be used as appropriate for GNSS RFI event notification in the case of:

GNSS airfield specific operations – QGA [GNSS AIRFIELD]

GNSS area wide operations – QGW [GNSS AREA]

Followed by the appropriate fourth and fifth letters from the below list:

LF – interference from [INTERFERENCE FM]

AU – Not available (specify reason if appropriate) [NOT AVBL]

For cancellation NOTAM the following 4TH and 5th letters shall be used:

AK – Resumed normal operations [OKAY]

AL – Operative (or re-operative) subject to previously published limitations/conditions [OPR SUBJ PREVIOUS COND]

Qualifier TRAFFIC: the « IV » should be used as a traffic qualifier, indicating that both IFR and VFR traffic may be impacted by the RFI

Qualifier PURPOSE: the code NBO should be used to notify RFI events:

Qualifier SCOPE: Depending on the impacted area, one of the following codes should be used:

- A = if the event only impacts aerodrome(s) operations (used QGA)
- E = if the event only impacts en-route traffic (used QWA)
- AE = if the event impacts both Aerodrome and En-route traffic (used QWA)

Qualifier LOWER/UPPER: Depending on the jamming range and the traffic in the impacted area.

Qualifier GEOGRAPHICAL REFERENCE – Coordinates: this qualifier indicates the interference source coordinates. For NOTAM with ‘Scope’ ‘A’ the Aerodrome Reference Point (ARP) coordinates should be inserted. For NOTAM with ‘Scope’ ‘AE’ or ‘E’ the centre of a circle whose radius encompasses the whole area of interference should be inserted.

Qualifier 'GEOGRAPHICAL REFERENCE' – Radius*: The radius of the impacted area should be inserted in this field.

Item A – Location

All FIR location indicators affected by the information should be entered in Item A), each separated by a space. In the case of a single FIR, the Item A) entry must be identical to the 'FIR' qualifier entered in Item Q). When an aerodrome indicator is given in Item A), it must be an aerodrome/heliport situated in the FIR entered in Item Q).

Item B – Start of Activity

A ten-digit date-time group giving the year, month, day, hour and minutes, at which the NOTAM comes into force, should be mentioned in Item B).

Item C – End of Validity

A ten-digit date-time group giving the year, month, day, hour and minute, at which the NOTAM ceases to be in force and becomes invalid, should be mentioned in Item C). This date and time should be later than that given in Item B).

Item E – NOTAM Text

The following standard text should be used according to Q-code:

QGAAU – GNSS NOT AVBL

QGWAU – GNSS NOT AVBL WITHIN: {specify route / geographical area (coordinates / waypoints)}

or

QGALF – GNSS INTERFERENCE

QGWLF – GNSS INTERFERENCE WITHIN: specify route / geographical area (coordinates / waypoints)

When cancelling the NOTAM, the following standard text shall be used:

QGAAC or QGWAC – GNSS OKAY {when resuming normal operations}

QGAAL or QGWAL – GNSS OPR SUBJ PREVIOUS COND. {only to be used where conditions have been published}.

APPENDIX 6.2B

***NOTAM TEMPLATE TO DISSIMINATE INFORMATION RELATED TO RISKS TO CIVIL
AVIATION OVER OR NEAR CONFLICT ZONES***

Item Q – Qualifier: the following qualifiers should be mentioned in item Q:

Qualifier FIR: This Item should contain the ICAO location indicator of the FIR within which the flights may be impacted.

Qualifier NOTAM CODE: the “QAFXX” should be used for conflict zone information.

Qualifier TRAFFIC: the « IV » should be used as a traffic qualifier, indicating that both IFR and VFR traffic are impacted

Qualifier PURPOSE: the code NBO should be used:

N = NOTAM selected for the immediate attention of flight crew members. Due to their importance, these NOTAM require the immediate attention of flight crew members. Flight crew members may request specific delivery of such NOTAM or their inclusion in specific Pre-flight Information Bulletins.

B = NOTAM of operational significance selected for PIB entry. The NOTAM will appear in a Pre-flight Information Bulletin containing all NOTAM relevant to a general Pre-flight Information Bulletin query. NOTAM qualified B, BO, or NBO will appear in the Pre-flight Information Bulletin.

O = NOTAM concerning flight operations. The NOTAM will appear in a PIB containing all relevant NOTAM. NOTAM with qualifiers BO or NBO will appear in the PIB.

Qualifier SCOPE: Navigation Warnings (W)

Qualifier LOWER/UPPER: Depending on the impacted area.

Qualifier GEOGRAPHICAL REFERENCE – Coordinates:

Item A – Location

The location indicators of FIR affected by the information should be entered in Item A

Item B – Start of Activity

A ten-digit date-time group giving the year, month, day, hour and minutes, at which the NOTAM comes into force, should be mentioned in Item B).

Item C – End of Validity

A ten-digit date-time group giving the year, month, day, hour and minute, at which the NOTAM ceases to be in force and becomes invalid, should be mentioned in Item C). This date and time should be later than that given in Item B).

Item E – NOTAM Text

SECURITY - HAZARDOUS SITUATION WI [State] / [name]FIR / AREA BOUND
BY[coordinates/waypoints].

POTENTIAL RISK TO AVIATION FROM [REASON¹]. FLIGHT OPERATIONS IN TO, OUT OF,
WITHIN OR OVER THE DEFINED AREA ARE: RESTRICTED TO FLIGHTS AT OR ABOVE
FLIGHT LEVEL [FL] WITH THE EXCEPTION² OF [ATS route designators] / PROHIBITED EXCEPT
FOR [type of operations³]

¹ Reason e.g. anti-aviation weaponry, military operations and armed conflicts

² Exceptions only included where applicable

³ Types of operations e.g. military, humanitarian etc

APPENDIX 6.2C

CCO-CDO PUBLICATION, CHARTING & DATABASE CODING**Recommended AIP structure and content: ENR1.5****CCO/CDO application**

- In every airport, where operationally feasible, RNAV SIDs and STARs will be published in order to facilitate CCO/CDO procedures. Where the publishing of CCO/CDO procedures is not available, CCO/CDO will be provided on a tactical basis wherever possible.
- Therefore, all aircraft are expected to fly a CCO/CDO profile to the extent possible. Compliance with CCO/CDO procedures is recommended provided they are compatible with ATC instructions and weather conditions are favourable.
- For more detailed information for each airport, see section 2.21 and 2.22 in the AD section of each aerodrome.

Recommended AIP structure and content: AD 2.21 / 2.22**Availability of published STAR procedures**

- When the traffic situation permits and subject to ATC instructions, inbound aircraft are expected to fly a CDO profile during the hours of operation of each CDO arrival procedure to maintain as high an altitude as practical and adopt a low power, low drag, continuous descent approach profile.
- Outside of the published hours of operation and if the traffic situation allows, crews can ask specifically to perform CDO profiles and to maintain the speed as appropriate to facilitate the CDOs. This authorisation will be given whenever possible outside of those hours.

Published CDO arrival Procedures

- All published STARs can potentially be flown with a CDO profile, because STARs have mainly “at or above” altitude restrictions not forcing the aircraft to fly steady segments or to cross fixes at specified altitudes. Specified minimum procedure altitudes must be adhered unless cancelled by ATC.
- The crew shall comply with speed and altitude restrictions published or provided for the destination airport, unless specifically amended by ATC.

The above-proposed content should be considered an example with inclusion optional, depending on local needs and requirements. Figures are examples that can be tailored to specific ATM values depending upon local conditions.

Charting of Speed Constraint, Level Constraint and Distance-to-Go information

An example of Speed Constraint, Level Constraint and Distance-to-Go information chart depiction is provided at appendix 3A.

Note : Distance-to-Go (DTG) abbreviation should be added in the State AIP section GEN 2 with (*) to indicate that this Abbreviations is not contained in, PANS-ABC (Doc 8400).

Database Coding:

Continuous Climb Operations (CCO): Unless operational requirements dictate otherwise, procedures should use track to fix (TF) legs. Direct to fix (DF) and course to fix (CF) legs are also used to a more limited extent and may provide operational flexibility in situations where a TF leg does not meet operational requirements.

Continuous Descent Operations (CDO): Unless operational requirements dictate otherwise, the following database conventions should be used:

Closed path CDO procedures: *These procedures should be coded with track to fix (TF) legs and fly-by waypoints. STARs that terminate with a link to an instrument approach procedure should terminate at a flyby*

- Closed path CDO procedures: These procedures should be coded with track to fix (TF) legs and fly-by waypoints. STARs that terminate with a link to an instrument approach procedure should terminate at a fly-by waypoint.
- Open path CDO procedures: After the Downwind termination waypoint (DTW) an FM path terminator should be coded. If ATC requires a defined path, a VM path terminator can be used instead.



INTERNATIONAL CIVIL AVIATION ORGANIZATION

MIDDLE EAST AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (MIDANPIRG)

MID REGION PERFORMANCE BASED NAVIGATION IMPLEMENTATION PLAN

EDITION MAY, 2023

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontier or boundaries.

AMENDMENTS

The MID Region PBN Implementation Plan should be reviewed and updated by the PBN and/or the ATM Sub-Groups and presented to MIDANPIRG for endorsement.

Stakeholders shall submit their proposal for amendment to the Plan to the ICAO MID Regional Office at least three months prior the PBN or the ATM Sub-Groups meetings in order to ensure adequate time for appropriate coordination. The table below provides a means to record all amendments.

An up to date electronic version of the Plan will be available on the ICAO MID Regional Office website.

[illegible]

EXECUTIVE SUMMARY

The MID Region Performance Based Navigation (PBN) Implementation Plan has been developed to harmonize PBN implementation in the MID Region and to addresses the strategic objectives of PBN based on clearly established operational requirements, avoiding equipage of multiple on-board or ground based equipment, avoidance of multiple airworthiness and operational approvals and explains in detail contents relating to potential navigation applications.

The Plan was prepared in accordance with ICAO provisions related to PBN, the Global Air Navigation Plan, Aviation System Block Upgrades (ASBU) methodology, MID Region Air Navigation Plan and the MID Region Air Navigation Strategy. In addition to the Assembly Resolutions and the twelfth Air Navigation Conference (AN-Conf/12) Recommendations related to PBN.

The plan envisages pre- and post-implementation safety assessments and continued availability of conventional air navigation procedures during transition. The plan discusses issues related to implementation which include traffic forecasts, aircraft fleet readiness, adequacy of CNS infrastructure etc. Implementation targets for various categories of airspace for the short term (up to Dec 2024) and for – Medium-to Long-Term (2025-2030+) have been projected in tabular forms to facilitate easy reference.

This Document consolidates, updates and supersedes all previous MID Region PBN Plans.

The parts related to PBN implementation for En-route will be reviewed and updated by the ATM Sub-Group and those related to terminal and approach will be reviewed and updated by the PBN Sub-Group.

Explanation of Terms

The drafting and explanation of this document is based on the understanding of some particular terms and expressions that are described below:

MID Region PBN Implementation Plan - A document offering appropriate guidance for air navigation service providers, airspace operators and users, regulating agencies, and international organizations, on the evolution of navigation, as one of the key systems supporting air traffic management, and which describes the RNAV and RNP navigation applications that should be implemented in the short, medium and long term in the MID Region.

Navigation aid (NAVAID) infrastructure. NAVAID infrastructure refers to space-based and/or ground-based NAVAIDs available to meet the requirements in the navigation specification.

Navigation application. The application of a navigation specification and the supporting NAVAID infrastructure, to routes and procedures, within a defined airspace volume, in accordance with the intended airspace concept.

Note.— The navigation application is one element, along with communications, ATS surveillance and ATM procedures which meet the strategic objectives in a defined airspace concept.

Navigation specification. A set of aircraft and aircrew requirements needed to support Performance-based Navigation operations within a defined airspace. There are two kinds of navigation specification:

RNAV specification. A navigation specification based on area navigation that does not include the requirement for on-board performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

RNP navigation specification. A navigation specification based on area navigation that includes the requirement for on-board performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH

Performance-based navigation. Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Note.— *Performance requirements are expressed in navigation specifications (RNAV specification, RNP navigation specification) in terms of accuracy, integrity, continuity and functionality needed for the proposed operation in the context of a particular airspace concept.*

REFERENCE DOCUMENTS

The below ICAO Documents provide Guidance related to the PBN implementation:

- Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM) (Doc 4444)
- Procedures for Air Navigation Services — Aircraft Operations, (PANS OPS), Volumes I and II, (Doc 8168)
- Performance-based Navigation (PBN) Manual (Doc 9613)
- Global Navigation Satellite System (GNSS) Manual (Doc 9849)
- Required Navigation Performance Authorization Required (RNP AR) Procedure Design Manual (Doc 9905)
- Continuous Descent Operations (CDO) Manual (Doc 9931)
- Continuous Climb Operations (CCO) Manual (Doc 9993)
- Manual on the Use of Performance-Based Navigation (PBN) in Airspace Design (Doc 9992)
- Quality Assurance Manual for Flight Procedure Design Manual (Doc 9906)
- Performance-based Navigation (PBN) Operational Approval Manual (Doc 9997)
- The Global Air Navigation Plan (GANP) (Doc 9750)
- The European PBN Implementation and Transition Planning Handbook

TABLE OF CONTENTS

Acronyms	8
Chapter 1	9
PERFORMANCE BASED NAVIGATION	9
1. Introduction	9
2. Benefits of Performance Based Navigation	9
3. Drivers and Objectives of PBN Implementation	9
4. Planning Principles	10
5. PBN Operational Requirements and Implementation Strategy	11
Chapter 2	13
CNS Infrastructure	13
1. Navigation infrastructure	13
2. Surveillance Infrastructure	14
3. Communication Infrastructure	14
4. Performance-based communication and surveillance (PBCS)	14
Chapter 3	16
Implementation of PBN	16
1. ATM Operational Requirements	16
2. Airspace concept	17
3. Implementation Roadmap:	18
CHAPTER 4	22
Safety Assessment and Monitoring	22
1. Need for Safety Assessment	22
2. Roles and Responsibilities	22
CHAPTER 5	23
1. Operational approval requirements	23
2. DOCUMENTATION OF OPERATIONAL APPROVAL	25
3. STATE REGULATORY MATERIAL	26
4. APPROVAL PROCESS	26
5. FOREIGN OPERATIONS	27
Chapter 6	28
NATIONAL PBN IMPLEMENTATION STRATEGY & PLAN	28
1. Introduction	28
2. Planning principles	28
3. States' Update On PBN Implementation	28
4. State PBN Implementation Strategy	28
5. National PBN Implementation Plan-Content	29

ACRONYMS

The acronyms used in this document along with their expansions are given in the following List:

ABAS	Aircraft-Based Augmentation System
AIP	Aeronautical information publication
AIRAC	Aeronautical information regulation and control
AIS	Aeronautical Information System
ANSP	Air navigation service provider
APCH	Approach
APV	Approach Procedures with Vertical Guidance
A-RNP	Advanced RNP
AOC	Air operator certificate
ATC	Air Traffic Control
ASBU	Aviation System Block Upgrades
Baro VNAV	Barometric Vertical Navigation
CCO	Continuous Climb Operations
CDO	Continuous Decent Operations
CNS/ATM	Communication Navigation Surveillance/Air Traffic Management
CPDLC	Controller Pilot Data Link Communications
DME	Distance Measuring Equipment
FIR	Flight Information Region
FMS	Flight Management System
GBAS	Ground-Based Augmentation System
GNSS	Global Navigation Satellite System
GLS	GBAS Landing System
INS	Inertial Navigation System
IRU	Inertial Reference Unit
LNAV/VNAV	Lateral navigation/vertical navigation
LOA	Letter of authorization/letter of acceptance
MEL	Minimum equipment list
MID eANP	MID Region Air Navigation Plan
MIDANPIRG	Middle East Air Navigation Planning and Implementation Regional Group
PANS	Procedures for Air Navigation Services
PBN	Performance Based Navigation
RCP	Required Communication Performance
RNAV	Area Navigation
RNP	Required Navigation Performance
SARP	Standards and Recommended Practices
SBAS	Satellite-Based Augmentation System
SID	Standard Instrument Departure
SOP	Standard operating procedure
STAR	Standard Instrument Arrival
TAWS	Terrain awareness warning system
TMA	Terminal Control Area
VOR	VHF Omni-directional Radio-range
WGS-84	World Geodetic System — 1984

CHAPTER 1

PERFORMANCE BASED NAVIGATION

1. INTRODUCTION

1.1 The Performance Based Navigation (PBN) concept specifies aircraft RNAV system performance requirements in terms of accuracy, integrity, availability, continuity and functionality needed for the proposed operations in the context of a particular airspace concept, when supported by the appropriate navigation infrastructure. In this context, the PBN concept represents a shift from sensor-based to performance based navigation.

1.2 The main tool for optimizing the airspace structure is the implementation of PBN, which will foster the necessary conditions for the utilization of RNAV and RNP capabilities by a significant portion of airspace users in the MID Region.

1.3 The MID Regional PBN Implementation Plan will serve as guidance for regional projects for the implementation of air navigation infrastructure, as well as for the development of national implementation plans.

1.4 The PBN Manual (Doc 9613) provides guidance on PBN navigation specifications and encompasses two types of approvals: airworthiness, exclusively relating to the approval of aircraft, and operational, dealing with the operational aspects of the operator. PBN approval will be granted to operators that comply with these two types of approval.

1.5 After the implementation of PBN as part of the airspace concept, the total system needs to be monitored to ensure that safety of the system is maintained. A system safety assessment shall be conducted during and after implementation and evidence collected to ensure that the safety of the system is assured.

2. BENEFITS OF PERFORMANCE BASED NAVIGATION

PBN offers a number of advantages over the sensor-specific method of developing airspace and obstacle clearance criteria. For instance, PBN:

- a) reduces the need to maintain sensor-specific routes and procedures, and their associated costs. For example, moving a single VOR ground facility can impact dozens of procedures, as VOR can be used on routes, VOR approaches, missed approaches, etc. Adding new sensor-specific procedures will compound this cost, and the rapid growth in available navigation systems would soon make sensor-specific routes and procedures unaffordable;
- b) avoids the need for development of sensor-specific operations with each new evolution of navigation systems, which would be cost-prohibitive. The expansion of satellite navigation services is expected to contribute to the continued diversity of RNAV and RNP systems in different aircraft. Some augmentations support PBN operations, and the introduction of new core-constellations and signals will further improve GNSS performance. The use of GNSS/inertial integration is also expanding;
- c) allows for more efficient use of airspace (route placement including the use of free routing, fuel efficiency, noise abatement, etc.);
- d) clarifies the way in which RNAV and RNP systems are used; and
- e) facilitates and harmonizes the operational authorization process for operators by providing a limited set of navigation specifications intended for global use.

3. DRIVERS AND OBJECTIVES OF PBN IMPLEMENTATION

3.1. The PBN Implementation has two main drivers:

- ICAO Resolution 37/11: Urges all States to implement RNAV and RNP air traffic services (ATS) routes and approach procedures in accordance with the ICAO PBN concept laid down in the Performance-based Navigation (PBN) Manual (Doc 9613). This resolution covers all phases of flight, and only specifies the kind of specification for the final approach phase.
- ICAO Doc 9750, the Global Air Navigation Plan (GANP) identifies PBN as the “highest priority” and outlines implementation issues involving PBN planning and implementation as part of the Aviation System Block Upgrades (ASBUs;

3.2. The MID Region PBN Implementation Plan has been developed in line with ICAO Resolution 37/11: adopted by ICAO Assembly in its 37th Session held in September 2010 and has the following strategic objectives:

- a) ensure that implementation of the navigation element of the MID CNS/ATM system is based on clearly established operational requirements;
- b) avoid unnecessarily imposing the mandate for multiple equipment on board or multiple systems on ground;
- c) avoid the need for multiple airworthiness and operational approvals for intra and inter-regional operations; and
- d) avoid an eclipsing of ATM operational requirements by commercial interests, generating unnecessary costs to States , and airspace users.

3.3. Furthermore, the Plan is being updated to provide a high-level strategy for the evolution of the navigation applications to be implemented in the MID Region for the short term (up to Dec 2024) and for Medium-to Long-Term (2025-2030+).

3.4. The plan is intended to assist the main stakeholders of the aviation community to plan the future transition and their investment strategies. For example, Operators can use this Regional Plan to derive future equipage and additional navigation capability investment; Air Navigation Service Providers can plan a gradual transition for the evolving ground infrastructure, Regulating Agencies will be able to anticipate and plan for the criteria that will be needed in the future.

4. PLANNING PRINCIPLES

4.1. The implementation of PBN in the MID Region shall be based on the following principles:

- a) implementation of PBN navigation specification and granting operational approvals should be in compliance with ICAO provisions;
- b) Pre- and post-implementation safety assessments will be conducted in accordance with ICAO provisions to ensure the application and maintenance of the established target level of safety;
- c) continued application of conventional air navigation procedures during the transition period, to guarantee the operation by users that are not PBN capable;
- d) Airspace users’ consultation, dedicated studies and safety cases are required to mitigate the withdrawal of existing ground networks.
- e) Strategy for rationalization of conventional radio navigation aids and evolution toward supporting performance-based navigation should be guided by the Guidelines and Principles as at attachment H, Annex 10, Vol I
- f) Users/operational requirements should be taken into consideration while planning

for PBN implementation;

- g) States should assess the benefit accrued from the implementation of PBN procedures and ATS Routes, and to report the environmental benefits to the ICAO MID Regional Office.

5. PBN OPERATIONAL REQUIREMENTS AND IMPLEMENTATION STRATEGY

5.1. Introduction of PBN should be consistent with the Global Air Navigation Plan. Moreover, PBN Implementation shall be in full compliance with ICAO SARPs and PANS.

En-route

5.2. Considering the traffic characteristic and CNS/ATM capability of the Region, the en-route operations can be classified as oceanic, continental, and local/domestic. In principle, each classification of the en-route operations should adopt, but not be limited to single PBN navigation specification. This implementation strategy should be applied by the States in coordination with airspace users and as coordinated at regional level to ensure harmonization.

5.3. For that MIDANPIRG established the PBN Sub-group to develop a PBN implementation plan for the MID Region and to address related regional PBN implementation issues. Accordingly, States are encouraged to work cooperatively bilaterally, multilaterally and with the PBN Sub-group to ensure regional harmonization of PBN implementation.

5.4. In areas where operational benefits can be achieved and appropriate CNS/ATM capability exists or can be provided for a more accurate navigation specification, States are encouraged to introduce more accurate navigation specification on the basis of coordination with stakeholders and affected neighbouring States.

5.5. Similarly, in circumstances where affected States are agreeable to completing an implementation in advance of the timelines specified in this plan, early implementation is encouraged on the basis of coordination between affected States and airspace users.

Terminal

5.6. Terminal operations have their own characteristics, taking into account the applicable separation minima between aircraft and between aircraft and obstacles. It also involves the diversity of aircraft, including low-performance aircraft flying in the lower airspace and conducting arrival and departure procedures on the same path or close to the paths of high-performance aircraft.

5.7. In this context, the States should develop their own national plans for the implementation of PBN in Terminal Control Areas (TMAs), based on the MID Region PBN Implementation Plan, seeking the harmonization of the application of PBN and avoiding the need for multiple operational approvals for intra- and inter-regional operations, and the applicable aircraft separation criteria.

5.8. Improved management of climb/descent flight profiles, together with the use of PBN, provides safer and more cost-effective operations in terminal areas. PBN procedures contribute to the increased use of CCO/CDO, which improves flight efficiency and reduces fuel consumption, CO2 emissions and noise. MID States are encouraged to implement CCO and CDO, where appropriate, as part of their PBN implementation plans, in line with the provisions of the Continuous Descent Operations (CDO) Manual (Doc 9931) and the Continuous Climb Operations (CCO) Manual (Doc 9993) , and in accordance with the MID Region Air Navigation Strategy (Doc002).

Approach

5.9. ICAO Assembly Resolution 37-11 calls for an ‘implementation of approach procedures with vertical guidance (APV) (Baro-VNAV and/or augmented GNSS), including LNAV-only minima, for all instrument runway ends, either as the primary approach or as a back-up for precision approaches ...’;

5.10. It is not foreseen that SBAS or GBAS augmentation systems will be available in the MID Region for the development of approach procedures in the period considered herein.

5.11. Approach procedures with vertical guidance (APV) should be implemented for all Instrument Runway End, with the purpose of increasing safety with stabilized approaches and reducing the possibility of CFIT. Priority will be given to their implementation at international airports and other controlled airports as determined by the competent authority of each State. The navigation specifications to be applied will be RNP APCH and A-RNP, with baro-VNAV for vertical guidance.

5.12. States are encouraged to plan for the implementation of RNP AR procedures, which can provide significant operational and safety advantages over other area navigation (RNAV) procedures by incorporating additional navigational accuracy, integrity and functional capabilities to permit operations using reduced obstacle clearance tolerances that enable approach and departure procedures to be implemented in circumstances where other types of approach and departure procedures are not operationally possible or satisfactory. Procedures implemented in accordance with RNP AR Procedure Design Manual (Doc 9905) allow the exploitation of high-quality, managed lateral and vertical navigation (VNAV) capabilities that provide improvements in operational safety and reduced unstabilized approaches and Controlled Flight Into Terrain (CFIT) risks.

5.13. The design of RNP APCH procedures with RF leg will be encouraged, with a view to shortening approach paths, with the corresponding fuel and CO2 savings.

5.14. ATC workload should be taken into account while developing PBN Approach Procedures. One possible way to accomplish this would be by co-locating the Initial Approach Waypoint (IAW) for PBN with the Initial Approach Fix (IAF) of the conventional approaches. States should phase-out conventional non-precision approach procedures at a certain point when deemed operationally suitable and taking in consideration GNSS integrity requirements.

CHAPTER 2

CNS INFRASTRUCTURE

Within an airspace concept, PBN requirements will be affected by the communications, ATS surveillance and ATM services, the NAVAID infrastructure, and the functional and operational capabilities needed to meet the ATM application. PBN requirements also depend on what reversionary, conventional navigation techniques are available and what degree of redundancy is required to ensure adequate continuity of functions.

States (ANSPs) shall ensure that the navigation, surveillance and communications infrastructure has the capabilities needed to support the intended PBN operation.

1. NAVIGATION INFRASTRUCTURE

1.1. The NAVAID infrastructure refers to ground- or space-based NAVAIDs. Conventional ground-based NAVAIDs include DME and VOR. The PBN concept requires that NAVAID Infrastructure provides position information to the aircraft through an on-board area navigation system. Space-based NAVAIDS include GNSS elements.

1.2. Performance Based Navigation provides procedures that can be flown with a variety of navigation aids and airborne sensors. Each navigation specification stipulates which positioning sensor may be used for a particular navigation application as indicated in the PBN Manual Doc 9613, Volume II table (II-A-1-4).

1.3. As such, each combination of navigation aid and sensor needs to be assessed to see if the requirements to support a specific procedure are met. Consequently, an ANSP can declare which navigation infrastructures are available to support the navigation specification in a given airspace.

1.4. Detailed guidance on the relationship between navigation infrastructure, navigation specifications and their application in a specific airspace are contained in ICAO Doc 9613, Performance Based Navigation Manual.

Global Navigation Satellite System (GNSS)

1.5. PBN procedures should always allow the use of GNSS.

1.6. Because GNSS (and ABAS using RAIM in particular) is available on a worldwide basis, infrastructure assessment for GNSS differs significantly from terrestrial navigation aids. Relevant aspects such as safety assessment and GNSS performance assessment are described in the GNSS Manual, ICAO Doc 9849 (2017 edition, especially chapters 7.5 and 7.8.2). In addition to considering constellation performance, the ANSP should assess that the space weather and radio frequency interference environment is satisfactory for the planned procedures, and implement vulnerability mitigation measures, if appropriate (chapter 5 and appendix F of the GNSS Manual). Further guidance on assessing and measuring GNSS interference is contained in ICAO Doc 8071, Testing of Radio Navigation Aids. During outages of GNSS and depending on available NAVAID facilities, ANSPs may find it useful to consider suspending planned routine maintenance activities to ensure the availability of an alternate source of navigation.

1.7. The processes in the Performance Based Navigation (PBN) Manual are defined with the aim to either identify which navigation specification can be applied in order to serve the operational requirements given by the constraints of a particular airspace environment. This involves lining up a navigation application with the appropriate navigation specification and navigation infrastructure.

1.8. States need to evaluate the navigation infrastructure both in the initial process of

identifying which navigation specification can support the application given the infrastructure, as well as in the final implementation once it has been agreed which specification to use. For each navigation specification, there are specific requirements on the infrastructure. The infrastructure assessment determines if these requirements are met.

1.9. Appropriate tools should be used to assess navigation infrastructure. While the assessment could be conducted using manual analysis and flight inspection, the use of a software tool is recommended in order to make the assessment more efficient. The software tool should be tailored to allow evaluating the infrastructure in light of the requirements imposed by a specific navigation specification. Such a tool could, but does not have to be integrated with procedure design tools.

1.10. In general, RNAV assessment tools should include a 3D terrain model with sufficient resolution and accuracy to allow predicting the line of sight visibility of NAVAIDS along a procedure service volume, including an analysis of their respective subtended angles and a variety of other geometric constraints.

1.11. Closely related to RNAV infrastructure assessment is RNAV instrument flight procedure validation, which looks at flyability and other operational aspects. It differs from RNAV flight inspection, which focuses on signal in space compliance with ICAO Annex 10 only. Guidance on instrument flight procedure validation is contained in ICAO DOC 9906 (Quality Manual, esp. Vol 5). Guidance on ground analysis and flight testing for PBN is discussed in chapter 8 of ICAO DOC 8071 Manual on Testing of Radio Navigation Aids, Volume 1 (2018 edition). Further context on the evolution of conventional navigation aids as a complementary infrastructure to GNSS in support of PBN can be found in ICAO Annex 10, Attachment H.

1.12. Note: Guidance material concerning for RNAV 1 Infrastructure Assessment is contained Doc EUROCONTROL- -GUID-114 accessible through the link : <https://www.eurocontrol.int/sites/default/files/2021-07/eurocontrol-guidelines-rnav-1-infrastructure-assessment-20.pdf> .

2. SURVEILLANCE INFRASTRUCTURE

2.1. For RNAV operations, States should ensure that sufficient surveillance coverage is provided to assure the safety of the operations. Because of the on-board performance monitoring and alerting requirements for RNP operations, surveillance coverage may not be required. Details on the surveillance requirements for PBN implementation can be found in the ICAO PBN Manual (Doc 9613) and ICAO PANS-ATM (Doc 4444), and information on the current surveillance infrastructure in the MID can be found in the MID eANP and in the MID Region Surveillance Plan.

3. COMMUNICATION INFRASTRUCTURE

3.1. Implementation of RNAV and RNP routes includes communication requirements. Details on the communication requirements for PBN implementation can be found in ICAO PANS-ATM (Doc 4444), ICAO RCP Manual (Doc 9869), and ICAO Annex 10. Information on the current communication infrastructure in the MID can also be found in MID eANP.

4. PERFORMANCE-BASED COMMUNICATION AND SURVEILLANCE (PBCS)

4.1 The performance-based communication and surveillance (PBCS) concept provides objective operational criteria to evaluate emerging communication and surveillance technologies suited for the evolving needs of ATM functions. Once these criteria are established and accepted, the implementation of a specific ATM function, including its performance in technical and human terms, can be assessed against these operational criteria to determine its feasibility.

4.2 The PBCS concept is aligned with that of PBN. While the PBN concept applies required navigation Performance (RNP) and area navigation (RNAV) specifications to the navigation element,

the PBCS concept applies the required communication performance (RCP) and required surveillance performance (RSP) specifications to communication and surveillance elements, respectively. Each RCP/RSP specification includes criteria attributed to the components of the communication and surveillance systems involved.

4.3 Where beneficial, the RCP, RNP/RNAV and RSP specifications may be applied to the communication, navigation and surveillance elements to ensure the operational system and its components perform in accordance with the specifications.

CHAPTER 3

IMPLEMENTATION OF PBN

1. ATM OPERATIONAL REQUIREMENTS

1.1. The Global ATM Operational Concept (Doc 9854) makes it necessary to adopt an airspace concept able to provide an operational scenario that includes route networks, minimum separation standards, assessment of obstacle clearance, and a CNS infrastructure that satisfies specific strategic objectives, including safety, access, capacity, efficiency, and environment.

1.2. During the planning phase of any implementation of PBN, States should gather inputs from all aviation stakeholders to obtain operational needs and requirements. These needs and requirements should then be used to derive airspace concepts and to select appropriate PBN navigation specification

1.3. In this regard, the following should be taken into consideration:

- a) Traffic and cost benefit analyses
- b) Necessary updates on automation
- c) Operational simulations in different scenarios
- d) ATC personnel training
- e) Flight plan processing
- f) Flight procedure design training to include PBN concepts and ARINC-424 coding standard
- g) Enhanced electronic data and processes to ensure appropriate level of AIS data accuracy, integrity and timeliness
- h) WGS-84 implementation in accordance with ICAO Annex 15 provisions
- i) Uniform classification of adjacent and regional airspaces, where practicable
- j) RNAV/RNP applications for SIDs and STARs
- k) Coordinated RNAV/RNP routes implementation
- l) RNP approach with vertical guidance
- m) Establish PBN approval database

1.4. The implementation of PBN additional functionalities/path terminator should be considered while planning/designing new procedures such as:

- the Radius to Fix (RF) for approach;
- Fixed Radius Transition (FRT) for En-route; and

2. AIRSPACE CONCEPT

2.1. The PBN Manual describes the Airspace Concept as a formal way to set out and respond to operational airspace change requirements. As such, the development of the Airspace Concept is a key step in PBN implementation because PBN ATS routes, SIDs/STARs are the backbone of the airspace organisation.

2.2. During the planning phase of any implementation of PBN routes, States should gather inputs from all aviation stakeholders to obtain operational needs and requirements. These needs and requirements should then be used to derive airspace concepts and to select appropriate PBN navigation specification.

3. IMPLEMENTATION ROADMAP:

En-route

Short Term (up to Dec 2024):

Oceanic Airspace

Considering the traffic complexity in oceanic airspace and the need to increase the levels of safety at the transfer points between the FIRs involved, RNP10 (RNAV10) is applied in oceanic airspaces, such as Muscat and Sana'a FIRs over Arabian Sea. This navigation specification and its applications rely primarily on GNSS to support the navigation element of the airspace concept.

Continental en-route

RNAV 5 implementation should be completed by December 2024.

Based on operational requirements, States may choose to implement RNAV 1 routes to enhance efficiency of airspace usages and support closer route spacing, noting that appropriate communication and surveillance coverage is provided. Details of these requirements are provided in the PBN manual (Doc 9613) and PANS-ATM (Doc 4444).

Medium- Term (2025-2030):

Oceanic Airspace

Along with the implementation of RNP10 (RNAV10), migration to RNP4 would be considered for implementation at the identified Airspace to support 30 NM lateral and the 30 NM longitudinal distance-based separation minima in a procedural oceanic airspace. It does not require any ground-based NAVAID infrastructure. GNSS is the primary navigation sensor to support RNP 4, either as a stand-alone navigation system or as part of a multi-sensor system.

Continental en-route

RNAV 5 specifications are applicable to all ATS routes in MID region.

RNAV 1 would be considered for implementation for en-route continental/local domestic operations.

Long Term (2031+): (TBD)

Terminal

Short Term (up to Dec 2024):

RNAV 1 or RNP 1 SIDs and STARs consistent with APTA-B0/2 should be completed at all RWYs ENDS at International Aerodromes.

Improved management of climb/descent flight profiles, together with the use of PBN, provides safer and more cost-effective operations in terminal areas. PBN procedures contribute to the increased use of CCO/CDO, which improves flight efficiency and reduces fuel consumption, CO2 emissions and noise. States should take into account CCO/CDO operations in the design of SIDs/STARs, within the possibilities of each scenario considered. CCO and CDO consistent with APTA B0/4 and APTA B0/5 should be implemented at the defined TMAs, in accordance with the State PBN implementation Plans, the MID Region Air Navigation Strategy and the MID ANP.

Note: CDOs are not necessarily related to the implementation of STARs. Member States may create specific procedures to ensure the implementation of CDOs in airspace with low air traffic volume, without applying STARs.

Medium- Term (2025-2030):

RNAV 1 or RNP 1 SIDs and STARs consistent with APTA-B0/2 will be implemented in all TMAs, as appropriate.

CCO and CDO should be implemented at all RWYs ENDS at International Aerodromes. When implemented, CCO and CDO should be consistent with APTA B0/4 and APTA B0/5.

Note: CDOs are not necessarily related to the implementation of STARs. Member States may create specific procedures to ensure the implementation of CDOs in airspace with low air traffic volume, without applying STARs.

Long Term (2031+): (TBD)

Approach

Short Term (up to Dec 2024):

Implementation of PBN Approaches (with basic capabilities) consistent with APTA-B0/1 for all instrument runway ends at the international aerodromes listed in the MID ANP except where approach procedures with vertical guidance (APV) is not feasible. RNP APCH with LNAV minima only should be deployed.

The introduction of PBN Approaches (with advanced capabilities) consistent with APTA-B1/1 would be limited to selected airports, to allow for the introduction of more flexible approaches including the use of RF legs within the Final Approach Segment where operational benefits can be obtained.

Medium- Term (2025-2030):

Implementation of PBN Approaches (with basic capabilities) consistent with APTA-B0/1 for all instrument runway ends except where approach procedures with vertical guidance (APV) is not feasible. RNP APCH with LNAV minima only should be deployed.

Widespread implementation of PBN Approaches (with advanced capabilities) consistent with APTA-B1/1 continue for airports where there are operational benefits.

Long Term (2031+): (TBD)

2.1. Table 3-2 summarizes the implementation targets of each PBN navigation specification in the MID Region:

Table 3-2. SUMMARY TABLE AND IMPLEMENTATION TARGETS

Airspace	Short Term (up to Dec 2024)		Medium- Term (2025-2030)		Long Term (2031+)	
	Navigation Specification Preferred	Performance Indicators/ Targets	Navigation Specification Acceptable	Performance Indicators/ Targets	Navigation Specification Acceptable	Performance Indicators/ Targets
En-route – Oceanic	RNAV 10 or RNP 4*	70 % by 2024	RNAV 10 RNP 4*	100% by 2030	TBD	
En-route – Continental	RNAV 5 RNAV 1	70 % by 2024	RNAV 5 RNAV 1	100% by 2030		
En-route - Local / Domestic	RNAV 5 RNAV 1	70 % by 2024	RNAV 5 RNAV 1	100% by 2030		
TMA – Arrival	RNAV 1 or RNP 1	70% by 2022 and 100% by 2024 for STARs at International Aerodromes	RNAV 1 or RNP 1	100% by 2030 for STARs at all TMAs, as appropriate		
TMA – Departure	RNAV 1 or RNP 1	70% by 2022 100% by 2024 for SIDs at International Aerodromes	RNAV 1 or RNP 1	100% by 2030 SIDs at all TMAs, as appropriate		
Approach	RNP APCH to LNAV/VNAV and LNAV minima only, as required. (PBN Approaches with basic capabilities)	100% by 2022 for all instrument runway ends at the international aerodromes	RNP APCH to LNAV/VNAV and LNAV minima only, as required. (PBN Approaches with basic capabilities) for all instrument runway ends	100% by 2030		
	RNP AR APCH (PBN Approaches with advanced capabilities)	100% by 2024 at selected Airports in MID	Widespread implementation of RNP AR APCH (PBN Approaches with advanced capabilities)	W/A		

– <i>W/A: where applicable/defined Airspace, in accordance with State PBN implementation Plans, the MID Region Air Navigation Strategy and the MID ANP.</i> – <i>* would be considered for implementation at the identified Airspace/TMAs</i> – <i>When no month is specified means by the end of the year.</i>	–	–

CHAPTER 4

SAFETY ASSESSMENT AND MONITORING

1. NEED FOR SAFETY ASSESSMENT

4.1. To ensure that the introduction of PBN en-route applications within the MID Region is undertaken in a safe manner and in accordance with relevant ICAO provisions, implementation shall only take place following the conduct of a safety assessment that has demonstrated that an acceptable level of safety will be met. This assessment may also need to demonstrate levels of risk associated with specific PBN en-route implementation. Additionally, ongoing periodic safety reviews shall be undertaken where required in order to establish that operations continue to meet the target levels of safety

2. ROLES AND RESPONSIBILITIES

4.2. To demonstrate that the system is safe, it will be necessary that the implementing agency – a State or group of States - ensures that a safety assessment and, where required, ongoing monitoring of the PBN en-route implementation are undertaken.

4.3. In undertaking a safety assessment to enable en-route implementation of PBN, a State or the implementing agency shall:

- a) establish and maintain a registry of PBN approvals;
- b) monitor aircraft horizontal-plane navigation performance and the occurrence of large navigation errors and report results;
- c) conduct safety and readiness assessments;
- d) monitor operator compliance with State approval requirements after PBN implementation; and
- e) initiate necessary remedial actions if PBN requirements are not met.

CHAPTER 5 OPERATIONAL APPROVAL

1. OPERATIONAL APPROVAL REQUIREMENTS

5.1. Operational approval is usually the responsibility of the regulatory authority of the State of the Operator for commercial air transport operations and the State of Registry for general Aviation (GA) operations. For certain operations, GA operators may not be required to follow the same authorization model as commercial operators.

5.2. The operational approval assessment must take account of the following:

- a) aircraft eligibility and airworthiness compliance;
- b) operating procedures for the navigation systems used;
- c) control of operating procedures (documented in the OM);
- d) flight crew initial training and competency requirements and continuing competency requirements;
- e) dispatch training requirements; and
- f) control of navigation database procedures. Where a navigation database is required, operators need to have documented procedures for the management of such databases. These procedures will define the sourcing of navigation data from approved suppliers, data validation procedures for navigation databases and the installation of updates to databases into aircraft so that the databases remain current with the AIRAC cycle. (For RNP AR applications, the control of the terrain database used by TAWS must also be addressed.)

Aircraft eligibility

5.3. An aircraft is eligible for a particular PBN application provided there is clear statement in:

- a) the Type Certificate (TC); or
- b) the Supplement Type Certificate (STC); or
- c) the associated documentation — Aircraft Flight manual (AFM) or equivalent document; or
- d) a compliance statement from the manufacturer that has been approved by the State of Design and accepted by the State of Registry or the State of the Operator, if different.

5.4. The operator must have a configuration list detailing the pertinent hardware and software components and equipment used for the PBN operation.

5.5. The TC is the approved standard for the production of a specified type/series of aircraft. The aircraft specification for that type/series, as part of the TC, will generally include a navigation standard. The aircraft documentation for that type/series will define the system use, operational limitations, equipment fitted and the maintenance practices and procedures. No changes (modifications) are permitted to an aircraft unless the CAA of the State of Registry either approves such changes through a modification approval process, STC or accepts technical data defining a design change that has been approved by another State.

5.6. For recently manufactured aircraft, where the PBN capability is approved under the TC, there may be a statement in the AFM limitations section identifying the operations for which the aircraft

is approved. There is also usually a statement that the stated approval does not itself constitute an approval for an operator to conduct those operations. Alternate methods of achieving the airworthiness approval of the aircraft for PBN operations is for the aircraft to be modified in accordance with approved data. (e.g. STC, minor modification, etc.)

5.7. One means of modifying an aircraft is the approved Service Bulletin (SB) issued by the aircraft manufacturer. The SB is a document approved by the State of Design to enable changes to the specified aircraft type and the modification then becomes part of the type design of the aircraft. Its applicability will normally be restricted by the airframe serial number. The SB describes the intention of the change and the work to be done to the aircraft. Any deviations from the SB require a design change approval; any deviations not approved will invalidate the SB approval. The State of Registry accepts the application of an SB and changes to the maintenance programme, while the State of the Operator accepts changes to the maintenance programme and approves changes to the MEL, training programmes and Operations specifications. An Original Equipment Manufacturer (OEM) SB may be obtained for current production or out of production aircraft.

5.8. In respect of PBN, in many cases for legacy aircraft, while the aircraft is capable of meeting all the airworthiness requirements, there may be no clear statement in the applicable TC or STC or associated documents (AFM or equivalent document). In such cases, the aircraft manufacturer may elect to issue an SB with appropriate AFM update or instead may publish a compliance statement in the form of a letter, for simple changes, or a detailed aircraft type specific document for more complex changes. The State of Registry may determine that an AFM change is not required if it accepts the OEM documentation. **Table 5-1** lists the possible scenarios facing an operator who wishes to obtain approval for a PBN application, together with the appropriate courses of action.

Table 5-1

Scenario	Aircraft certification status	Actions by operator/owner
1	Aircraft designed and type certificated for PBN application. Documented in AFM, TC or the STC	No action required, aircraft eligible for PBN application
2	Aircraft equipped for PBN application but not certified. No statement in AFM. SB available from the aircraft manufacturer	Obtain SB (and associated amendment pages to the AFM) from the aircraft manufacturer
3	Aircraft equipped for PBN application. No statement in AFM. SB not available. Statement of compliance available from the aircraft manufacturer	Establish whether the statement of compliance is acceptable to the regulatory authority of the State of Registry of the aircraft
4	Aircraft equipped for PBN application. No statement in AFM. SB not available. Statement of compliance from the aircraft manufacturer not available	Develop detailed submission to State of Registry showing how the existing aircraft equipment meets the PBN application requirements
5	Aircraft not equipped for PBN application	Modify aircraft in accordance with the aircraft manufacturer's SB or develop a major modification in conjunction with an approved design organization in order to obtain an approval from the State of Registry (STC).

Operating procedures

5.9. The Standard operating procedure (SOP) must be developed to cover both normal and non-normal (contingency) procedures for the systems used in the PBN operation. The SOP must address:

- a) preflight planning requirements including the MEL and, where appropriate, RNP/RAIM prediction;
- b) actions to be taken prior to commencing the PBN operation;
- c) actions to be taken during the PBN operation; and
- d) actions to be taken in the event of a contingency, including the reporting of significant incidents

GA pilots must ensure that they have suitable procedures/checklists covering all these areas

Control of operating procedures

5.10. The SOP must be adequately documented in the OM and checklists

Flight crew and dispatch training

5.11. A flight crew and dispatch training programme for the PBN operation must cover all the tasks associated with the operation and provide sufficient background to ensure a comprehensive understanding of all aspects of the operation. The operator must have adequate records of course completion for flight crew, flight dispatchers and maintenance personnel.

Control of navigation database procedures

5.12. If a navigation database is required, the procedures for maintaining currency, checking for errors and reporting errors to the navigation database supplier must be documented in the maintenance manual by commercial operators

2. DOCUMENTATION OF OPERATIONAL APPROVAL

2.1. Operational approval may be documented as an endorsement of the Air operator certificate (AOC) through:

- a) Operations specification, associated with the AOC; or
- b) amendment to the OM; or
- c) LOA.

2.2. During the validity of the operational approval, the CAA should consider any anomaly reports received from the operator or other interested party. Repeated navigation error occurrences attributed to a specific piece of navigation equipment may result in restrictions on use or cancellation of the approval for use of that equipment. Information that indicates the potential for repeated errors may require modification of an operator's training programme. Information that attributes multiple errors to a particular pilot or crew may necessitate remedial training and checking or a review of the operational approval.

2.3. The State may determine that a GA aircraft may operate on a PBN route/procedure provided that the operator has ensured that the aircraft has suitably approved equipment (is eligible), the navigation database is valid, the pilot is suitably qualified and current with respect to the equipment, and adequate procedures (checklists) are in place.

3. STATE REGULATORY MATERIAL

3.1. Individual States must develop national regulatory material which addresses the PBN applications relevant to their airspace or relevant to operations conducted in another State by the State's operators or by aircraft registered in that State. The regulations may be categorized by operation, flight phase, area of operation and/or navigation specification. Approvals for commercial operations should require specific authorization.

4. APPROVAL PROCESS

General

3.2. Since each operation may differ significantly in complexity and scope, the project manager and the operational approval team need considerable latitude in taking decisions and making recommendations during the approval process. The ultimate recommendation by the project manager and decision by the DGCA regarding operational approval should be based on the determination of whether or not the applicant:

- a) meets the requirements established by the State in its air navigation regulations;
- b) is adequately equipped; and
- c) is capable of conducting the proposed operation in a safe and efficient manner.

3.3. The complexity of the approval process is based on the inspector's assessment of the applicant's proposed operation. For simple approvals, some steps can be condensed or eliminated. Some applicants may lack a basic understanding of what is required for approval. Other applicants may propose a complex operation, but may be well prepared and knowledgeable. Because of the variety in proposed operations and differences in an applicant's knowledge, the process must be thorough enough and flexible enough to apply to all possibilities.

Phases of the approval process

Step 1 — Pre-application phase

3.4. The operator initiates the approval process by reviewing the requirements; establishing that the aircraft, the operating procedures, the maintenance procedures and the training meet the requirements; and developing a written proposal to the regulator. A number of regulators have published "job aids" to assist the operator in gathering the necessary evidence to support the approval application. At this stage a pre-application meeting with the regulator can also be very beneficial. If the proposed application is complex, the operator may need to obtain advice and assistance from OEMs or other design organizations, training establishments, data providers, etc.

Step 2 — Formal application phase

3.5. The operator submits a formal, written application for approval to the CAA, which appoints a project manager either for the specific approval or generally for PBN approvals.

Step 3 — Document evaluation phase

3.6. The CAA project manager evaluates the formal, written application for approval to determine whether all the requirements are being met. If the proposed application is complex, the project manager may need to obtain advice and assistance from other organizations such as regional agencies or experts in other States.

Step 4 — Demonstration and inspection phase

3.7. During a formal inspection by the project manager (assisted as necessary by a CAA team), the operator demonstrates how the requirements are being met.

Step 5 — Approval phase

3.8. Following a successful formal inspection by the CAA, approval is given through:

- a) Operations specification, associated with the AOC; or
- b) amendment to the OM; or
- c) LOA.

Some PBN applications may not require formal approval for GA operations — this will be determined by the State of Registry.

Note.— The approval procedure described above consists of a simplified process of the certification guidance contained in Part III of the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335).

5. FOREIGN OPERATIONS

5.1. A State undertakes, in accordance with Article 12 to the Convention, to ensure that every aircraft flying over or maneuvering within its territory shall comply with the rules and regulations relating to the flight and maneuver of aircraft there in force. Article 33 to the Convention provides that certificates of airworthiness and certificates of competency and licenses issued, or rendered valid, by the State in which an aircraft is registered, shall be recognized by other States, provided that the requirements under which such certificates or licenses were issued or rendered valid are equal to or above the minimum standards which may be established by ICAO. This requirement for recognition is now extended by Annex 6, Part I and Part III, Section II, such that Contracting States shall recognize as valid an AOC issued by another Contracting State, provided that the requirements under which the certificate was issued are at least equal to the applicable Standards specified in Annex 6, Part I and Part III.

5.2. States should establish procedures to facilitate the application by foreign operators for approval to operate into their territory. States should be careful in their requirements for applications, to request only details relevant to the evaluation of the safety of the operations under consideration and their future surveillance. When evaluating an application by an operator from another State to operate within its territory a State will examine both the safety oversight capabilities and record of the State of the Operator and, if different, the State of Registry, as well as the operational procedures and practices of the operator. This is necessary in order for the State, in the terms of Article 33 to the Convention, to have confidence in the validity of the certificates and licenses associated with the operator, its personnel and aircraft, in the operational capabilities of the operator and in the level of certification and oversight applied to the activities of the operator by the State of the Operator.

5.3. The operator will need to make applications to each State into or over which it is intended to operate. The operator will also need to keep its own CAA, as the authority of the State of the Operator, informed of all applications to operate in other States. Applications should be made direct to the CAAs of the States into which it is intended to operate. In some cases it will be possible to download information and instructions for making an application and the necessary forms from a website maintained by the CAA in question.

5.4. Because functional and performance requirements are defined for each navigation specification, an aircraft approved for an RNP specification is not automatically approved for all RNAV specifications. Similarly, an aircraft approved for an RNP or RNAV specification having a stringent accuracy requirement (e.g. RNP 0.3 specification) is not automatically approved for a navigation specification having a less stringent accuracy requirement (e.g. RNP 4).

CHAPTER 6

NATIONAL PBN IMPLEMENTATION STRATEGY & PLAN

1. INTRODUCTION

6.1 The ICAO Assembly Resolution 37-11 stressed the need for a National PBN Implementation Plan.

6.2 In order to assist States to achieve the ICAO objectives set out in Resolution 37-11, this chapter provides step-by-step guidance to States on how to establish their own national plan in a standard consistent way in relation to Assembly Resolutions, ICAO SARPs, GANP, GASP, Regional plans and other related documents.

6.3 Whilst it is not possible to provide a tailor made PBN implementation plan, and even less desirable to create a 'one-size fits all' plan, what is possible is to provide a generic architecture showing one example of such a PBN Implementation Plan and suggests what such a plan could contain.

6.4 This chapter provides a skeleton 'architecture' or 'outline' which could assist States and ANSPs formulate an ICAO National PBN Implementation Plan.

2. PLANNING PRINCIPLES

6.5 The following principles should be applied in drawing up the State PBN implementation plan.

Global harmonization: all regulations, navigation requirements, and flight procedures designs should comply with ICAO's PBN Manual, SARPs, PANS, and other international standards

Regional harmonization: there should be no conflict with MID region's PBN implementation plan.

Smooth transition: continued application of conventional air navigation procedures during the transition period, to guarantee availability by users that are not RNAV- and/or RNP-equipped;

CBA: conduct of cost-benefit analyses to justify the implementation of the RNAV and/or RNP concepts in each particular airspace;

Safety Assessment: conduct of pre- and post-implementation safety assessments to ensure the application and maintenance of the established target levels of safety.

Collaborative Consultation: collaborative consultation is critical between the regulatory authority, the service provider, other stakeholders, and the users of the air navigation services.

3. STATES' UPDATE ON PBN IMPLEMENTATION

6.6 States should provide the ICAO MID Regional Office with their updated PBN Implementation Plans on an annual basis (by end of December) in accordance with MSG Conclusion 4/11. The States' National PBN Implementation Plan should be published on the MID Office website as per MSG Conclusion 6/21, to facilitate consultation and planning of airspace users.

4. STATE PBN IMPLEMENTATION STRATEGY

6.7 It is expected that the State (CAA) will develop the policy and PBN Implementation Strategy and the Service Provider will define a deployment plan to deliver the policy goals. The PBN Implementation Plan should be completed in collaborative-partnership approach.

6.8 To ensure the civil aviation authority's (CAA's) plans are complementary to the ANSP and industry plans, they should begin with a shared broad strategic direction. This could start in the form of PBN Implementation Strategy that evolves into a State PBN implementation plan

6.9 A Sample State PBN Implementation Strategy is provided at the PBN Portal through the link <https://pbnportal.eu/epbn/main/Implementing-PBN/Implementation-Considerations/Sample-State-PBN-Implementation-Strategy.html>

5. NATIONAL PBN IMPLEMENTATION PLAN-CONTENT

The National PBN Implementation Plan should contain the following:

a) Executive Summary

The ANSP may elect to explain why a PBN implementation plan is being developed. It is highly likely that the NSPs will want to highlight why the changes are required and what the expected benefits will be for the airspace users.

b) Drivers for PBN Implementation

Within this section, the ANSP could identify the specific reasons why an airspace change is needed.

c) Analysis of Current Operations

Detailing the current operations would provide the Service Providers with the initial input to the PBN implementation. This detailing of current operations is known as the Reference Scenario is described in Activity 4 of the Manual on the Use of Performance-Based Navigation (PBN) in Airspace Design (Doc 9992). The Reference Scenario includes all existing ATS Routes, SIDs/STARs, airspace volumes, ATC sectorization, air traffic data and as well as all the existing coordination agreements. Description and analysis of the Reference Scenario is a crucial exercise. The Reference Scenario provides a 'baseline' to understand and analyze the current operations, within the national airspace and airports could cover the following elements:

Airspace:

- a. Structure
- b. Airspace Classification
- c. Sectorisation
- d. TMA and CTR
- e. Route Structure

Aircraft Fleet

- f. Fleet Equipage Assessment
- g. Categories of Airspace Users
- h. Aircraft certification
- i. Crew operational approval

Communication Infrastructure

- j. Communications coverage and limitations

Navigation Infrastructure

- k. Conventional Navigation Aids
- l. Precision Approach Landing Aids
- m. GNSS status

Surveillance Infrastructure

- n. Surveillance coverage and limitations

ATM capabilities (existing and planned)

WGS-84 implementation

d) PBN Operational Requirements & Implementation Strategy

Selection of applicable Navigation Specifications

- Based on National Objectives
- Ensuring Regional Harmonization
- Aligned with ICAO implementation strategies / policies

Realistic Near / Medium / Long term implementation roadmaps for:

- Enroute Operations
 - o Key traffic flows and City Pairs Identified
 - o Harmonization and interoperability across FIR
- Terminal Operations
 - o Specific terminal areas selected for implementation
- Instrument Approaches
 - o Designation of airports eligible for RNP APCH and APV
 - o Selection of airports requiring RNP AR APCH (based on operational justification)

e) Transition Strategies

Considerations for mandate or phased update of procedures or equipage

Infrastructure

- NAVAID phase-out and replacement strategy (VOR / DME / NDB / ILS)
- Requirements for continued application of conventional navigation procedures to accommodate non-RNAV / RNP users
- Provisions for contingency operations

Procedure

- Strategy for mixed-mode operations
- Integration with ATM system

Personnel

- Promotion and training for ATC, Designers and Inspectors

f) Safety Assessment & Monitoring Requirements

Need for a safety assessment

Pre and Post safety assessment in accordance with ICAO provisions

Periodic safety reviews undertaken by the State or group of States where required

Required Metrics

g) Expected Operational Benefits - specific implementations

High-level business case for implementation near / mid long-term)

APPENDIX 6.5A

AMENDMENT PROPOSAL

PROPOSAL FOR AMENDMENT OF THE ICAO
MID AIR NAVIGATION PLAN (DOC 9708), VOLUME II

(Serial No. MID-II-XX/XX-ATM)

- a) **Plan:** MID Air Navigation Plan Volume II – Part IV-ATM
Specific Regional Requirements
- b) **Proposed amendment:** Editorial note: Amendments are arranged to show “deleted text” using
strikeout (~~text to be deleted~~), and “added text” with grey shading (text to be inserted)

TABLE ATM II-MID-1 MID REGION ATS ROUTE NETWORK

EXPLANATION OF THE TABLE

Column

1	<i>Designator of ATS route and Type (Conventional, RNAV5 or RNAV1 etc.)</i>
2	<i>Significant points defining the ATS routes. Only prominent locations have been listed. Additional points where facilities are provided to complete navigational guidance along a route, but not otherwise marking significant characteristics of the route (change of heading of centre line, intersection with other routes, etc.) have normally not been included. Locations shown in parentheses indicate significant points outside the Region.</i>
Note 1.	<i>Not representing the operator's requirements. Operator's required route and/or nav aids are shown in square brackets ([]).</i>
Note 2.	<i>Subject to further study. Including the associated navigation aid coverage.</i>
Note 3	<i>Subject to military agreement.</i>
Note 4.	<i>Not acceptable at present.</i>
Note 5.	<i>At present, implementation possible only during specific periods (e.g. weekends, nights, etc., as published).</i>
Note 6.	<i>At present, implementation of the RNAV route only possible above FL 300, or as published.</i>
Note 7.	<i>Unidirectional use.</i>
Note 8.	<i>For ATS route or part thereof is RNAV 1</i>

6.5A-2

- 1) **Amend** requirements for ATS routes A410, A411, A412, A414, A416, A422, A424, A453, A647, A727, A788, A791, B121, B400, B407, B411, B413, B415, B416, B417, B441, B451, B526, B527, B535, B541, B544, G55, G202, G208, G216, G452, G482, G652, G660, G662, G663, G665, G666, G667, G669, G670, G775, G781, G783, G792, G795, L124, L125, L200, L223, L305, L311, L313, L314, L319, L323, L324, L333, L417, L425, L427, L430, L513, L519, L554, L556, L560, L654, L570, L601, L602, L604, L607, L612, L617, L620, L631, L677, L681, L692, L700, L710, L713, L717, L720, L721, L768, L852, L883, M301, M316, M317, M318, M319, M320, M321, M324, M425, M428, M430, M434, M440, M444, M449, M550, M551, M557, M559, M561, M562, M564, M565, M572, M573, M574, M628, M634, M651, M677, M701, M715, M718, M762, M855, M860, M861, M863, M872, M999, N39, N72, N300, N302, N303, N310, N312, N315, N317, N318, N319, N324, N438, N563, N567, N569, N570, N571, N636, N685, N687, N697, N700, N705, N715, N717, N764, P126, P300, P307, P312, P315, P323, P550, P555, P559, P566, P567, P568, P570, P574, P699, P715, P751, P752, P753, P899, P975, R219, R401, R611, R652, R654, R655, R659, R660, R661, R777, R784, R785 and R794.
- 2) **Add** requirements for ATS routes A18, A420 (V300), B21, B418 (W148), B547 (W147), B727 (W861), G655, L12, L31, L553, L567 (B527), L702 (T702), L716 (T136), M1, M7, M214, M215, M553 (H732), P320 (M600), M620, M621, M622, M700 (Q620), M702 (J852), M705 (Y415), M707 (T297), M709 (W9), M711 (Y511), M713 (Y613), M723 (Q733), M726, M727, M731, M732, M739, M740, M979, M980, N68, N163, N323 (Q332), N703 (V13), N704 (J874), N707 (Y517), N708 (Z178), N709 (J749), N711 (V100), N713 (T513), N718 (Q978), N720 (V790), N722 (T142), N982 (W857), P32, P126, P128, P310 (Z350), P318 (T238), P324, P558 (Z855), P560 (Z270), P563 (W863), P573 (Z333), P702 (W852), P703 (J735), P705 (V975), P706 (T295), P707 (T707), P709 (T299), P710 (Q510), P711 (T100), P712 (Q212), P713 (T934), P720 (Z980), P721 (Q21), P723 (Q143), R778 and R845.
- 3) **Delete** requirements for ATS routes B412, B538, G674, G799, L126, L306, L308, L310, L438, L440, L443, L444, L563, L566, L573, L695, L764, M203, M303, M305, M309, M600, M681, M877, N430, N638, N694, N929, P304, P316, P425, P513, P517, P552, P560, P561, P562, P563, P634, R205, R402 and R799.

6.5A-3

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
A16	RASDA 330600N 0305700E MELDO 320201N 0310406E BALTIM (BLT) 313144N 0310721E DEGDI 311429N 0311035E CAIRO (CVO) 300532N 0312318E
A18	KADAR (KDR) 322200N0133700E RYHAN 321200N 0133000E TAWUS 315218N 0131736E MIZDA (IZD) 312709N 0130038E FUNGI 303636N 0120824E DERJE 294742N 0111900E (ZARZAITINE (IMN) 280412N 0093954E
A408	(SOLIR 135224N 421918E) SALEH 140000N 0422500E ORNIS 141615N 0423657E HODEIDAH (HDH) 144622.4N 0425911.4E
A410	KAFIA 084400N 0233100E ALMAM 093345N 0244451E RADAG 110340N 0270020E ELOBEID (OBD) 1306410.53N 0301335.25E IMSUT 142048N 0312230E RADKA 145006N 0315040E VATEN 153358N 0323312E
A411	(MITBA 333919N 0111142E) TANLI 332938N 0113000E CLAMS 331700N 0120800E DERKA 330900N 0132202E KAVOX 325700N 0145603E GARUS 324000N 0170000E PRAWN 324000N 0180500E BENINA (BNA) 320728N 0201513E MKILY 315900N 0222000E NASER 315112N 0235518E LOSUL 314100N 0250800E SIDI BARANI (BRN) 313432N 0260020E
A412	TANF (TAN) 332900N 0383920E RAFIF 331247N 0381919E ZELAF 325700N 0380000E DAXEN 3244445N 0374105E NADEK 322728N 0371429E ASLON 321211N 0365111E KUPRI 320825N 0364530E LUDAN 320256N 0363713E GETUP 315833.47N 0363037.47E QUEEN ALIA (QAA) 314423.44N 0360927.59E OSAMA 315550N 0353706E
A414	DEBER 375006N 0580200E BOJNORD (BRD) 372942.2N 05719243.8E EGLUL 372407N 0564855E ORSEK 370517N 0551109E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-4

LOWER/UPPER AIRSPACE	
Designator	Significant Points
1	2
	ALNIT 370022N 0544645E GORGAN (GGN) 365545.7N 0542233.3E IMPIR 364958N 0535846E DATOL 364717N 0534706E DASHT-E-NAZ (DNZ) 3638543.6N 0531120.4E LABET 360950N 0530127E BUBUX 353023N 0524814E DEHNAMEK (DHN) 351515.0N 0524312.0E
A416	TABRIZ (TBZ) 3808543.5N 0461247.6E EGVON 381647N 0475421E ARDABIL (ARB) 3818576.5N 0482605.4E GIVTA 380050N 0484744E GABMI 374115N 0491052E RASHT (RST) 3719354.8N 0493657.4E KOBUB 370621N 0501031E EGMAN 370311N 0501827E RAMSAR (RSR) 3654132.5N 0504050.4E ALKUP 364702N 0510409E NOSHahr (NSR) 363946.4N 0512751.4E IMKER 363938N 0515239 ^E MODEK 363918N 0523407 ^E DASHT E NAZ (DNZ) 3638543.6N 0531120.4E GORGAN (GGN) 365545.7N 0542233.3E LOVEN 363926N 0553355E ODKOL 363136N 0560702E SABZEVAR (SBZ) 361011N 0573415.4E LOXED 355854N 0580609E RIBUX 360112N 0582647E MASHHAD (MSD) 361352.2N 0593902E SOGES 351600N 0595822E SOKAM 331316N 0603754E
A418	KUMUN 254000N 0551515E PAPAR 264000N 0542700E *Note 7 (OI and OM) ~~Segment KUMUN-PAPAR~~ *Note 4 (KUMUN-PAPAR) SHIRAZ (SYZ) 293224N 0523520E
A420	TANLI 332938N 0113000E FARWA 330000N 0121812E ZAWIA (ZAW) 324643N 0123847E TRIPOLI (TPI) 323940N 0130919E LIBDA 323048N 0140000E MISRATA (MIS) 321852N 0150440E YAQUT 321300N 0170000E HAMOR 320900N 0182400E BENHAZI BENINA (BNA) 320728N 0201513E
A422	UROMIYEH (UMH) 374114N 0450504.7E RABEM 374841N 0452949E SETNA 375615N 0455522E TABRIZ (TBZ) 3808543.5N 0461247.6E MURID 382744N 0463525E DARUN 383339N 0464235E DASDA 384135N 0465214E

6.5A-5

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	PARSABAD-E-MOGHAN (PAD) 393443N 0475803E PARSU 393748N 0480448E
A424	LOVEK 322208N 0444001E *Note 4 (LOVEK-LOTAN) LOTAN 295942N 0433848E RAFHA (RAF) 293713N 046074632953E LUDEP 290948N 0430646E TAMRO 283838N 0424047E SIKLI 275801N 0420721E HAIL (HIL) 272530N 0414059E *Note 7 (JDW-HIL) HAMED 265133N 0411706E LAKRO 263051N 0410241E ORMAD 260353N 0404401E GOMRA 253656N 0402534E MIXUG 251537N 0401104E MADINAH (PMA) 243251N 0394219E DEGVU 234245N 0393941E ORMEK 233454N 0393917E RULEB 230059N 0393731E DATAP 223927N 0392910E JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E
A453	(GADER 294100N 0612800E) PIRAN 293407N 0612809E ZAHEDAN (ZDN) 292912.3N 06054065.7E ULOVI 291948N 0603429E DANOV 291444N 0602357E PEKES 285929N 0595221E NABOX 281630N 0582601E DAVEP 274226N 0572009E BANDAR ABBAS (BND) 271149.4N 0562200.3E PAVON 270206N 0561149E GHESHM ISLAND (KHM) 264547.4N 05554287.6E *Note 7 (KHM-BAHKUA) SERDU 264715N 0545757E ROSUM 264741N 0543637E KAPIP 264322N 0521403E MIDSI 264142N 0515442E BOTOB 263350N 0514505E SOLOB 262241N 0513132E TOBLI 262134N 0512301E SOGAT 262029N 0511443E RIKET 261952N 0510954E ASTAD 261812N 0505646E BAHRAIN (BHR) 261530N 0503919E ELOS0 262409N 05035501E DESB0 263240N 0503241E EGMOR 264211N 050290867E LOTOR 264854N 0502200E RAMSI 270249N 0500714E ORNAK 272854N 0493248E SOLEM 275229N 0491136E KUMBO 281705N 0485526E GESAK 283430N 0484353E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-6

LOWER/UPPER AIRSPACE	
Designator	Significant Points
1	2
	DEBTI 284407N 04829245E KUWAIT (KUA) 291457N 0475717E
A454	(PARET 252518N 0645102E) *Note 7 (PARET-PASOV) TAPDO 242400N 0612000E VUSET 235540N 0590812E UMEKO N240620 E0583450 BORER N242623 E0573048 PASOV 243841N 0565037E
A647	NAZAR 363929N 0601926E MASHHAD (MSD) 361352.2N 0593902.4E SABZEVAR (SBZ) 361011.4N 05734154.9E MITUS 360535N0565748E ULANO 354937N 0550052E ODKAT 354650N 0544146E MIRUR 354221N 0541139E RAPKI 353454N 0532208E BUBUX 353023N0524814E VARAMIN (VR) 3520343.6N 05138143.8E IMAMKHOMAINI (IKA) 3524354.8N 05110432.5E RUDESHUR (RUS) 3526443.7N 0505419.3E LOXAM 350415N 0491601E HAMADAN (HAM) 3452010.8N 0483301.0E KERMANSHAH (KMS) 342023.0N 04710098.9E RAGET 333048N 0455348E
A727	CAIRO (CVO) 300532N 0312318E SOLAM 294201N 0313106E RASMI 285901N 0314506E SEMUR 280200N 0320306E NABED 271801N 0321706E LUXOR (LXR) 254458N 0324607E BOVAR 244140N 0322419E LOPID 231900N 0315530E ABU SIMBLE (SML) 222118N 0313719E NUBAR 220000N 0313806E MEROWE (MRW) 182449N 0314949E ALPOX 171131N 0320831E GOPDA 161115N 0325135 GAGNI 135430N 0324706E KHARTOUM (KTM) 153358N 0323312E KENANA (KNA) 130141N 0325423E AVONO 092606N 0335418E KUTOP 0804087.80N 0341704.20E EPSIX 063808N 0344002E AMATO 051836N 0350124E ANTAX 040000N 0352248E LODWAR (LOV) 030627N 0353646E
A775	REXOD 211230N 0613830E TUMET 222307N 0595702E IMDEK 224647N 0592217E OBTIN 230216N 0585920E *Note 7 (OBTIN-KUSRA)

6.5A-7

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	KUSRA 232426N 0582611E
A777	TONVO 250500N 0563200E *Note 7 (TONVO-VAXIM) BUBAS 245938N 0570003E NADSO 244957N 0574926E MUNGA 242516N 0584533E MIXOL 240523N 0592959E VAXIM 231900N 0611100E
A788	HALAIFAH (HLF) 262603N 0391609E LOXOR 270903N 0410002E HAIL (HIL) 272530N 0414059E ORNIL 273503N 0422443E TOTAD 275043N 0433904E LOXOM 275648N 0440832E LOTOK 280834N 0450402E HAFR AL BATIN (HFR) 282126N 0460703E *Note 7 (HFR-PATIR) DERKO 282751N 0465213E SOROR 283417N 0473932E WAFRA (KFR) 283715N 0475729E DEBTI 284407N 0482925E BOXIK 284814N 0484734E DANAL 285128N 0490450E RETEL 285236N 0491048E PATIR 285606N 0492923E KHARK ISLAND (KHG) 291550N 05019010.7E IVERA 292303N 0511540E RUBAK 292617N 0514218E SHIRAZ (SYZ) 2932254.6N 052352019.6E
A791	LALDO 251806N 0563600E GIDIL 251742N 0564923E IMLOT 251708N 0570804E KATUS 251600N 0574700E PEDEX 251211N 0592131E KINOX 250945N 0600942E EGPIC 250811N 0603730E EGRON 250444N 0613245E (BIVIN 25035049.80N 0614744.40E)
B21	INDOT 342000N 0165653E *Note 7 (DOLFI-INDOT) OKLIR 335959.40N 0171049.80E DOLFI 331248N 0174312N PRAWN 324000N 0180500E HAMOR 320900N 0182400E BOURI 314124N 0184259E MARSA BREGA (MB) 302506N 0193421E DAYFA 281918N 0205236E KARUB 273524N 0211524E KUFRA (KFR) 240909N 0231827E ORNAT 200000N 0250000E
B121	OXADU 350837N 0511226E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-8

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	RUDESHUR (RUS) 352644.7N 0505419.3E VEBER 354209N 0504400E DAVMI 355657N 0503401E PAXID 361703N 0502021E ALTIV 364131N 0500330E RARTA 365323N 0495516E RASHT (RST) 371935.8N 0493657.4E SIVIT 373553N 0490511E DASDA 384135N 0465214E MAGRI 385408N 0462300E
B400	MUSCAT (MCT) 233528.04N 0581536.48E ITURA 232351N 0580720E GEPOT N232351 1446N E0580720053E GEVED N2314460105N E058005375111E IZKI (IZK) 2253198.6N 05745432.73E DARAT N222000N E0572830E KEBAS N214330N E0570948E ITSAG N213720N E0570640E MEVLI N211632N E0565606E VUTAP N205411N E0564449E ORSIT N202306N E0562915E HAIMA (HAI) 195813.34N 05616510.82E *Note 7 (HAI-DAXAM) KUKDI N193022N E0555953E ITUVO N190315N E0554328E LABED N182135N E0551827E ASTUN 180832N 0551040E DAXAM 171612N 0544715E MUTVA 165325N 0543201E IMKAD 155245N 0535147E NODMA 1526036N 0533359E RIGAM 143932N 0530414E RAPDO 132317N 0521532E VEDET 120134N 05124210E (MOGADISHU) MOGDU 020024N 0451736E)
B403	(AXIKU 112332N 0493519E) BOMIX 121002N 0502757E ODBEN 123747N 0505648E KAVAN 133250N 0515431E RIGAM 143932N 0530414E
B404	(ESTIK 112206N 0471854E) DEMGO 120258N 0483040E PURKA 131208N 0503042E GESIX 134440N 0512823E RIGAM 143932N 0530414E
B407	JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E DENBU 210129N 0382031E KAROX 205717N 0381547E MAHDI 202600N 0373918E PORT SUDAN (PSD) 192404.42N 0371430.24E
B411	TAKSU 293625N 0343623E

6.5A-9

LOWER/UPPER AIRSPACE

Designator

Significant Points

1

2

*Note 7 (TAKSU-ULINA)
KARIK 292633N 0344541E
ULINA 292451N 0345818E
ELETA 293201N 0352900E
TAMIM 293640N 0354840E
PETRA 294206N 0362210E
DEESA 294509N 0364102E
OBSOT 295451N 0373455E
AL SHIGAR (ASH) 300722N 0384753E
NEVOL 302446N 0393841E
KAVID 303552N 0401147E
ARAR (AAR) 305429N 0410832E
MURIB 311337N 0415136E
RALTI 314208N 0430001E
RUKAM 315008N 0431938
ELODI 320256N 0435126E
LOVEK 322208N 0444001E
LONOR 323839N 0450458E
NOLDO 324932N 0452129E
PAPUS 325334N 0452707E
PAXAT 332056N 0460519E
ILAM (ILM) 333442.3N 0462455.4E
YASER 335850N 0470456E
IVELI 343459N 0482952E
DAXIL 345135N 0493454E
SAVEH (SAV) 350107.8N 0502217.9E
SOGOL 350829N 0503128E
OXADU 350837N 0511226E
NAGIN 350619N 0515308E
DEHNAMAK (DHN) 351515N 0524312E
*Note 7 (DHN-MSD)
GIBAB 353213N 0543656E
ITELO 353534N 0550052E
RABAM 355442N 0572955E
LOXED 355854N 0580609E
RIBUX 360112N 0582647E
MASHHAD (MSD) 361352.2N 0593902E
TANBU 353422N 0603430E
PAMTU 351006N 0610806E

B412 ~~HALAIFA (HLF) 262603N 0391609E~~
~~RABIGH (RBG) 224731N 0390550E~~
~~[KING ABDULAZIZ] (JDW) 214244N 0390723E~~

B413 LADEN 185342N 0380506E
(DULAB 181006N 0390018E)
KOBAS 170428N 0402029E
DANAK 160800N 0412900E
RIBOK 154700N 0415230E
ERSAL 151352N 0422905E
MIPIN 150608N 0423735E
HODEIDAH (HDH) 144622.4N 0425911.4E
UKNAN 141839N 0432901E
ULBIR 135949.2N 0434940E
TAIZ (TAZ) 134150N 0440819E
GOMRI 131816N 0443224E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-10

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	ADEN (KRA) 124952.20N 0450125E UMEBU 121559N 0452325E ZIZAN 115136N 045394200E
B415	DOHA HAMAD INTL (DOH) 251500459.66N 05136354.80E *Note 8 (DOH-BUNDU) KUPSA 250445N 0521151E BUNDU 250024N 0522924E *Note 7 (BUNDU-SIXIV) ASNAX 245659N 0524054E EGPOG 244727N 0531950E UKILI 2438165.5N 0535636.4E KUGTO 243231N 0542224E RURAL 243045N 0543156E SIXIV 242009N 0550439E
B416	KUWAIT (KUA) 291457N 0475717E *Note 7 (KUA-KUVER) BOXIK 284814N 0484734E IMDOX 283455N 0491438E AMBIK 283222N 0492025E *Note 8 (AMBIK-KUVER) KUVER 280924N 0500600E IMDAT 274100N 0511100E DURSI 271219N 0520144E PEGET 270434N 0521515E EGMIT 263340N 0530825E LEVNA 261535N 0533857E ORSAR 260430N 0535730E ~~PEBAT 255153N 0542357E~~ ~~DESDI 253603N 0544230E~~
B417	EGVEL 344258N 0503005E UKITA 330657N 0500041E IMKEN 314407N 0493611E BANDAR MAHSHAHR (MAH) 3033232.8N 0490858E UKNAR 295538N 0490450E TULAX 293853N 0490301E DESLU 292800N 0490150E EGVAL 292448N 0484545E ALVAX 292030N 04824422E KUWAIT (KUA) 291457N 0475717E *Note 3 (OKAC) BONIM 285929N 0472925E BOSID 284234N 0465228E HAFR AL BATIN (HFR) 282126N 0460703E KING SAUD AB (KMC) 275250N 0453321E EMARO 273342N 0451330E ALKIR 270758N 0444343E RARLO 265939N 0443410E ASNID 264600N 0441835E GASSIM (GAS) 261753N 0434647E *Note 7 (JDW-GAS) AMBIV 254816N 0431649E KINO B 253146N 0430018E KURDO 245306N 0422158E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-11

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	BIR DARB (BDB) 241951N 0414928E ASVIV 235532N 0412121E DASOR 234116N 0410459E PATOR 231639N 0403657E EGREP 222754N 0395007E JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E
B418	PAMTU 351006N 0610806E BIRJAND (BJD) 325821N 0591201E IMPAT 322451N 0580856E NADSA 321438N 0575002E DARBAND (DAR) 314659N 0565940E PURBO 311346N 0565832E ALGUV 304702N 0565734E KERMEN (KER) 301658N 0565632E
B419	KING FAHD (KFA) 262951N 0494643E *Note 7 (KFA-RAMSI) NAGTO 263717N 0495137E KASES 264538N 0495709E ITESA 265016N 0500014E METLA 265645N 0500433E RAMSI 270249N 0500714E
B424	ITOLI 152825N 0450927E MEGPA 160017N 0461653E LABRA 161813N 0465113E IMTAN 163253N 0471943E ALSOD 164203N 0473753E TASBI 165853N 0481118E KANEM 173700N 0492655E IMPOS 183137N 0511848E SABEL 185158N 0520339E NOVNO 193313N 0535858E OTISA 201000N 0554556E KASIN 201853N 0555742E VELIK 203322N 0561656E TUBSA 204029N 0562626E VUTAP 205411N 0564449E *Note 7 (VUTAP-GISKA) GISKA 213503N 0574014E
B441	NABOX 281630N 0582601E SILKO 295558N 0584138E BOPAG 304413N 0584929E KUVAV 313426N 0585747E BIRJAND (BJD) 325821N 0591201E BOPEB 331913N 0591448E ASVIS 334633N 0591828E NOTSO 351416N 0593034E MASHHAD (MSD) 361352N 0593902E ALMUX 362736N 0605121E OTRUZ 363108N 0610956E MARAD 363730N 0612748E
B451	DEHNAMAK (DHN) 3515145N 0524312E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-12

LOWER/UPPER AIRSPACE	
Designator	Significant Points
1	2
	RAPKI 353454N 0532208E ITMEL 360729N 0542812E SHAHROUD (SHR) 362522.3N 0550520.5E RIBOB 371705N 0565226E BOJNORD (BRD) 372942.2N 0571924.8E DEBER 375006N 0580200E (ASHGABAT) (ASB) 380011N 0582008E
B457	NARMI 261802N 0501939E BAHRAIN (BHR) 261530N 0503919E TULUB 260644N 0510041E DENVO 260452N 0510509E PATOM 255821N 0511836E EMISA 254658N 0514207E
B505	LALDO 251806N 0563600E *Note 7/8 (LALDO-PASNI) NADSO 244957N 0574926E ITLOB 244325N 0590701E EGTAL 243458N 0603724E APELO 243455N 0612000E (PASNI (PI) 251717N 0632055E)
B524	NADSO 244957N 0574926E *Note 7 (NADSO-ALPOR) DAMUM 243236N 0591307E ASLOM 242113N 0600552E VEKAN 241235N 0604454E ALPOR 240441N 0612000E
B526	KHARTOUM (KTM) 153358N 0323312E DENDI 153006N 0341642E KASSALA (KSL) 152427.47N 0362014.05E TESON 152054N 0371042 (ASMARA (ASM) 151704.04N 0385403.92E) (ZULAC 150136N 0410106E) (PURAD 145500N 0415354E) FARES 145400N 0420100E EMABA 1451387N 0421943E HODEIDAH (HDH) 144622.40N 0425911.40E UMILI 144609N 0435133E SOKAT 144606N 0440145E PAVEN 144602N 0441112E OBNAM 144541N 0444448E PEBIX 1444478N 0454637E DASIT 144412N 0462931E IVORA 144342N 0470342E MEGPO 144257N 0473438E RASBA 144124N 0484128E MUKALLA (RIN) 144015.30N 0492329.30E DANAN 144010N 0495334E KUSOL 144009N 0501534E KIRAD 143954N 0511241E TATNA 144000N 0515200E RIGAM 143932N 0530414E

6.5A-13

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
B527	KHARTOUM (KTM) 153358N 0323312E SUVRI 135436N 0321800E RABAK 130110N 0320957E MALAKAL (MLK) 093347.40N 0313911.44E JUBA (JUB) 045234N 0313559E OVELA 040000N 0311454E (~~GOTOD 014501.20N 030515049.80E~~)
B535	JUBA (JUB) 045234N 0313559E TAPOS 055408N 0332002E DAGAP 062400N 0341200E (EPSIX 064014N 0343956E) (IMTOR 064641N 0345102E) (APKOD 074053N 0362448E) (KOFTA 081258N 0372041E) (ITPOT 084406N 0380951E) (GAWASA (GWZ) 090622.33N 03846121.71E) (ASOLE 095626N 0401357E) (NIDEG 103632N 0412400E) (LAKBE 110224N 0420939E) (DJIBOUTI (DTI) 11325465.67N 043053376.77E) (KASOL 115248N 0433546E) TORBA 121036N 0440206E KATAN 122724N 0442728E ADEN (KRA) 124952.20N 0450125E BANAR 130604N 04538554E TAMIM 134754.0N 0471703E ULAXI 141524N 0482317E BAROM 142432N 0484533E MUKALLA (RIN) 144015.30N 0492329.30E NAKAD 150056N 0500402E EGMIX 151811N 0503810E NANRI 160754N 0521603E ASMAK 162327N 0524634E KAPET 163322N 0530614E LADAR N165324 E0534655 SALALAH (SLL) 170259.35N 05406576.94E *Note 7 (ASTUN-SLL) DARAB 174632N 0544902E ASTUN 180832N 0551040E
~~B538~~	~~ALEPPO (ALE) 3610476.86N 03712343.76E~~ ~~KARIATAIN (KTN) 3412487.82N 0371551.15E~~
B540	GERAR 240600N 0573616E *Note 7 (GERAR-MIVEK) DEGNU 242734N 0570613E PASOV 243841N 0565037E KUPMA 245148N 0562648E ORKOB 245309N 0562421E MIVEK 245240N 0561516E
B541	LAR (LAR) 2740310.7N 05424554.7E NABEX 271157N 0541334E DELBU 265021N 0540506E KISH ISLAND (KIS) 2631310.6N 05357454.7E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-14

LOWER/UPPER AIRSPACE	
Designator	Significant Points
1	2
	ORSAR 260430N 0535730E
B544	(KILIS 364213N 0372402E) TUSYR 363915N 0372341E ALEPPO (ALE) 361047N 0371234E TUDMU 343100N 0380754E TANF (TAN) 332900N 0383939E NAMBO 331826N0383939E DAPUK 330139.44N 0384026.29E MODAD 323540.39.88N 0384138.14E SODAR 315602N 0384326E TURAIF (TRF) 314146N 0384408E EGPOL 311048N 0384522E ORKAS 304725N 0384617E AL SHIGAR (ASH) 300722N 0384753E LABAD 291922N 0385411E ENABI 290639N 0385550E SOBAS 275600N 0390453E HALAIFA (HLF) 262603N 0391609E *Note 7 (PMA-HLF) BELAL 254629N 0392523E ALTEP 252157N 0393103E MADINAH (PMA) 243251N 0394219E *Note 7 (PMA-JDW) SISUD 234505N 0392538E ASLAD 233742N 0392305E RABIGH (RBG) 224731N 0390550E NOMDA 224257N 0390556E JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E *Note 7 (NOBSU-JDW) BOSUT 204705N 0393158E LOVIL 201553N 0394537E TORBI 195514N 0401610E QUNFIDAH (QUN) 192211N 0410429E RABGO 191452N 0411452E ITESO 184436N 0415732E ABHA (ABH) 181431N 0423925E LALGI 173029N 0430453E NOBSU 171554N 04313158E MIXON 163035N 0432931E IMSIL 155738N 0434112E IMKAR 153511N 0435039E MUTEX 152524N 0435445 NAGIL 152024N 0435651E MISAN 150001N 0440522E PAVEN 144602N 0441112E GEVEL 141229N 0442547E MOGEM 132655N 0444529E ADEN (KRA) 124952.20N 0450125E
B547	PERSIAN GULF (PRG) 272137N 0524552E LAVAN ISLAND (LVA) 264843N 0532121E ALNOL 264055N 0533757E KISH ISLAND (KIS) 263130N 0535745E IBNUX 261617N 0541208E SIRRI ISLAND (SIR) 255453N 0543207E

6.5A-15

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
B549	THAMD 171700N 0495500E ITELI 171310N 0502605E GOGRI 170752N 0510857E TONRO 165850N 0522235E PUTRA 165432N 0525631E LADAR 165324N 0534655E MUTVA 165325N 0543201E KIVEL 165306N 0553633E
B727	(ZARZAITINE (IMN) 280359.60N 0093939.30E) NGIRT 285200N 0112700E HAMRA 293200N 0125000E SWIRF 295300N 0134300E ALBEY 302600N 0150000E TAMIT 304412N 0154654E SIRTE (SRT) 310333N 163552.20E CILBA 311800N 0172400E BOURI 314124N 0184259E BENGHAZI BENINA (BNA) 320728N 0201513E EL BEDIA (LAB) 324641N 0220113E
G55	ABADAN (ABD) 302231.4N 0481314.2E UKNAR 295538N 0490450E KHARK ISLAND (KHG) 291550.0N 0501901.0.7E BUSHEHR (BUZ) 285705.7N 05049343.5E TOTNO 291052N 0515336E SHIRAZ (SYZ) 293225.6N 0523520.49.6E
G183	(KAROL 3252.00N 03229.00E) PASOS 311300N 0330600E NADOL 311734N 0334100E EL ARISH (ARH) 310423N 0334955E TABA (TBA) 293624N 0344751E
G202	(VELOX 3349.00N 03405.00E) SILKO 334754.9N 03435.00E ELIKA 334455N 0343500E KHALDEH (KAD) 334827N 0352910E *Note 4 (OSKAD-DAM) DAKWE 3338.956N 03554595.0E DAMASCUS (DAM) 332154N 0362807E SOFIA 332301N 0364941E ABBAS 332610N 0374320E SULAF 332718N 0381027 TANF (TAN) 332900N 0383920E MODIK 332806.4N 0390100E RAPLU 332300N 0414530E PUSTO 332100N 0424500E DELM I 331918N 0431328E LAGLO 331539N 0441457E ITOVA 331951N 0444129E SINKA 332137N 0444753E RAGET 333048N 0455348E ILAM (ILM) 333442.3N 0462455.4E ALTET 333209N 0470047E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-16

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	MIPON 332801N 0475344E KHORAM ABAD (KRD) 332603.4N 04817310.7E UKSIS 332159N 0484002E NOTSA 331745N 0490315E RASLA 331202N 0493409E UKITA 330657N 0500041E BOMID 325904N 0504029E IMRAG 325142N 0511643E ESFAHAN (ISN) 334449.4N 05149410.8E PARUG 324704N 0522947E LABOT 324839N 0530053E ALNER 325124N 0540202E MITET 325226N 0542850E NODLA 325330N 0545850E ORSOK 325502N 0554532E IMSOG 325636N 0564649E ROSOS 325815N 0584814E BIRJAND (BJD) 3258210.7N 05912010.5E KAMAR 323900N 0604400E
G208	(PANJGUR (PG) 265710.24N 0640813.06E) KEBUD 273552N 0625024E DANIB 290706N 0611717E ZAHEDAN (ZDN) 292912.3N 06054065.7E DAPAP 294630N 0602554E TOVUS 300643N 0595235E BOPAG 304413N 0584929E DARBAND (DAR) 314659.4N 0565940.4E NIVRA 315905N 0563810E SOGOT 324008N 0552339E NODLA 325330N 0545850E ROVAD 333131N 0535240E RADAL 345423N 0522023E ELEDI 350136N 0520356E IMAM KHOMAINI (IKA) 3524354.8N 05110432.5E VEBER 354209N 0504400E GOLNU 355711N 0502052E PAROT 361128N 0495841E LOXUB 363640N 0484942E ZANJAN (ZAJ) 3646476.8N 04821121.9E AMBEX 370356N 0472143 GETOB 371227N 0465129E PARAS 373133N 0454134E TOTBO 373455N 0452858E UROMIYEH (UMH) 374114N 04505043.7E ALRAM 374230N 0443736E (SHRT)
G216	LAKLU 232235N 0570401E IVAKU 232919N 0574103E MUSCAT (MCT) 233528.04N 0581536.48E *Note 7 (LAKLU-SIDKA) ITILA 234055N 0584817E SODEB 234747N 0593023E DERTO 235033N 0594746E ALPOR 240441N 0612000E

6.5A-17

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	(SIDKA 240844N 0614745E)
G452	SHIRAZ (SYZ) 293225.4.60N 0523520.19.60E NALBI 294650N 0535357E RIKAS 295337N 0543224E DAVUT 300214N 0552301E GETIS 301145N 0562226E KERMEN (KER) 301658.4N 0465632.3E ALKES 301045N 0573025E ORDAD 300608N 0575454E SILKO 295558N 0584138E DANUS 293628N 0602030E ZAHEDAN (ZDN) 292912.3N 0605406.5.7E DERBO 292542N 0611701E (SOKIR 290801N 0642502E)
G462	ROVOS 241825N 0552143E *Note 7 (ROVOS-TUMAK) TUBGO 242403N 0551219E ULODA 243530N 0545301E KUVDA 244309N 0543909E ORBOL 245134N 0542348E UKUVO 251228N 0534707E OXARI 252535N 0533458E PURLI 253644N 0532436E TUMAK 255031N 0531108E
G482	TABRIZ (TBZ) 380854.5N 0461247.6.6E MAGRI 385408N 0462300E
G650	JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E RIBAM 204231N 0390551E RASKA 190732N 0390329E (DULAB 181006N 0390018E)
G652	ADEN (KRA) 124952.20N 0450125E IVOSO 131734N 0453107E BORIL 132617N 0454029E IVORA 144342N 0470342E MENTA 150322N 0472434 DEKMA 152226N 0474553E NABUP 155417N 0482143E DANIN 160544N 0483438E GIBAX 162047N 0485137E IVINA 163253N 0490514E THAMD 171700N 0495500E IMPOS 183137N 0511848E DUDRI 190000N 0520000E *Note 7 & 8 (NALKI-DUDRI) DAVOX 194400N 0524817E MIPUB 200004N 0530607E GEROL 201443N 0532243E OBSUS 203905N 0534952E LONOV 211856N 0543516E KOBES 214504N 0550526E TOKRA 220925N 0553350E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-18

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	*Note 7 (NALKI-TOKRA) DEBAV 221532N 0554617E DATBU 222243N 0560054E NAMVA 223309N 0562223E NALKI 224928N 0565614E TULBU 230005N 0571827E GEPOT 231446N 0580053E KUSRA 232426N 0582611E SODEB 234747N 0593023E *Note 7 (TAPDO-SODEB) VEKAN 241235N 0604454E TAPDO 242400N 0612000E
G655	(ILDOR 200937.20N 180119.20E) GARIN 220000N 0170636 ELGAN 245000N 0153754E TOTOD 260051N 145942.60 SEBHA (SEB) 265944N 0142735E HAMRA 293200N 0125000E EBITO 301222.80N 122406.60E FUNGI 303636N 0120824E GALPO 311534.20N 0113851E FARES 320949N 0105652E (INSAT 330352.20N 0101135.40E)
G656	JUBA (JUB) 045234N 0313559E ATUGA 040000N 0314800E
G660	(ARBEG 131355N 0205740) GENEI 132859N 0222748E EL FASHIR (FSR) 133554.09N 02518110.66E EL OBEID (OBD) 1306410.53N 0301335.25E IMSUT 142048N 0312230E RADKA 145006N 0315040E KHARTOUM (KTM) 1533587.93N 0323312.46E BOPID 163948N 0335142E PORT SUDAN (PSD) 192404.42N 0371430.21E BOGUM 200636N 0380300E MIPOL 203322N 0382145E *Note 7 (MILPOL-JDW) EGMEG 205130N 0383336E JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E
G662	BUSRA 322000N 0363700E KUPRI 320826N 0364530E DESLI 314900.40N 03659010.60E ALKOT 313254N 0371122E GURIAT (GRY) 312445N 0371712E *Note 7 (ASH-GRY) ITUNO 310913N 0373542E AL SHIGAR (ASH) 300722N 0384753E ODBAT 293221N 0392626E NIMAR 290635N 0395425E EGVOP 275458N 0411024E HAIL (HIL) 272530N 0414059E DAROP 270505N 0421936E MODIV 263842N 0430840E

6.5A-19

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2

GASSIM (GAS) 261753N 0434647E
 *Note 7 (GAS-KIA)
 KUSRO 255138N 0444328E
 VELOS 252126N 0454712E
 KING KHALID (KIA) 245310N 0464534E

G663 UМЕНА 262832N 0483952E
 *Note 7 (UMENA-ULADA)
 TABTA 262837N 0484325E
 *Note 7 (TABTA-ULADA)
 KING FAHD (KFA) 262951N 0494643E
 RABKA 263531N 0495728E
 *Note 8 (ALSER)
 ULADA 264527N 0501624E
 LOTOR 264854N 0502200E
 RAKAK 265221N 0502618E
 TOLMO 265504N 0502927E
 KOBOK 265839N 0503349E
 GETAL 270410N 0504040E
 *Note 7 (DASDO-GETAL)
 VEDOR 270855N 0504630E
 ALSER 271100N 0504900E
 IMDAT 274100N 0511100E
 DEPSU 283409N 0515047E
 DASDO 285401N 0520551E
 SHIRAZ (SYZ) 293225.4.6N 0523520.19.6E
 KINOT 303207N 0531731E
 DEDAK 305600N 0533439E
 BONEG 312826N 0535815E
 YAZD (YZD) 315352.4.6N 0541658.7.7E
 BOMIT 321257N 0544414E
 DANEM 322854N 0550717E
 SOGOT 324008N 0552339E
 ORSOK 325502N 0554532E
 ALMUD 331758N 0561941E
 RIBEN 332902N 0563620E
 TABAS (TBS) 334021.2N 05653310.9E
 PATEN 340825N 0572334E
 TASLU 342531N 0574131E
 RAMIL 352909N 0584941E
 MASHHAD (MSD) 361352.2N 0593902E

G665 ARAR (AAR) 305429N 0410832E
 *Note 4 (AAR-ABD)
 ABADAN (ABD) 30221631.4N 048134214.2E
 DEMPO 301717N 0484329E
 VATAN 300800N 0493533E
 BOTAS 295241N 0505515E
 KAVIL 294820N 0511704E
 EGSIR 294615N 0512735E
 SHIRAZ (SYZ) 293225.4.6N 0523520.19.6E
 *Note 5 (Q1SYZ-VAVAS)
 VAVAS 291650N 0535340E
 BOTUX 285828N 0552205E
 SOLAK 285156N 0555215E
 ASMET 284758N 0561019E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-20

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2

NANTO 284140N 0563831E
RIGUT 283136N 0572226E
NABOX 281630N 0582601E
LOXOL 274556N 0604538E
ASVIB 265724N 0631812E
(PANJGUR (PG) 265710-24N 0640813-06E)

G666 SHIRAZ (SYZ) 2932254.6N 052352019.6E
KUPTO 282418N 0525432E
LAMERD (LAM) 272222.2N 0531102.3E
LAVAN ISLAND (LVA) 264843.4N 0532121.4E
DATUT 263332N 0533538E
ELIRA 262105N 0534502E
ORSAR 260430N 0535730E
LUDAM 255508N 0535859E
KIVUS 254522N 0540032E
TOTKU 253534N 0540410E
ULIVA 252647N 0540611E
VEGEK 251837N 0540803E
REVAV 250909N 0541012E
ITOMI 250152N 0541151E
ELOVU 245721.3N 05420187.5E

G667 PUTMA 374800N 0515736E
NOSHAHR (NSR) 363946.4N 0512751.4E
DANEH 362001N 0512408E
NAGMO 360214N 0512055E
TEHRAN (TRN) 354149.4N 05117024.6E
RUDESHUR (RUS) 3526443.7N 0505419.3E
SOGOL 350829N 0503128E
SAVEH (SAV) 3501076.8N 05022176.9E
ARAK (ARK) 34081443.9N 049511443.8E
RASLA 331202N 0493409E
ALTAX 323014N 0492142E
NAGRO 321015N 0491549E
RABIM 315839N 0491225E
EGVAX 314337N 0490802E
AHWAZ (AWZ) 312015.3N 04845532.5E
GABSU 305319N 0483035E
ABADAN (ABD) 30221631.4N 048134214.2E
*Note 4 (ABD-ALSAN)
ALSAN 295707N 0481456E
RALKA 292611N 0481819E
KUWAIT (KUA) 291457N 0475717E
WAFRA (KFR) 283715N 0475729E
*Note 7 (KFR-KIA)
KATOD 283141N 0475554E
COPPI 275033N 0474359E
EMENI 273234N 0473848E
RADGI 272640N 0473708E
MANNI 270812N 0473152E
LUGAL 264603N 0472235E
MAGALA (MGA) 261720N 0471225E
AVOBO 260334N 0470719E
ESRAT 255117N 0470247E
KING KHALID (KIA) 245310N 0464534E

6.5A-21

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	MUNTO 235345N 0463459E ~~DEBAS 231059N 0462728E~~ ~~ESIKNU 233328N 0463125E~~ KITUB 224922N 0462342E ~~TUGUP 215522N 0455541E~~ TABNA 211842N 0453653E WADI ALDAWASIR (WDR) 203019N 0451219E TASMU 190016N 0450120E NEJLAN (NEJ) 173625N 0442456E NETAS 1726003N 04423054E ELONA 165753N 0442124E LABDO 164842N 0442032E XABIP 161001N 0441653E ASREM 154637N 0441443E SANA'A (SAA) 153000N 0441311E MISAN 150001N 0440522E SOKAT 144606N 0440145E DEPDA 143206N 0435807E ULBIR 13594920N 0434940E PARIM 123142N 0432712E (DJIBOUTI (DTI) 1132554.67N 04305376.77E)
G669	AL SHIGAR (ASH) 300722N 0384753E AL JOUF (AJF) 294722N 0400418E VELAL 294602N 0403821E PAXAN 294418N 0411833E TOKLU 294213N 0420220E RAFHA (RAF) 293713N 0432953E NISER 293030N 0441825E *Note 3 (OKAC) SOLAT 290942N 0463810E BUBER 291118N 0470057E KUWAIT (KUA) 291457N 0475717E SESRU 290909N 0485450E NANPI 290457N 0493157E VELUT 291001N 0495341E KHARK ISLAND (KHG) 291550N 05019010.7E IVERA 292303N 0511540E RUBAK 292617N 0514218E SHIRAZ (SYZ) 2932254.6N 052352049.6E
G670	RASHT (RST) 371934.8N 0493657.4E MODIL 374925N 0494117E LALDA 381615N 0494511E
G674	~~MADINAH (PMA) 243251N 0394219E~~ ~~*Note 7 (BPN PMA)~~ ~~KUKNI 245451N 0403140E~~ ~~EMURI 250545N 0405627E~~ ~~ROSUL 253945N 0421519E~~ ~~MUNPI 260112N 0430621E~~ ~~GASSIM (GAS) 261753N 0434647E~~ ~~MOBAD 263607N 0442629E~~ ~~SERPU 264608N 0444833E~~ ~~BOPAN (BPN) 270314N 0452643E~~
G775	ASHGHABAT (ASB) 380011N 0582008E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-22

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	ORPAB 374200N 0583430E MIDMO 370543N 0590124E MASHHAD (MSD) 361352.2N 0593902E NOTSA 351416N 0593034E ASVIS 334633N 0591828E BOPEB 331913N 0591448E BIRJAND (BJD) 3258210.7N 05912010.5E *Note 4 ODBES 323050N 0592556E ELOKA 312325N 0595922E LUDAX 295658N 0604101E ZAHEDAN (ZDN) 292912.3N 06054065.7E
G781	(VAN) BONAM 380256300N 0441759800E TUDNU 375301N 0444447E UROMIYEH (UMH) 374114N 04505043.7E TUBAR 373018N 0452609E ROVON 371601N 0455322E ZANJAN (ZAJ) 3646476.8N 04821121.9E LABKA 364142N 0504342E NOSHAHR (NSR) 363946.4N 0512751.4E
G782	JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E *Note 7 (KFR-JDW) KAPAV 220645N 0394620E VEMEM 221554N 0400118E BOPEV 225127N 0410011E DAFINAH (DFN) 231658N 0414310E ASMUN 233116N 0424514E TUKVU 234626N 0435319E RAGAHBA (RGB) 235533N 0443547E DURMA 242710N 0454610E KING KHALID (KIA) 245310N 0464534E ESRAT 255117N 0470247E AVOBO 260334N 0470719E MAGALA (MGA) 261720N 0471225E LUGAL 264603N 0472235E MAANI 270812N 0473152E RADGI 272640N 0473708E EMENI 273234N 0473848E COPPI 275033N 0474359E KATOD 283141N 0475554E WAFRA (KFR) 283715N 0475729E KUWAIT (KUA) 291457N 0475717E
G783	PURDA 210805N 0510329E ASNUR 212654N 0514335E SILBU 214512N 0522304E ALROK 215400N 0524217E IMGOV 221828N 0533624E DANUX 223605N 0541558E TANSU 224136N 0542828E RIGIL 230146N 0551430E UKRAG 233056N 0552306E ELUDA 235107N 0552905E

6.5A-23

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	ASPED 240036N 0553154E VAVIM 241535.4N 05536232.9E *Note 7 (GIDIS-VAVIM) DESVU 242222N 0554253E GIDIS 243600N 0555600E
G792	~~BODKA 3939.0N 05130.0E~~ GIRUN 380612N 0562018E BOJNORD (BRD) 372942.2N 05719243.8E SILPO 370806N 0580006E BOTEK 364755N 0583734E MASHHAD (MSD) 361352.2N 0593902E TANBU 353422N 0603430E PAMTU 351006N 0610806E
G795	RALKA 292611N 0481819E *Note 7 (RALKA-BSR) TASMI 300120N 0475505E BASRAH (BSR) 303132.30N 0472112.40E *Note 4 (BSR-RAF) RAFHA (RAF) 293713N 0432953E
G799	~~MADINAH (PMA) 243251N 0394219E~~ ~~*Note 7 (ELONU-PMA)~~ ~~ELONU 240942N 0403053E~~
L12	TONBA 213518N 0195112E *Note 7 (SUDIK-TONBA) AKMID 253829.40N 185330.60E KEPOS 272206N 182810.20E DAHRA (DHR) 292803N 175554E NAGDA 321500N 0162328E LOTIN 342000N 0150959E (SUDIK 352429.40N 143028.20)
L31	LOTIN 342000N 0150959E *Note 7 (LOTIN-MIS) IVAKI 325530N0150618E MISRATA (MIS) 321852N 0150440E
L124	(VAN 382757.6N 0431930.6E) BONAM 380256300N 0441759800E TUDNU 375301N 0444447E PARAS 373133N 0454134E GETOB 371227N 0465129E AMBEX 370356N 0472143 ZANJAN (ZAJ) 3646476.8N 04821124.9E TULGU 362836N 0484235E SAVEH (SAV) 3501076.8N 05022176.9E EGVEL 344258N 0503005E PEKAM 332904N 0510118E SIVUD 330119N 0520009E PARUG 324704N 0522947E RANDU 323240N 0525917E YAZD (YZD) 3153524.6N 05416587.7E BOMUN 313648N 0544555E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-24

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	UKVEV 310557N 0553718E ALMOB 303434N 0562824E KERMEN (KER) 301658.4N 0465632.3E PEKES 285929N 0595221E SODOK 281113N 0613652E KEBUD 273552N 0625024E (PANJGUR (PG) 265710.24N 0640813.06E)
L125	(NAKHCHIVAN (NAX) 390954.30N 0452909.40E) DULAV 385700N 0453800E RABDI 384804N 0454431E SIBVU 384444N 0454657E BUDED 375313N 0472032E MURPU 373043N 0480319E ASPOK 365918N 0484948E PAROT 361128N 0495841E GOLNU 355711N 0502052E VEBER 354209N 0504400E IMAM KHOMAINI (IKA) 352435.48N 05110432.5E ELEDI 350136N 0520356E RADAL 345423N 0522023E ROVAD 333131N 0535240E NODLA 325330N 0545850E SOGOT 324008N 0552339E NIVRA 315905N 0563810E DARBAND (DAR) 314659.4N 0565940.4E BOPAG 304413N 0584929E TOVUS 300643N 0595235E DAPAP 294630N 0602554E ZAHEDAN (ZDN) 292912.3N 06054065.7E DANIB 290706N 0611717E KEBUD 273552N 0625024E
L126	PUSTO 3321.00N 04245.00E SOGUM 3412.12N 0435454.9E SIGNI 340006.1N 0444200.2E MIGMI 334554.9N 0452724.4E ILAM (ILM) 333442N 0462455E
L200	OSAMA 315550N 0353706E AMMAN (AMN) 3200154.65N 03603587.55E LOXER 320256N 362500E MESLO 320231N 0363148E LUDAN 320256N 0363713E KUPRI 320825N 0364530E ASLON 321211N 0365111E NADEK 322728N 0371429E DAXEN 324444N 0374105E ORNAL 324755N 0375153E KAREM 325110N 0380324E KUMLO 325811N 0382807E DAPUK 330139N 0384026E PASIP 330600N 0385600E GIBUX 330500N 0411100E SIGBI 330200N 0422000E SILBO 325900N 0432900E

6.5A-25

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
L223	(AGRI (ARI) 3938454.90N 04301387.50E) *Note 7 (ARI-DASIS-UMH) DASIS 385435N 0441230E *Note 7 (UMH-DASIS) UROMIYEH (UMH) 374114N 0450503E KAPES 372520N 0452004E REXAN 355850N 0463935E TAVNI 353807N 0465631E TUKLO 351014N 0471751E UKSIS 332159N 0484002E ALTAX 323014N 0492142E KIXOB 310917N 0502459E EGSIR 294615N 0512735E RUBAK 292617N 0514218E TOTNO 291052N 0515336E DASDO 285401N 0520551E LAGSA 283306N 0522056E LAMERD (LAM) 272222.2N 0531102.3E KISH ISLAND (KIS) 2631310.6N 05357454.7E SIRRI (SIR) 2554521N 0543211E TATLA 254753N 0544008E *Note 7 (TATLA-TARDI) VUTEB 2536454.6N 054515049.4E LOVEM 252645.4N 0551440.4E IVOXI 25124039.6N 0552513.4E LAGTA 250602N 0553315E ANVIX 244655.0N 0555616.0E PEDUL 244116N 0560205E KIPOK 243611N 0560719E TARDI 243418N 0560915E ~~LAKLU 232235N 0570401E~~
L300	LUXOR (LXR) 254458N 0324607E *Note 7 (YEN-LXR) MEMPO 252518N 0335457E OTEMO 250341N 0350810E GIBAL 243713 N0363443E YENBO (YEN) 240858N 0380219E
L301	(ANKOX 220256N 0662842E) RASKI 230330N 0635200E VAXIM 231900N 0611100E *Note 7 (VAXIM-RAGMA) RAGMA 232301N 0603846E
L305	DOHA HAMAD INTL (DOH) 251500459.66N 05136354.80E *Note 7 (DOH- EMOTA) *Note 8 (DOH-ASTOG) ORMAL 252304N 0522201E ENANO 252348N 0522559E ALSEM 252703N 0524322E ASTOG 252822N 0525025E PURLI 253644N 0532436E GODKI 254122N 0534347E KIVUS 254522N 0540032E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-26

LOWER/UPPER AIRSPACE	
Designator 1	Significant Points 2
	ITBUL 254910N 0541227E EMOTA 255254N 0542414E
L306	TOKRA 220925N 0553350E *Note 7 (TOKRA LAKLU) DEMKI 224941N 0562308E LAKLU 232235N 0570401E
L308	DAROR 270244N 0495815E *Note 7 (NAGSA DAROR) EGREX 270433N 0492158E SILBA 270554N 0485301E GESOR 270322N 0475751E SIBLI 265459N 0462334E ALMUL 262943N 0450553E NAGSA 261811N 0443117E GASSIM (GAS) 261753N 0434647E DEGSO 261054N 0531946E QBNET 260032N 0534514E ITITA 254410N 0541839E DESDI 253603N 0544230E RAGOL 252743N 0550739E SERSA 251945N 0553118E TUKLA 251936N 0554010E NADNI 251915N 0555658E LALDO 251806N 0563600E IMLOT 251708.1N 0570804.1E KATUS 2516005.9N 05747.00E DIVAB 2510.7N 05952.1E EGPIC 2508.6N 06029.5E (JIWANI) (JI) 250350N 0614744E LATEM 243144.7N 0644944.7E
L310	BOXAK 244536N 0540032E *Note 7 & 8 to LALDO SIGBO 245526.4N 0545653.9E NALTA 250242.7N 0553955.8E AVAMI 250554.9N 0555647.8E LALDO 251806N 0563600E
L311	KAROX 205717N 0381547E MAHDI 202600N 0373918E PASIL 161331N 0332010E VATEN 153358N 0323312E RADKA 145006N 0315040E IMSUT 142048N 0312230E ELOBEID (OBD) 1306410.53N 0301335.25E RADAG 110340N 0270020E ALMAM 093345N 0244451E KAFIA 084400N 0233100E
L313	TARDI 243418N 0560915E KIPOK 243611N 0560719E IMPED 2458254.5N 0560406.2E KULBA 251326N 0560153E EGPEP 2557476.8N 05558232.5E

6.5A-27

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
L314	NABAN 1631234N 043015048E DAROV 160637N 0431338E GOBLO 154050N 0432550E LUDOX 152034N 0433524E RAMLO 151033N 0434007E UMILI 144609N 0435133E DEPDA 143206N 0435807E EGNOL 140745N 0440929E NOPVO 135436N 0441535E GOMRI 131816N 0443224E
L315	CAIRO (CVO) 300532N 0312318E *Note 7 (CVO-HGD) OBTAV 280120N 0330657E SOKOT 273104N 0333127E HURGHADA (HGD) 271040N 0334747E SOBEL 265011N 0341040E *Note 7 (GIBAL-SOBEL) MOGAP 260055N 0350455E GIBAL 243713N 0363443E
L317	MAHDI 202600N 0373918E AZAZA 173046N 0335009E ASNON 150818N 0305312E ITGAL 125209N 0281244E KAPIB 104917N 0255200E LOVAB 100147N 0245828E KAFIA 084400N 0233100E
L319	BAHRAIN (BHR) 261530N 0503919E *Note 7 (BAHR-DASDO) DAVRI 264936N 0505732E OBTAR 265934N 0510309E DASDO 285401N 0520551E IMGOD 301419N 0513050E RADID 302444N 0512613E NOTSA 331745N 0490315E KEBEP 350454N 0474014E PAREX 360527N 0465154E ROVON 371601N 0455322E PARAS 373133N 0454134E TUDNU 375301N 0444447E BONAM 380300N 0441800E
L320	KAROX 205717N 0381547E RAKTA 190506N 0352358E SOGAD 171404N 0324125E DATIM 152833N 0301323E DELAM 144001N 0290644E HASAN 130129N 0265813E KISAL 101811N 0232526E
L321	OBRAN 302957N 0290522E *Note 7 (SML-OBRAN) REXUM 301822N 0291917E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-28

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	KUNKI 290726N 0291949E SOBAM 264529N 0301336E EGNAM 262856N 0301942E GIBAD 253635N 0303807E KUNAK 252745N 0304112E LUGAV 224205N 0313722E ABU SIMBEL (SML) 222118N 0313719E
L323	TONTU 223446N 0284313E ~~SISIDENABU~~ 220000N0280838E ~~ELOXO~~ 183827N 0255031E ASKOL 154854N 0240005E
L324	(TEZAK 332751.40N 03147121.60E) LAKTO 323800N 0320500E GENIV 314831N 0330714E
L333	(DORUK 391645N 0421107E) DASIS 385435N 0441230E BORES 382829N 0452137E VUVAG 382529N 0452926E TABRIZ (TBZ) 3808543.5N 04612476.6E RAKED 375621N 0470712E BUDED 375313N 0472032E RALGO 372840N 0490112E RASHT (RST) 3719354.8N 0493657.4E KOBUB 370621N 0501031E EGMAN 370311N 0501827E RAMSAR (RSR) 3654132.5N 050405049.6E ALKUP 364702N 0510409E NOSHAHR (NSR) 363946.4N 0512751.4E LABET 360950N 0530127E MIRUR 354221N 0541139E GIBAB 353213N 0543656E ALROT 351116N 0554136E LUBIX 345214N 0563219E TASLU 342531N 0574131E ALPEX 340919N 0582221E ASVIS 334633N 0591828E SOKAM 331316N 0603754E (DANOD 322422N 0620032E)
L417	VUSEB 361637N 0434800E DAXOG 354612N 0434527E UMESA 351741N 0434307E MUTAG 343003N 0433834 E LAGLO 33515398.6N 0441457.0E ELOSI 330800N 0441800E LOVEK 322208.1N 04440.01E ELIBA 320915N 0444645E NADOX 310505N 0451851E
L425	BOSUT 204705N 0393158E *Note 7 (BSH-BOSUT-BSH) AMBAL 202506N 0401625E GODSA 201258N 0404040E

6.5A-29

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	BISHA (BSH) 195840N 0423728E KATIX 200212N 0425406E WADI ALDAWASIR (WDR) 203019N 0451219E EGREN 202236N 0464422E DENKU 201123N 0484331E ASTIN 200410N 0495320E MEDMO 194837N 0521027E DAVOX 194400N 0524817E GOBRO 193622N 0534741E NOVNO 193313N 0535858E ITUVO 190315N 0554328E DEDSO 185811N 0560041E BOVOS 182230N 0575844E ASPUX 174404N 0600004E (MAMIG 164100N 0614641E)
L427	KAROX 205717N 0381547E BILAL 184044N 0330227E ASRAV 172442N 0301943E BOXIG 155958N 0272606E GIPSA 150616N 0253946E ELGENIENAD (GNA)132824.39N 0223207.30E
L430	VAXIM 231900N 0611100E ASLOM 242113N 0600552E MESPO 244817N 0595040E PEDEX 251211N 0592131E NOVSU 263407N 0573849E MELMI 264625N 0572300E VELAP 272556N 0565950E TAVNO 281112N 0563253E ASMET 284758N 0561019E SIRJAN (SRJ) 293323.5N 0553937E
L438	~~LONOS 283027N 0491713E LOPOL 281849N 0492845E ATBAG 280842N 0493844E GODRI 280256N 0494307E RAKSO 275326N 0495032E GOGRA 274918N 0495344E OBNAX 272650N 0501103E DEKTA 271605N 0501946E VELOG 270215N 0503055E KOBOK 265839N 0503349E MOGAS 264759N 0503909E TOSTA 262746N 0504912E ASTAD 261811N 0505646E~~
L440	KANIP 241040.7N 05520.7E ~~*Note 7 RETAS 235754N 0553423E~~
L443	~~RABAP 283625N 0492722 TESSO 282852N 0492723E LOPOL 281849N 0492845E ENAVI 275552N 0493151E~~

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-30

LOWER/UPPER AIRSPACE	
Designator	Significant Points
1	2
	~~GIRSI 274126N 0493310E~~ ~~ORDAN 271706N 0495442E~~ ~~RAMSI 270249N 0500714E~~ ~~GASSI 270257N 0502229E~~
L444	~~KIPOL 230410N 0612903E~~ ~~*Note 7 (KIPOL-TOLDA)~~ ~~VUSIN 225940N 0605510E~~ ~~MIBSA 225400N 0601338E~~ ~~KAXEM 225103N 0595243E~~ ~~IMDEK 224647N 0592217E~~ ~~TOLDA 224008N 0583624E~~
L513	MURAK 345600N 0364200E BRAVO 344118N 0363500E LEBOR 341656N 03634514E LOTAX 335952N 0363231E DAMASCUS (DAM) 332154N 0362807E ~~*Note 3 (OSTT)~~ BUSRA 322000N 0363700E ~~LOSAR 320930.06N 036285049.77E~~ ~~LOXER 3201487.76N 0362251.46E~~ ~~QUEEN ALIA (QAA) 314423.41N 03609276.59E~~ ~~QATRANEH (QTR) 311454.44N 0360334.31E~~ MUNRA 304944N 0360835E
L519	PATAT 261613N 0560059E ~~*Note 7 (PATAT-ATUDO)~~ ~~EGPEP 2557476.8N 05558232.5E~~ ITLAP 254925N 0555010E ~~PUVAL 253558.0N 0554258.0E~~ ~~DETGU 2526243.9N 05536054.6E~~ SERSA 251945N 0553118E ~~IVOXI 25124039.6N 0552513.1E~~ ~~VEKAL 2503343.5N 05503410.5E~~ ~~KUTLI 245151.3N 0545618.0E~~ GEVIV 244118N 0545000E ELEPO 243211N 0544410E ODKUN 242608N 0544017E VUXOD 242005N 0543625E ~~ATUDO 241708.0N 0543432.0E~~
L550	WAFRA (KFR) 283715N 0475729E NIDAP 283857N 0473656E BOSID 284234N 0465228E SIBSA 284506N 0462006E LAKSO 284751N 0454129E VATIM 285136N 0444443E RASMO 285713N 0433119E ORSAL 290235N 0421107E TOLDI 290329N 0415621E NORGI 290515N 0412546E ULAKO 290758N 0403440E NIMAR 290635N 0395425E ENABI 290639N 0385550E ASTUM 290628N 0382237E

6.5A-31

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	OBNAK 290554N 0373032E EGSIS 290515N 0362850E KITOT 290205N 0345050E NUWEIBAA (NWB) 290156N 0344016E KARIK 292733N 0344641E TAKSU 293625N 0343623E DATOK 293624N 0341400E SERMA 312200N 0330834E GENIV 314831N 0330714E PASOS 321300N 0330600E (STEPSA 324859N 0322349E)
L551	ANTAR 334800N 0281600E *Note 7 (NOZ-ANTAR) GOMVA 320010N 0292615E NOGLI 321249N 0291811E ALEXANDRIA (NOZ) 311115N 0295703E
L553	AXOTI 100330N 0341318E GINPU 102031N 0312036E RAMKO 102439N 0303926E KAPIB 104917N 0255200E KURAM 110204N 0225614E
L554	NUBAR 220000N 0313824E PASAB 184553N 0313836E SISOR 124543N 0313859E ITOXa 102401N 0313908E MALAKAL (MLK) 093347.40N 0313911.44E KUNDI 083920N 0313819E EGBIM 072916N 0313716E JUBA (JUB) 045234N 0313559E
L555	TOTOX 215030N 0622230E TUMET 222307N 0595702E TOLDA 224008N 0583624E
L556	EGREN 202236N 0464422E NONGA 205048N 0492014E PURDA 210805N 0510329E *Note 7 (PURDA-KUTVI) IMVID 205718N 0520704E IVABO 204749N 0530058E SEMSI 204455N 0531724E OBSUS 203905N 0534952E IMDAM 202416N 0550801E OTISA 201000N 0554556E KEDON 200503N 0555901E HAIMA (HAI) 195813.3N 05616510.82E GIVNO 195011N 0563059E KUTVI 184306N 0582642E
L557	TUMAK 255031N 0531108E *Note 7 (TUMAK-RAGAS) VEDOM 260109N 0524456E ORLUP 260651N 0523216E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-32

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
	VELAK 261307N 0521821E RAGAS 263537N 0521337E
L558	DASTU 074921N 0330800E IMDUR 074114N 0323107E EGBIM 072916N 0313716E DASAG 070454N 0294914E ASKON 061745N 0262537E
L559	DAPOK 235956N 0572959E *Note 7 (DAPOK-FJV) PASOV 243841N 0565037E MENSA 245750N 0563249E FUJAIRAH (FJV) 250603N 0562116E
L560	LAKTO 323800N 0320500E LOVEX 320952.69N 03228487.72E SERMA 312200N 0330834E VUTAR 293627.47N 0334901.26E SIMSA 291428.47N 03357165.76E SHARM EL SHEIKH (SHM) 275953N 0342448E SILKA 263400N 0352900E
L561	MAHDI 202600N 0373918E SUVRI 135436N 0321800E NABUS 110003N 0295910E ZENUB 094106N 0285841E ASKON 061745N 0262537E
~~L563~~	~~MAHDI 202600N 0373918E PORT SUDAN (PSD) 192404.12N 0371430.21E ELUDU 143525N 0351202E SODIL 105401N 0334204E DEDVA 102746N 0333134E IMDUR 074114N 0323107E~~
L564	DOHA/HAMAD (DOH) 251500.459.66N 05136354.80E LADEM 245545N 0513714E EMEXA 245052N 0513604E DATRI 244239N 0513407E DENSI 242519N 0512959E *Note 8 (DOH) BATHA (BAT) 241257N 0512707E SOMAL 232844N 0512716E KUTNA 231341N 0512730E MIGMA 225035N 0512749E RAGPO 222759N 0510600E LOTOS 220000N 0503912E ALNUG 213009N 0500453E NONGA 205048N 0492014E DENKU 201123N 0484331E GERUG 185530N 0473402E ASKET 181905N 0470113E PATOG 180241N 0464631E VUVOD 173941N 0463200E TULIS 173033N 0462616E

6.5A-33

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	ULBON 171426N 04615125E RAGNI 163454N 0454815E LOPAD 161651N 0453738E ITOLI 152825N 0450927E OBNAM 144541N 0444448E GEVEL 141229N 0442547E NOPVO 135436N 0441536E TAIZ (TAZ) 134150N 0440819E PARIM 123142N 0432712E
L566	~~ASMAK 162327N 0524634E~~ ~~TAKMI 160542N 0522012E~~ ~~PURUG 151204N 0510142E~~ ~~KUSOL 144009N 0501534E~~ ~~NOTBO 142609N 0495530E~~ ~~EMABI 141627N 0494139E~~ ~~SOKEM 134235N 0485329E~~ ~~DATEG 123549N 0471627E~~
L567	IMDUR 074114N 0323107E JUBA (JUB) 045234N 0313559E OVELA 040000N 0311454E
L570	ROTOX 283323N 0494809E AGHAJARI (AJR) 304441N 04940493E IMKEN 314407N 0493611E ALTAX 323014N 0492142E NOTSA 331745N 0490315E
L572	LESRI 370420N 0411348E KAMISHLY (KML) 370200N 0412006E HASSAKEH (HAS) 362900N 0404600E DIER ZZOR (DRZ) 351831N 0401102E TANF (TAN) 332900N 0383920E
L573	~~DAFINAH (DFN) 231658N 0414310E~~ ~~MADINAH (PMA) 243251N 0394219E~~ ~~WEJH (WEJ) 261045N 0362917E~~
L601	(ADANA (ADA) 36562640N 035123740E) *Note 7 (ADA-KTN) TUNLA 355300N 0360200E SALIM 352908N 0361847E KARIATAIN (KTN) 341248N 0371551E
L602	TUMAK 255031N 0531108E *Note 7 (TUMAK-KTNGAZ) VEDOM 260109N 0524456E ORLUP 260651N 0523216E VELAK 261307N 0521821E LABOP 261907N 0520429E ALTOM 262230N 0515639E BOPOV 262430N 0515043E ALMOK 262832N 0513840E GITBO 263527N 0511750E VEDOS 264106N 05100445E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-34

LOWER/UPPER AIRSPACE	
Designator	Significant Points
1	2
	MOGAS 264800N 0503909E TOLMO 265504N 0502927E EGLIT 270256N 0502006E TOKMA 270939N 0501159E ORSOL 272135N 0500208E ITNAS 274644N 0493957E DAMUR 280137N 04926378E ITEVO 281558N 0491332E DAVUS 282346N 0490622E BOXIK 284814N 0484734E RALKA 292611N 0481819E TASMI 300120N 0475505E GADSI 303358N 0471116E ALPET 311219N 0461844E UROKO 314735N 0452917E MUTLO 321019N 0445703E LOVEK 322208N 0444001E DELMI 331918N 0431328E ASNOT 333000N 0425717E GEPAP 334906N 0422851E *Note 4 (GEPAP-GAZ) ELEXI 344130N 04140900E KUKSI 364508N 0374910E GAZIANTEP (GAZ) 3657051N 03728234E
L604	(PALEOCHORA (PLH) 351339.49N 0234051.04E) SALUN 340000N 0242700E SIDI BARANI (BRN) 313432N 0260020E DANAD 285106N 0280609E ALTAT 263602N 0294618E EGPAP 261448N 0300148E EL KHARGA (KHG) 252654N 03035274E KUNAK 252745N 0304112E EMENA 253749N 0315147E LUXOR (LXR) 254458N 0324607E ASRAB 254726N 0330619E LORAS 255649N 0342714E MOGAP 260055N 0350455E IMRAD 260506N 0354444E WEJH (WEJ) 261046N 0362917E NADIK 261815N 0374637E RABDA 262048N 0381440E HALAIFA (HLF) 262603N 0391609E MUPVI 262943N 0403437E LAKRO 263051N 0410241E DAXAP 262142N 0430228E GASSIM (GAS) 2617543N 0434647E *Note 7 (GAS-NARMI) NAGSA 261811N 0443117E KUMTO 261815N 0445350E LABIS 261815N 0451755E PUSLA 261758N 0461706E LOROX 261751N 0463021E MAGALA (MGA) 261720N 0471225E MUSRI 261647N 0474137E KASOM 262111N 0480312E

6.5A-35

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
	UMENA 262832N 0483952E TABTA 262837N 0484325E KING FAHD (KFA) 262951N 0494643E NARMI 261802N 0501939E ~~BAHRAIN (BAH) 261551N 0503855E~~ ~~DENVO 260452N 0510509E~~ ~~PATOM 255821N 0511836E~~ ~~EMISA 254658N 0514207E~~ ~~KAPAX 254218N 0515118E~~ ~~ORSIS 252801N 0521636E~~ ~~ENANO 252348N 0522559E~~ ~~TOSNA 251612N 0524116E~~
L607	(SITIA (SIT) 350406.32N 02611210.63E) *Note 7 (SIT-NABSI) PAXIS 335706N 0272000E NABSI 314353N 0290419E
L612	(SITIA (SIT) 350406.32N 02611210.63E) *Note 7 (SIT-BLT) KUMBI 334250N 0284500E MIVOR 322922N 0300603E BAL TIM (BLT) 313144N 0310721E
L613	ABU SIMBEL (SML) 222118N 0313719E EL KHARGA (KHG) 252654N 0303527E DEPNO 262438N 0301413E BOPOS 264318N 0300722E IMREK 290643N 291220E KIVIL 293845N 0284415E MERSA MATRUH (MMA) 311911N 0271320E *Note 7 (MMA-AMAXI) ITEXO 325832N 0265834E TANSA 340000N 0264900E (AMAXI 350552N 0254658E)
L617	CAIRO (CVO) 300532N 0312318E *Note 7 (CVO-SIT) MENKU 310531N 0301806E ALEXANDRIA (NOZ) 311115N 0295703E SOBAX 313508N 0291835E NABSI 314353N 0290419E TANSA 340000N 0264900E (SITIA (SIT) 350406.32N 02611210.63E)
L620	(ALSUS 350206N 0343924E) BALMA 342856.30N 0350302.30E KALDE (KAD) 3348216.70N 03529109.53E
L631	TOTOX 215030N 0622230E *Note 7 (TOTOX-MCT) IVOMA 223408N 0605430E DEBDA 224327N 0603525E MIBSA 225400N 0601338E AMBOS 230324N 0595405E ELIGO 232458N 0590848E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-36

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	KARAR 233042N 0585438E MUSCAT (MCT) 233528.04N 0581536.48E
L677	CAIRO (CVO) 300532N 0312318E MENLI 294700N 0315206E KAPIT 291700N 0323606E *Note 7 (PASAM-KAPIT) SHARM EL SHIEKH (SHM) 275953N 0342448E *Note 7 (PASAM-SHM) PASAM 273045N 0345542E DARAX 264713N 0354703E WEJH (WEJ) 261046N 0362917E *Note 7 (PASAM-JDW-WEJ) RAGNO 251617N 0371123E YENBO (YEN) 240858N 0380219E RIDEP 233847N 0381558E MIGDA 223829N 0384253E JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E *Note 7 (JDW-ABKAR) RIBAM 204231N 0390551E PATUS 192945N 0393720E ABKAR 190511N 0401612E IMRAM 175604N 0413004E MEKTU 172307N 0420445E LUBAL 171544N 0421228E JAZAN (GIZ) 165428N 0423439E *Note 7 (GIZ-IMSIL) NABAN 1631234N 043015048E IMSIL 155738N 0434112E SANA'A (SAA) 1530002959.60N 04413110.60E
L681	GESOR 270322N 0475751E *Note 5 & 7 & 8 (GESOR-ULIKA-ORLEK) LABLI 264522N 0482100E RABSA 263050N 0483951E TABTA 262837N 0484325E EMOGA 261647N 0490230E BOSIV 261258N 0490837E DEMKA 261008N 0491310E GISRA 253344N 0501047E ULIKA 251545N 0503849E ORLEK 252542N 0503712E
L692	ALRIK 220631N 0482535E *Note 7 (ALRIK-GISKA) LOTOS 220000N 0503912E ORBEM 215758N 0512430E DEBEP 215700N 0514434E VATIX 215522N 0521638E ALROK 215400N 0524217E DEBIN 214716N 0543309E KOBES 214504N 0550526E DAPOL 214301N 0553416E EMAVA 214208N 0554936E ITSAG 213720N 0570640E GISKA 213503N 0574014E

6.5A-37

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
L695	~~PAROK 231030N 0590245E~~ *Note 7 (PAROK-ITURA) ~~ITURA 232351N 0580720E~~
L700	*Note 5 (KHM-MIXAM) GHESHM ISLAND (KHM) 264547-N 05554287.6E ULDUN 262429N 0560924E BOTOV 252812N 0564307.80E GIDIL 251742N 0564923E BUBAS 245938N 0570003E GERAR 240600N 0573616E MIXAM 234139N 0575523E
L702	TIMAD 115500N 0463500 IMPAG140637.8N0503924E TATNA 144000N 0515200E UKSAB 145200N 0521800E NODMA152600N 0533400E
L703	LONOS 283027N 0491713E LOPOL 281850N 0492845E GEPUT 281307N 0493423E GODRI 280257N 0494308E GOGRA 274918N 0495344E OBNAX 272651N 0501103E DEKTA 271605N 0501946E VELOG 270215N 0503056E KOBOK 265839N 0503349E RIKET 261952N 0510954E RASDI 260425N 0512407E
L704	LONOS 283027N 0491713E *Note 7 (LONOS-TOSNA) LOPOL 281850N 0492845E GEPUT 281307N 0493423E GODRI 280257N 0494308E GOGRA 274918N 0495344E OBNAX 272651N 0501103E DEKTA 271605N 0501946E VELOG 270215N 0503056E KOBOK 265839N 0503349E DEBEN 265254N 0504856E DAVRI 264936N 0505732E SODAK 264634N 0510530E DANOB 263946N 0512640E BOTOB 263350N 0514505E VEDED 260558N 0514628E ORSIS 252801N 0521636E ENANO 252348N 0522559E TOSNA 251612N 0524116E
L710	UKRAG 233056N 0552306E *Note 7 (UKRAG-to-DEDSO) MENTU 232517N 0552443E GOGMI 230215N 0553159E ITKUN 223731N 0553934E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-38

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	DEBAV 221532N 0554617E EMAVA 214208N 0554936E ITETA 211618N 0555208E IVENI 205158N 0555430E KASIN 201853N 0555742E KEDON 200503N 0555901E KUKDI 193022N 0555953E DEDSO 185811N 0560041E
L713	DASHT E NAZ (DNZ) 363854.6N 0531120.4E IMDUX 361511N 0534211E GIBAB 353213N 0543656E PAXER 350901N 0550000E ULETA 342805N 0554002E EMITI 335811N 0560845E RIBEN 332902N 0563620E OTISO 331451N 331451N EGPOD 324901N 0571545E NADSA 321438N 0575002E TOVUS 300643N 0595235E ULOVI 291948N 291948N SODOK 281113N 0613652E KEBUD 273552N 0625024E
L716	ULADA 264527N 0501624E RABKA 263531N 0495728E DAMMAM/KING FAHD (KFA) 262951N 0494643E *Note 7 (KFA-EMUSA) EMOGA 261647N 0490230E EMUSA 261101N 0484317E
L717	RANRU 300115N 0610048 LUDAX 295658N 0604101E PEKES 285929N 0595221E (OGOGO 302457N 0630904.20E)
L720	RIKOP 374026N 0581450E BOJNORD (BRD) 372942.2N 0571924.8E ODKOL 363136N 0560702E IBRAV 362041N 0555430E ULANO 355228N 0552043E ITELO 353534N 0550052E
L721	LAVAN ISLAND (LVA) 264843.4N 0532121.4E EGMIT 263340N 0530825E IMLUV 262936N 0530101E ELIDU 262424N 0525133E *Note 7 (ELIDU-BAYAN) UKNEP 262127N 0524818E UKUBU 261428N 0524039E ORLUP 260651N 0523216E ITMUB 255919N 0522402E ALKAN 255214N 0521615E SENKI 254637N 0520928E LABOV 253412.1N 0515521E BAYAN 252926N 0514849E

6.5A-39

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
L764	~~MUSCAT (MCT) 233528N 0581536E~~ ~~ALMOG 233524N 0574940E~~ ~~IVETO 233520N 0570704E~~ ~~PAXIM 240245N 0561631E~~
L768	ALPOB 254218N 0530055E *Note 7 (ALPOB to FIRAS) *Note 8 (ALPOB-COPPI) ROTAG 255353N 0523621E ITMUB 255919N 0522402E MODOG 261012N 0515935E RAMKI 261138N 0515625E RABLA 261506N 0514834E SOLOB 262241N 0513132E ALREP 262541N 0512209E ORDIG 262738N 0511603E MEDMA 263421N 0505454E OBMON 263832N 0504125E EGMOR 264211N 0502907E ULADA 264527N 0501624E ITESA 265016N 0500014E JUBAIL (JBL) 270043N 0492443E LAKSI 271306N 0490004E ITUDA 273432N 0481647E IVoba 274138N 0480219E COPPI 275033N 0474359E DUSBO 280616N 0465254E AL QAISUMAH/HAFR AL BATIN (HFR) 282126N 0460703E VATIM 285136N 0444443E RAFHA (RAF) 293713N 0432953E ARAR (AAR) 305429N 0410832E OVANO 314801N 0390951E OTILA 320131N 0390153E MODAD 323542N 0384136E KUMLO 3258121.82N 0384138.14E SOKAN 330806N 0382206E RAFIF 331247N 0381919E SULAF 332718N 03810247E FIRAS 335218N 0375512E
L852	UROMIYEH (UMH) 374114.4N 04505043.7E TESVA 381709N 0442947E (ESENK 384441.40N 4256176.80E)
L883	REXOD 211230N 0613830E GADMA 211439N 0600938E TAVKO 211519N 0593147E UMILA 211555N 0584738E *Note 7 (UMILA to ALNUG) MEVLI 211632N 0565606E KUROV 211627N 0561853E ALNUN 211625N 0561041E ITETA N211618 E0555208 SITOL 211604N 0552514E LONOV 211856N 0543516E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-40

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	DASAP 212047N 0540045E EGSAB 212446N 0523634E ASNUR 212654N 0514335E EGSIT 212746N 0511956E ALNUG 213009N 0500453E *Note 7 (ALRIK to ALNUG) ALRIK 220631N 0482535E *Note 7 (ALRIK-KITUB) KITUB 224922N 0462342E ~~UMRAN 231508N 0452023E~~ *Note 7 (PMA to URMAN) ~~DASTO 232236N 0445953E~~ ~~NADLI 233725N 0441843E~~ TUKVU 234626N 0435319E KODIS 240254N 0425312E ~~BIR DARB (BDB) 241951N 0414928E~~ ~~GOKSA 242442N 0410403E~~ MEDRO 242730N 0403649E ~~MADINAH (PMA) 243251N 0394219E~~
L934	PATOM 255821N 0511836E LUBET 261441N 0510347E EGPUD 262904N 0505019E OBMON 263832N 0504125E OVUPI 265320N 0502727E TOKMA 270939N 0501159E ORSOL 272135N 0500208E ITNAS 274644N 0493957E DAMUR 280137N 0492638E ITEVO 281558N 0491332E DAVUS 282346N 0490622E
M1	(ARLOS 343731.20N 230000.60E) RASNO 342000N 0212758E REDFI 332030N 0205442E WHALE 324436N 0203300E BENINA (BNA) 320728N 0201513E
M7	BONAR 342999N 0190213E *Note 7 (BONAR to MB) RZAAN 324818N 0191536E ASRAP 315251N 0192258E RIGED 315250.40N 0192258.20E MARSA BREGA (MB) 302506N 0193421E LEBKO 284907.80N 193736.60E MASIT 272815.60N 0194915.60E LAGSI 252145N 0194418E TONBA 213518N 0195112E
M214	(ILDOR 200937.20N 180119.20E) GARIN 220000N 0170636E ELGAN 245000N 0153754E TOTOD 260051N 145942.60 SEBHA (SEB) 265944N 0142735E
M215	(KILDO 204517.40N 195807.80E)

6.5A-41

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
	TONBA 213518N 0195112E *Note 7 (TONBA to UPLIT) KANIR 254613.20N 182903.60E NABUR 290307.80N 172011.40E SOLAB 300234.80N 165832.40E SIRTE (SRT) 310333N 163552.20E TULIR 332240.20N 151613.80E LUMED 342000N 0144203E (UPLIT 363000N 0133222.80E)
M203	PUSTO 332100N 0424500E *Note 7 (PUSTO to ILMAP) SILBO 325900N 0432900E LOVEK 322208N 0444001E KODAV 314500N 0460400E ILMAP 312133N 0465702E
M300	(KADOL 190003N 0633602E) LOTAV 203700N 0605700E GADMA 211439N 0600938E GOLBA 213318N 0594600E EMURU 221357N 0585338E
M301	(PURAD 145500N 0415354E) KIPAM 150030N 0421526E MIPIN 150608N 0423735E LUDOX 152034N 0433524E MUTEX 152524N 0435445E SANA'A (SAA) 153000295960N 04413110.60E ITOLI 152825N 0450927E PASAD 153634N 0460713E PAPOR 154322N 0465652E GIBIT 154849N 0473804E NABUP 155417N 0482143E SAYUN (SYN) 1557432.64N 0484710.18E XAGAG 160206N 0492722E GINBO 160349N 0494017E RARBA 161021N 0503920E SIMKO 161821N 0515526E ASMAK 162327N 0524634E
M303	MUSCAT (MCT) 233528.04N 0581536.48E *Note 7 (MCT KIPOL) SEVLA 233321N 0591122E KIPOL 230410N 0612903E
M305	SIDI BARANI (BRN) 313432.5N 0260020.3E ATMUL 200000N 0290527.4E *Note 3
M309	KING KHALED (KIA) 245310N 0464534E *Note 1 (KIA VEMEM) DURMA 242710N 0454610E RAGHBA (RGB) 235533N 0443547E LAKMI 232424N 0430827E DIPEX 231656N 0424758E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-42

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	~~KUTOL 230718N 0422147E~~ ~~ITOLO 224602N 0412244E~~ ~~ALPUT 224019N 0410705E~~ ~~VUTEX 223418N 0405044E~~ ~~VEMEM 221554N 0400118E~~
M316	~~IMLOT 251708N 0570804E~~ KATUS 251600N 0574700E SEVDA 260217N 0590549E NAGES 262451N 0594514E SOLUV 264157N 0601533E GOKSO 265542N 0604012E
M317	GABKO 260404N 0554755E RADEB 261140N 0554719E NANPA 262301N 0553136E ORPEN 263119N 0552008E SERDU 264715N 0545757E ROTAL 273241N 0535320E KUPTO 282418N 0525432E IMGOD 301419N 0513050E RADID 302444N 0512613E NOTSA 331745N 0490315E KEBEP 350454N 0474014E PAREX 360527N 0465154E *Note 5 (RABEM-DASIS) RABEM 374841N 0452949E KHOY (KHY) 382601.4N 04457598.9E DASIS 385435N 0441230E
M318	RIKOP 374026N 0581450E *Note 7 (ATUDO-RIKOP) SILPO 370806N 0580006E BONEM 363826N 0574647E SABZEVAR (SBZ) 361011.4N 05734154.9E RABAM 355442N 0572955E SITEL 351304N 0571825E DAPIN 342034N 0570413E TABAS (TBS) 334021.2N 05653310.9E OTISO 331451N 0564936E IMSOG 325636N 0564649E NIVRA 315905N 0563810E PARID 313041N 0563358E MIRER 305943N 0562926E GETIS 301145N 0562226E ASMET 284758N 0561019E ASMUK 280952N 0560453E GHESHM ISLAND (KHM) 264547.4N 05554287.6E RADEB 261140N 0554719E GABKO 260404N 0554755E DAVMO 255127.4N 0553900.0E TOVIV 253302N 0551942E LOVEM 252645.4N 0551440.4E MITIX 251746.4N 055073029.7E EGTAG 250856N 0545652E VEKOV 245750N 0544925E

6.5A-43

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	TULON 245511.4N 0544739.4E KUVDA 244309N 0543909E IMLIP 243648N 0543549E RURAL 243045N 0543156E ATUDO 241708.0N 0543432.0E MUSEN 241429N 0543236E BOPIT 235947N 0540404E DANOK 234220N 0533111E ESROM 232424N 0525729E GOLGU 231051N 0523109E MUXIT 230229N 0523024E KATIT 224928N 0522923E MEDPO 222421N 0520751E DEGPA 221801N 0520227E DEBEP 215700N 0514434E MIBDO 214340N 0513318E EGSIT 212746N 0511956E PURDA 210805N 0510329E ASTIN 200410N 0495320E KUTMA 182927N 0481202E NITPO 174554N 0472624E SHARURAH (SHA) 172813N 0470802E NADKI 171417.8N 0464703.6E RAGNI 163454N 0454815E IMDEN 162101N 0452744E MUTAB 155314N 0444700E RAKIDRAYDE 154134N 0442959E SANA'A (SAA) 153000.2959.60N 044131.10.60E NAGIL 152024N 0435651E RAMLO 151033N 0434007E HODEIDEH (HDH) 144622.40N 0425911.40E
M319	ULINA 292451N 0345818E SESMO 293458N 0351159E LOXUS 301301N 0352601E LOSIL 304951N 0354841E QATRANEH (QTR) 311454N 0360334E MOUAB 314758.00N 0353559.00E
M320	KING FAHD (KFA) 262153N 0494910E ALVAP 264547N 0493524E KODAG 2703.3N 04920.4E GODBA 264905N 0493302E JUBAIL (JBL) 270222N 0492426E EGREX 270433N 0492158E PUSRA 272031N 0491030E ASNIS 275643N 0484412E RAS MISHAB (RAS) 280441N 0483653E KUWAIT (KUA) 291457N 0475717E ASVIR 283220N 0482220E KUWAIT (KUA) 291457N 0475717E
M321	HALAIFA (HLF) 262603N 0391609E *Note 7 (KIA-HLF) IMROV 260936N 0402145E ORMAD 260353N 0404401E ROSUL 253945N 0421519E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-44

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	KINOB 253146N 0430018E MIRAS 251508N 0443001E OVEKU 250955 0445701E IVONU 250323N 0454030E KING KHALED (KIA) 245310N 0464534E RESAL 240649N 0470427E NAGUB 232752N 0473102E AMBAG 230529N 0474611E BOSOB 224130N 0480218E ALRIK 220631N 0482535E DAXOK 213157N 0485041E OBRUR 213852N 0484541E NONGA 205048N 0492014E ASTIN 200410N 0495320E SILPA 184953N 0510158E IMPOS 183137N 0511848E LOTEL 180926N 0514103E PUTRA 165432N 0525631E
M323	IMDUR 074114N 0323107E BOTOK 102859N 0334548E EGTOT 144511N 0353913E MIPOL 203322N 0382145E
M324	RIKOP 374026N 0581450E LOXED 355854N 0580609E TABNI 353052N 0575840E TASLU 342531N 342531N ROXEK 331123N 0572138E EGPOD 324901N 324901N DARBAND (DAR) 314659.4N 0565940.4E PURBO 311346N 0565832E KERMAN (KER) 301658.4N 0565632.3E NANTO 284140N 0563831E BANDAR ABBAS (BND) 271149.4N 0562200.3E MOBET 264406N 0560908E PATAT 261613N 0560059E
M425	ELIKA 334955N 0343500E CHEKA (CAK) 341802.1.84N 0354200.159.64E
M428	IVURO 251940N 0560915E *Note 7/8 (IVURO-MUNGA) SUTVO 251531N 0562153E GOMTA 251115N 0563447E TARBO 244351N 0574637E MUNGA 242516N 0584533E
M430	KING KHALID (KIA) 245310N 0464534E *Note 5 (KIA-DOH) *Note 7 (ULIKA-KIA) DEGLA 250243N 0472847E KOBOK 250716N 0475046E GOLNO 251155N 0483658E KIREN 251447N 0490724E *Note 8 (KIREN-TOSNA) AL AHSA (HSA) 251645N 0492903E

6.5A-45

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	SALWA 251538N 0503048E ULIKA 251545N 0503849E GINTO 251606N 0510416E LAGNO 251613N 0511518E DOHA/HAMAD (DOH) 251500459.66N 05136354.80E *Note 7 (OXARI-DOH) BOVIP 251555N 0523135E TOSNA 251612N 0524116E PUTIB 251900N 0525755E RORON 252053N 0530916E TAGDU 252258N 0532153E OXARI 252535N 0533458E
M434	UMESA 351741N 0434307E OTALO 351700N 0441900E TOTAM 351601N 0444006E DAVAS 351724N 0451235E BOXIX 351724N 0460921E ASLAX 351607N 0463118E NOLTO 351435N 0465623E SANANDAJ (SNJ) 35142019.7N 0470029.2E TUKLO 351014N 0471751E LOVID 350740N 0472841E KEBEP 350454N 0474014E HAMADAN (HAM) 3452010.8N 0483301.0E ORLOG 345512N 0490915E SAVEH (SAV) 3501076.8N 05022176.9E
M440	KING KHALED (KIA) 245310N 0464534E OTALI 243313N 0474744E SITER 241107N 0485443E ITULU 232031N 0510948E KUTNA 231341N 0512730E BOPEK 230059N 0520007E KATIT 224928N 0522923E *Note 7 (KATIT-TULBU) DAVLU 224136N 0533310E DANUX 223605N 0541558E MIDGU 222706N 0552230E DEMKI 224941N 0562308E TULBU 230005N 0571827E
M444	DOHA/HAMAD (DOH) 251500459.66N 05136354.80E EMISA 254658N 0514207E PATOM 255821N 0511836E DENVO 260452N 0510509E TULUB 260644N 0510041E BAHRAIN (BHR) 261530N 0503919E ELOSO 262409N 05035501E DESBU 263240N 0503241E EGMOR 264211N 0502907E LOTOR 264854N 0502200E *Note 7 (LOTOR-DAVUS) RAMSI 270249N 0500714E ORDAN 271706N 0495442E GIRSI 274126N 0493311E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-46

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
	ENASO 275707N 0491911E EMORI 281434N 0491051E DAVUS 282346N 0490622E
M449	BUSRA 322000N 0363700E GIBOX 320700N 0363308E MESLO 320231N 0363148E GETUP 315833.47N 0363037.47E ALNOR 313955.26N 03625087.52E EGLOT 3116576.94N 03618243.86E MUNRA 304944.29N 03608354.88E KINOD 301200.30N 03616010.60E PETRA 294206N 0362210E GIBET 292620N0362501E EGSIS 290515N 0362850E RABUG 283622N 0363402E TABUK (TBK) 282153N 0363637E NETOL 270748N 0363226E WEJH (WEJ) 261046N 0362917E
M550	GOLGU 231051N 0523109E RIBOT 230844N 0522428E BOPEK 230059N 0520007E MIGMA 225035N 0512749E *Note 7 (MIGMA-MEVDO) ODBUK 224657N 0510720E MEVDO 223205N 0494616E
M551	(DONSA 143518N 0651136E) ANGAL 1614046N 06000046E OTOTO 164004N 0570435E KIVEL 165306N 0553633E DAXAM 171612N 0544715E
M553	LADNA 262749N 0502245E KING FAHD (KFA) 262951N 0494643E EMOGA 261647N 0490230E EMUSA 261101N 0484317E
M554	TOKAR 180624N 0374812E MIPOL 203322N 0382145E
M555	ALRAM 374230N 0443736E KAPES 372520N 0452004E
M556	ORMID 253354N 0525434E DASLO 254537N 0523029E ALKAN 255214N 0521615E RABLA 261506N 0514834E SOLOB 262241N 0513132E ALREP 262541N 0512209E ORDIG 262738N 0511603E MEDMA 263421N 0505454E BAHRAIN (BHR) 261530N 0503919E NARMI 261802N 0501939E

6.5A-47

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
M557	IVOXI 25124039.6N 0552513.4E MITIX 251746.4N 055073029.7E RIDAP 2525543.7N 0543701.2E OTIKI 253229N 0541441E TOTKU 253534N- 0540410E GODKI 254122N- 0534347E RALMI 254505N- 0533033E TUMAK 255031N- 0531108E
M559	JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E *Note 7 (JDW-LABNI) RIBAM 204231N 0390551E PATUS 192945N 0393720E IMLIL 171949N 0403219E LABNI 165620N 0410921E NISMI 1624158N 04218386E DAROV 160637N 0431338E IMSIL 155738N 0434112E ASREM 154637N 0441443E RAKIDRAYDE 154134N 0442959E ITOLI 152825N 0450927E LONIS 151910N 0460016E MEMTA 150322N 0472434E OBNIS 145840N 0474903E BOSAX 144740N 0484553E MUKALLA (RIN) 144015.30N 0492329.30E EMABI 141627N 0494139E XANLO 135653N 0495628E PURKA 131208N 0503042E ODBEN 123747N 0505648E VEDET 120134N 05124210E
M561	RAGAS 263537N 0521337E *Note 7 (RAGAS-KIS) EGMIT 263340N 0530825E KISH ISLAND (KIS) 2631310.6N 05357454.7E MIVUN 263151N 0541953E DENSE 263158N 0542920E BANDAR LENGHEH (LEN) 263210.4N 0545104.2E BOSOS 264325N 0554311E GHESHM ISLAND (KHM) 264547.4N 05554287.6E *Note 7 (KHM-ASVIB) PAVON 270206N 0561149E RUKOT 265324N 0580339E LADPA 265331N 0592514E GOKSO 265542N 0604012E ASVIB 265724N 0631812E (PANJGUR (PG) 265710.24N 0640813.06E)
M562	VATEN 153358N 0323312E PASIL 161331N 0332010E BOPID 163948N 0335142E IMTPARX 1706092005N 03423314026E PORT SUDAN (PSD) 192405412N 03714293024E BOGUM 200636N 0380300E MIPOL 203322N 0382145E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-48

LOWER/UPPER AIRSPACE	
Designator 1	Significant Points 2
M564	PASOV 243841N 0565037E *Note 7 (PASOV-UMAMI) PUXIL 244117N 0563145E VAXAS 244308N 0561807E NALNU 244737N 0560925E UMAMI 245114.7N 0560223.3E
M565	ALRAP 133945N 0361344E *Note 7 (ALRAP-LUGAV) EGTOAT 144511.5325N 03539134256E GIDARX 152731.2126N 03516423107E ELONO 163635N 0343934E IMTPARX 170609.2005N 03423314026E DARI BREV 1931594449N 03302523656E ENABUSISID 220000N 0322927E LUGAV 224205N 0313722E
M568	NUBAR 220000N 0313824E UMIDA 185115N 0311704E ASNON 150818N 0305312E KASAB 134346N 0304233E KINOV 093414N 0301149E DEKUM 043742N 0293936E
M572	NOLSU 251248.0N 05607387.8E *Note 7 (NOLSU-GOMTA) GOMTA 251115N 0563447E
M573	TEHERAN (TRN) 354149.10N 051170221.60E DAMOS 372619N 0474521E TABRIZ (TBZ) 3808543.50N 04614052473.95.70E DASIS 385435N 0441230E
M574	NABIL 122200N 0600006E BOTEM 135413N 0551418E RIGAM 143932N 0530414E UKSAB 145200N 0521800E NODLI 150301N 0513549E PURUG 151204N 0510142E EGMIX 151811N 0503810E UKORA 152407N 0501547E TAVLI 153502N 0493430E RALMO 153824N 0492155E NABUP 155417N 0482143E MUTOK 161005N 0472228E LABRA 161813N 0465113E OVABI 162442N 0462642E RAGNI 163454N 0454815E ELONA 165753N 0442124E NOBSU 171554N 04313158E
M600	RANBI 251908N 0544500E KISAG 251834N 0541408E TUMAK 255031N 0531108E *Note 7 (TUMAK-KUMBO)

6.5A-49

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	~~VEDOM 260109N 0524456E~~ ~~ORLUP 260651N 0523216E~~ ~~VELAK 261307N 0521821E~~ ~~LABOP 261907N 0520429E~~ ~~ALTOM 262230N 0515639E~~ ~~BOPOV 262430N 0515043E~~ ~~ALMOK 262832N 0513840E~~ ~~GITBO 263527N 0511750E~~ ~~VEDOS 264106N 05100445E~~ ~~MOGAS 264800N 0503909E~~ ~~RAKAK 265221N 0502618E~~ ~~RAMSI 270249N 0500714E~~ ~~ORNAK 272854N 0493248E~~ ~~SOLEM 275229N 0491136E~~ ~~KUMBO 281705N 0485526E~~
M600	(ZARZAITINE (IMN) 280412N 0093954E) TOKDA 303311.40N 0111143.80E GALPO 311534.20N 011385100E ZAWIA (ZAW) 324643N 0123847E SARKI 342000N 0131447E
M620	(KUTOS 350625.80N 0183538.40E) *Note 7 (KUTOS - BNA) BONAR 342999N 0190213E RAMLI 334300N 0192300E PUFER 325901N 0194748E ATOLL 324500N 0195454E BENGHAZI BENINA (BNA) 320728N 0201513E DAMUN 302805.40N 205530.60E VATAX 275312N 0215601.20E SODOR 273746.20N 220158.80E KUFRA (KFR) 240912N 231831.20E
M621	(BEKNI 351215.60N 172807.80E) *Note 7 (BNA-BEKNI) OLMAX 342000N 0180750E ERMIX 335819.20N 182401.80E FARUJ 333124N 0184354E RZAAM 324818N 0191536E BENGHAZI BENINA (BNA) 320728N 0201513E
M622	(DIBAK 351610.80N 152759.40E) *Note 7 (BNA-DIBAK) INDOT 342000N 0165653E LETNO 340000N 172810.80E TUNAR 332448N 0182212E RZAAM 324818N 0191536E BENGHAZI BENINA (BNA) 320728N 0201513E
M628	~~DAFINAH (DFN) 231658N 0414310E~~ ~~*Note 7 (UMRAN-DFN)~~ ~~DIPEX 231656N 0424758E~~ ~~NALBA 231639N 0433419E~~ ~~DAXUR 231537N 0445436E~~ ~~UMRAN 231508N 0452023E~~

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-50

LOWER/UPPER AIRSPACE	
Designator	Significant Points
1	2
	~~*Note 7 (UMRAN-MIGMA)~~ ~~DEBAS 231059N 0462728E~~ AMBAG 230529N 0474611E ~~*Note 7 (MIGMA-AMBAG)~~ DEGNO 225945N 0485954E ~~OBSEP 225158N 0510742E~~ MIGMA 225035N 0512749E ~~BOSAK 225021N 0514213E~~ KATIT 224928N 0522923E PEKEM 224648N 0535942E RIGIL 230146N 0551430E LUDID 230227N 0551800E GOGMI 230215N 0553159E ~~*Note 7 (TULBU-LUDID)~~ LABSA 230153N 0555505 EGVAN 230127N 0561907 KUNGO 230034N 0565850E TULBU 230005N 0571827 IZKI (IZK) 2253198.60N 05745432.73E TOLDA 224008N 0583624E ~~*Note 7 (PARAR-TOLDA)~~ LOXOP 223722N 0594548E LOSIM 223513N 0603238E IVOMA 223408N 0605430E PARAR 222630N 0630700E
M634	ANGAL 1614046N 06000046E TOKPU 145122N 05711034E BOTEM 135413N 0551418E KEDAV 125553N 0531509E VEDET 120134N 05124210E (IMTIS 112506N 0502858E)
M651	NADKI 1714178N 04647036E OVABI 162442N 0462642E MEGPA 160017N 0461653E PASAD 153634N 0460713E LONIS 151910N 0460016E PEBIX 1444478N 0454637E LADLI 132724N 0451604E ADEN (KRA) 124952.20N 0450125E ~~KORABULDAK~~ 121109N 0445028E OKTOB 114730N 0444348E (IMVEB 112638N 0443753E)
M677	SESRU 290900N 0485450E ~~*Note 7 (SESRAU-TUKSI)~~ RETEL 285236N 0491048E RABAP 283625N 0492722E PASAK 282500N 0494847E IVIVI 273734N 0502437E DEBGU 272648N 0503252E VEDOR 270855N 0504630E TOSDA 2700045N 0505629E TORBO 265223N 0511024E SEVNI 264401N 0513815E

6.5A-51

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	SOGAN 263915N 0515408E MURUB 262455N 0523751E UKNEP 262127N 0524818E DEGSO 261054N 0531946E OBNET 260032N 0534514E LUDAM 255508N 0535859E ITBUL 254910N 0541227E DIXAM 254151N 0543557E VUTEB 253645.4N 0545149.4E LOVEM 252645.4N 0551440.4E KURTU 252211N 0554625E MISEG 252134N 0555205E TUKSI 252006N 0560525E IVURO 251940N 0560915E KUSEN 251828.0N 0562340.0E LALDO 251806N 0563600E
M681	~~TARBO 244351N 0574637E~~ ~~*Note 7/8 (TARBO-DAMUM)~~ ~~DAMUM 243236N 0591307E~~
M686	LUXOR (LXR) 254458N 0324607E *Note 7 (JDW-LXR) MEMPO 252518N 0335457E OTEMO 250341N 0350810E GIBAL 243713N 0363443E ALPOV 232037N 0374252E BOMOX 222949N 0382704E JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E
M688	(OTKEP 375133N 0423936E) *Note 7 (OTKEP-SIDAD) RATVO 371426N 0435604E KEDIM 364617N 0440909E SOBIL 343000N 0451008E VAXEN 331800N 0451500E SISIN 325006N 0454113E ULDUR 305023N 0472958E SIDAD 295231N 0482944E
M690	ZELAF 325656N 0375959E ORNAL 324755N 0375153E KODER 323300N 0373800E DESLI 314900N 0365901E ELOXI 313401N 0364534E KULDI 311847N 0363214E MUNRA 304944N 0360835E LONOL 300801N 0353500E SESMO 293458N 0351159E ULINA 292451N 0345818E NUWEIBAA (NWB) 290156N 0344016E
M691	LADNA 262749N 0502245E *Note 7 (ALPOT-LADNA) KING FAHD (KFA) 262951N 0494643E DASVA 264551N 0492301E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-52

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	SILBA 270554N 0485301E ALPOT 271841N 0480511E KEDAT 272149N 0475901E EMENI 273234N 0473848E ITIXI 275031N 0470435E
M700	PARAR 222630N 0630700E *Note 7 (AMBOS - PARAR) AMBOS 230324N 0595405E
M701	LUMOM 371612N 0444924E PAVOD 370204N 0451834E ENEDA 355211N 0462718E NOLTO 351435N 0465623E KHORAM ABAD (KRD) 332603.4N 04817310.7E DAPEM 325126N 0484159E NAGRO 321015N 0491549E IMKEN 314407N 0493611E MESVI 311057N 0500006E BOTAS 295241N 0505515E IVERA 292303N 0511540E DEPSU 283409N 0515047E DURSI 271219N 0520144E KAVAM 265737N 0515818E MIDSI 264142N 0515442E
M702	SILKA 263400N 0352900E WEJH (WEJ) 261046N 0362917E KULKI 254814N 0371445E TULOK 251001N 0383037E BOVET 245742N 0385436E EGVED 244857N 0391129E MADINAH/PRINCE MOHAMMAD BIN ABDULAZIZ (PMA) 243251N 0394219E MEDRO 242730N 0403649E GOKSA 242442N 0410403E BIR DARB (BDB) 241951N 0414928E AL DAWADMI (DAW) 242656N 0440709E TASBA 243059N 0443028E KAVUR 244246N 0454036E RIYADH/KING KHALED (KIA) 245310N 0464534E ETBAS 253451N 0473318E AKRAM 255036N 0475133E GETOT 260646N 0481025E
M705	DEESA 294509N 0364102E BOSAL 292912N 0375933E LABAD 291922N 0385411E NIMAR 290635N 0395425E *Note 7 (NIMAR-LOTOK) DEDGI 285903N 0404128E GENON 285119N 0412758E TAMRO 283838N 0424047E GEXUP 282724N 0433514E VUTAD 282352N 0435158E LOTOK 280834N 0450402E

6.5A-53

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
M707	VARIG 342000N 0134350E *Note 7 (VARIG-ABU) NAWRS 325324N 0133148E ABU ARGUB (ABU) 322746N 0131010E
M708	DAROR 270244N 0495815E *Note 7 (DAROR-DASUT) RAMSI 270249N 0500714E GASSI 270257N 0502229E VELOG 270215N 0503056E TOSDA 270005N 0505629E TORBO 265223N 0511024E SEVNI 264401N 0513815E SOGAN 263915N 0515408E MURUB 262455N 0523751E DASUT 261832N 0531108E
M709	BENGHAZI BENINA (BNA) 320728N 0201513E MARSA BREGA (MB) 302506N 0193421E DAHRA (DHR) 292803N 175554E NABUR 290307.80N 172011.40E FUGHA 281001N 0160541E SEBHA (SEB) 265944N 0142735E TAZIT 255624N 0115418E GHAT (GHT) 255624N 0100820E TWARG 250301N 0100200E
M710	DASIS 385435N 0441230E REXUS 385624N 0451332E DULAV 385700N 0453800E
M711	TOKRA 220924N 0553348E *Note 7 (TOKRA-PMA) DARER 221152N 0550332E IMGOV 221828N 0533624E MEDPO 222421N 0520751E LABDU 222457N 0515807E RAGPO 222759N 0510600E MEVDO 223205N 0494616E BOSOB 224130N 0480218E KITUB 224922N 0462342E DANOM 225454N 0450509E ASMIS 225631N 0444014E NALBA 231639N 0433419E LAKMI 232424N 0430827E ASMUN 233116N 0424514E AMRAH 233928N 0421716E BOXEB 234439N 0415921E ALVIR 234825N 0414618E ALKAV 235200N 0413348E ASVIV 235532N 0412121E NAGBO 240219N 0405720E ELONU 240942N 0403053E MADINAH/PRINCE MOHAMMAD BIN ABDULAZIZ (PMA) 243251N 0394219E
M713	EPLAS 040000N 0341148E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-54

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	TAPOS 055408N 0332002E IMDUR 074114N 0323107E MALAKAL (MLK) 093347N 0313911E GINPU 102031N 0312036E EL OBEID (OBD) 130641N 0301335E
M715	ASVIB 265724N 0631812E SARAVAN (SRN) 272454N 0621932E PEKES 285929N 0595221E SILKO 295558N 0584138E EGRES 304855N 0573144E PURBO 311346N 0565832E PARID 313041N 0563358E DANEM 322854N 0550717E MITET 325226N 0542850E PURKI 331140N 0535657E KAVEK 332249N 0533814E RERET 333336N 0532651E OXADU 350837N 0511226E IMLIM 351200N 0510400E ELIPO 354046N 0502117E ZANJAN (ZAJ) 364647N 0482112E
M717	LADLI 132724N 0451604E DASIT 144412N 0462931E GIBIT 154849 N 0473804E KANEM 173660N 0492655E SILPA 184953 N 0510158E SILPA 184953N 0510158E *Note 7 (SILPA-PUTSO) MEDMO 194837N 0521027E METNO 201418N 0524050E DAXUT 203706N 0530802E SEMSI 204455N 0531724E DASAP 212047N 0540045E DEBIN 214716N 0543309E DARER 221152N 0550332E MIDGU 222706N 0552230E ITKUN 223731N 0553934E KATAK 224811N 0555708E EGVAN 230127N 0561907E GENIR 231111N 0563630E PUTSO 232037N 0565322E
M718	ULDUS 380000N 0510100E LABKA 364142N 0504342E GOPKA 361256N 0503724E DAVMI 355657N 0503401E SAVEH (SAV) 350107N 0502217E
M719	MESPO 244817N 0595040E NAGES 262452N 0594514E
M720	DITAR 265903N 0250000E DANAD 285106N 0280609E TAKRI 292503N 0290432E

6.5A-55

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	FAYOUM (FYM) 292351N 0302335E CAIRO (CVO) 300532N 0312318E
M722	NARMI 261802N 0501939E *Note 7 (NARMI-TOSNA) TOSTA 262746N 0504913E SOLOB 262241N 0513132E VEDED 260558N 0514628E ORSIS 252801N 0521636E ENANO 252348N 0522559E TOSNA 251612N 0524116E
M723	ORNAT 200000N 0250000E EGSUM 185726N 0274545E RAGEN 184724N 0281124E LAMAB 182601N 0290548E ALPOX 171131N 0320831E KUVTI 163152N 0325025E
M726	(DOKIK 352822.80N 131333E) *Note 7 (DISOL-DOKIK) SARKI 342000N 0131447E DISOL 334113N 0131428E SHELL 3320224N 0131530E MITIGA (MTG) 325338N 0131619E
M727	(EDELI 350452.20N 123800E) *Note 7 (EDELI-ZAW) ABRAM 342000N 0123816E AMWAJ 332842N 0123754E ZAWIA (ZAW) 324643N 0123847E VASUT 295959.40N 124237.20E UBARI (UBR) 263552.20N 0124648.60E TUBET 250000N 124007.80E DEKIL 220001N 122806E
M731	(DJERBA (JBA) 335238.40N 0104617.40E) FARES 320949N 0105652E NALUT 315101N 0105854E NAFUS 304436N 0110954E DERJE 294742N 0111900E ORBEL 282236N 0113218E TAZIT 255624N 0115418E DEKIL 220001N 122806E (DIRKOU (DIR) 185852.80N 125249.20E
M732	(GOZO (GZO) 360214.40N 141219.80E *Note 7 (GZO-DITAR) ELIMO 342000N 0162210E EVRAN 340000N 0164634.80E DOLFI 331248N 0174312E RIGED 315250.40N 0192258.20E ROTOD 312538.40N 0195724.60E ANHAR 303100N 0210500E DITAR 265903N 0250000E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-56

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
M739	VARIG 342000N 0134350E *Note 7 (VARIG-MIS) REXUN 333206N 0141539E MISRATA (MIS) 321852N 0150440E
M740	(LAMPEDUSA (LPD) 352959.40N 0123751E) *Note 7 (NAWRS-LPD) SARKI 342000N 0131447E HITAN 332736N 0132624E NAWRS 325324N 0133148E KADRA (KDR) 322200N 0133700E KAVEN 295959.40N 0135957.60E SEBHA (SEB) 265944N 0142735E
M762	REXOD 211230N 0613830E *Note 7 (REXOD-VAXAS) SUR (SUR) 2232487.9N 059293029.70E DELISO 225606N 0585233E ITURA 232351N 0580720E ALMOG 233524N 0574940E VELOD 234611N 0573435E GEXAN 241257N 0565649E TAPRA 242607N 0563803E VAXAS 244308N 0561807E RUDAT 244605.1N 0561714.1E MIVEK 245240N 0561516E
M855	RASDA 330600N 0305700E MIVOR 322922N 0300603E GOMVA 320010N 0292615E NABSI 314353N 0290419E MERSA MATRUH (MMA) 311911N 0271320E SIDI BARANI (BRN) 313432N 0260020E LOSUL 314100N 250800E VUSOR 300000N 0232117E AMTAR 340000N 0215618E RASNO 342000N 0212758E (TIPAC 353910N 0194814E)
M860	(SIHRT (SRT) 375438.40N 0415255.10E) *Note 7 (GADSI-SHRT) EFFEZ 373518N 0423919E NINVA 372100N 0431300E ROXOP 364445N 0433322E VUSEB 361637N 0434800E TOMSI 354858N 0440229E OTALO 351700N 0441900E NAMDI 343027N 0444133E SEPTU 331300N 0444400E RESAK 323305N 0451552E KODAV 314500N 0460400E GADSI 303358N 0471116E
M861	ELEXI 344126371.105N 041085010549.0E DIER-ZZOR (DRZ) 351831N 0401114E TABQA 354704N 0383432E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-57

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	ALEPPO (ALE) 361047N 0371234E NISAP 3647401N 0363805E (MILBA 365705N 0362846E)
M863	JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E GIBAP 212218N 03809310E TOMRU 204411N 0361950E DARB 1931594449N 03302523656E SOMAK 190301N 0314717E RAGSI 185526N 0312747E UMIDA 185115N 0311704E TAVNA 174808N 0283938E SOGIN 171145N 0271200E ASKOL 154854N 0240005E KITOB 1521436N 0225848E (IPONO 150624N 0222436E)
M872	(LINGI 343043N 0243244E) *Note 7 (REXUM-LINGI) METRU 340000N 0250900E ITEXO 325832N 0265834E NABSI 314353N 0290419E SOBAX 313508N 0291835E ORNAS 311838N 0291845E REXUM 301822N 0291917E FAYOUM (FYM) 292351N 0302335E LUBOS 284201N 0311306E SEMRO 280200N 0320306E BOPOB 272253N 0332316E HURGHADA (HGD) 271040N 0334747E *Note 7 (HGD-KIA) ALMOD 270123N 0341349E SILKA 263400N 0352900E WEJH (WEJ) 261046N 0362917E KULKI 254814N 0371445E TULOK 251001N 0383037E BOVET 245742N 0385436E EGVED 244857N 0391129E MADINAH (PMA) 243251N 0394219E MEDRO 242730N 0403649E GOKSA 242442N 0410403E BIR DARB (BDB) 241951N 0414928E AL DAWADMI (DAW) 242656N 0440709E TASBA 243059N 0443028E KAVUR 244246N 0454036E KING KHALID (KIA) 245310N 0464534E AKRAM 255036N 0475133E *Note 8 (OB) to MIDSI ALMAL 261553N 0482108E DAVRI 264936N 0505732E MIDSI 264142N 0515442E
M877	VUSET 235540N 0590812E ITILA 2340155N 0584817E KUSRA 232426N 0582611E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-58

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
M979	(SUDIK 352428.80N 0143028.80) *Note 7 (LAB-SUDIK) INDOT 342000N 0165653E NETAG 340032.40N 0181516.80E RAMLI 334300N 0192300E EL BEDIA (LAB) 324641N 0220113E
M980	(GODAK 353816.20N 0153659.40E) *Note 7 (GODAK-LOSUL) BONAR 342000N 0190213E DARIP 333125N 0210045E LOSUL 314100N 0250800E
M999	(ZARZAITINE (IMN) 280400359.60N 0093939.30E) BUHRA 272234N 0124717E SEBHA (SEB) 265944N 0142735E HORUJ 270906N 0161442E KEPOS 272230N 0182810E MASIT 272816N 0194016E ARRIG 272930N 0200112E KARUB 273524N 0211524E SODOR 273747N 0220159E SARIR (GS) 273900N 0223000E DITAR 265903N 0250000E NAKDO 260554N 0282101E DAMPO 254707N 0292708E IMLAX 252924N 0302707E EL KHARGA (KHG) 252654N 0303527E KUNAK 252745N 0304112E EMENA 253749N 0315147E LUXOR (LXR) 254458N 0324607E ELELI 251854N 0332934E SEDVA 235813N 0354006E DASPA 230121N 0370841E DEDLI 224232N 0373719E *Note 7 (DEDLI-JDW) MUVOL 221749N 0381452E JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E *Note 7 (LABNI-JDW) BOSUT 204705N 0393158E LOVIL 201553N 0394537E DAVUV 194408N 0395924E ABKAR 190511N 0401612E LABNI 165620N 0410921E DANAK 160800N 0412900E APDOS 153955N 0413947E (PURAD 145500N 0415354E)
N39	ULDUS 380000N 0510100 ^E ULEXI 374344N 0510631 ^E NOSHahr (NSR) 363946.4N 0512751.4E ELEDI 350136N 0520356 ^E
N68	MARSA BREGA (MB) 302506N 0193421E *Note 7 (MB-OLMAX) GENIN 320840.20N 0185710.20 ^E

6.5A-59

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	ORGON 325245.60N 0184052.20 ^E MISIK 330715N 0183527 ^E NETAG 340031.80N 0181516.80 ^E OLMAX 342000N 0180750 ^E
N72	BATEV 381005N 0501419 ^E UMIRO 375524N 0501514 ^E GOLNU 355711N 0502052 ^E ELIPO 354046N 0502117 ^E SESBI 353154N 0502130 ^E PEDAR 350826N 0502206 ^E SAVEH (SAV) 3501076.8N 05022176.9 ^E UKITA 330657N 0500041 ^E IMKEN 314407N 0493611E BANDAR MAHSHAHR (MAH) 3033232.8N 0490858.0E UKNAR 295538N 0490450E TULAX 293853N 0490301E
N163	ABRAM 342000N 0123816E *Note 7 (ABRAM-GRT) ABU ARGUB (ABU) 322746N 0131010E TAWUS 315218N 0131736E GHERIAT (GRT) 302341N 0133509E
N300	DOHA/HAMAD (DOH) 251500459.66N 05136354.80E *Note 7 & 8 (DOH-LALDO) ELOBI 250753N 0521722E NAMLA 250532N 0523318E MIBRU 250321N 0524540E RUGIS 245916N 0530340E KAXOB 245423N 0532450E GIDOB 244445.3N 05359532.6E ORBOL 245134N 0542348E LORID 245552.5N 0543904.1E VEKOV 245750N 0544925E OBREV 250200N 0551135E LAGTA 250602N 0553315E RUKOR 250823N 0554603E NOLSU 251248.0N 05607387.8E SUTVO 251531N 0562153E LALDO 251806N 0563600E
N302	SIDAD 295231N 0482944E *Note 7 (SIDAD-ALVAX) ALVAX 292030N 0482422E
N303	(KASOL 283147N 0531533E) PARIM 123142N 0432712E ORNIS 141615N 0423657E EMABA 145137N 0421943E KIPAM 150030N 0421526E RIBOK 154700N 0415230E LABNI 165620.3N 0410921.4E
N307	MELDO 320201N 0310406E LAKTO 323800N 0320500E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-60

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
N310	BALMA 342856N 0350302E CHEKA (CAK) 341802.484N 0354200.159.64E *Note 7 (CAK-LATEB BASEM) LATEB 340154N 03624043.60E LOTAX 335952N 0363231E BASEM 3333387.6N 0373907.4E
N311	NUBAR 220000N 0313824E TOVIL 175557N 0304439E DATIM 152833N 0301323E JEBRA 125520N 0291349E SIGNO 094716N 0275031E ASKON 061745N 0262537E
N312	ASVIB 265724N 0631812E GENEV 264247N 0603757E NOVSU 263407N 0573849E MOBET 264406N 0560908E GHESHM ISLAND (KHM) 264547.4N 05554287.6E SERDU 264715N 0545757E ROSUM 264741N 0543637E LAVAN ISLAND (LVA) 264843.4N 0532121.4E MIDSI 264142N 0515442E
N314	ATMUL 220000N 0290530E UMIDA 185115N 0311704E KUVTI 163152N 0325025E TIKAT 122418N 0353812E
N315	ASPUX 174404N 06000064E KUTVI 184306N 0582642E *Note 7 (KUTVI-SITOL) MOBAB 201032N 050564415E ORSIT 202306N 050562915E VELIK 203322N 0561656E IVENI 205158N 0555430E SITOL 211604N 0552514E LOTOS 220000N 0503912E RAPMA 232256N 0482028E RESAL 240649N 0470427E KING KHALED (KIA) 245310N 0464534E
N316	HALAIFA (HLF) 262603N 0391609E NETOL 270748N 0363226E PASAM 273045N 0345542E *Note 7 (PASAM-HDG) HURGHADA (HDG) 271040N 0334747E
N317	MENSA 245750N 0563249E NOLSU 251248.0N 05607387.8E REXEV 251502.3N 05601376.7E NADNI 251915.2N 05556598.9E
N318	MOUAB 314758N 0353559E QUEEN ALIA (QAA) 314423.41N 03609276.59E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-61

LOWER/UPPER AIRSPACE

Designator

Significant Points

1

2

ALNOR 313955N 0362507E
KINUR 313626N 0363714E
ELOXI 313359N 0364536E
GENEX 312935N 370052E
GURIAT (GRY) 312445N 0371712E KULDI 311847N 0363214E
*Note 7 (KULDI GRY-ORKAS)
TULEP 311537N 0371432E
ITUNO 310913N 0373542E
ORKAS 304725N 0384617E
NEVOL 302446N 0393841E
GIBAM 300018N 0401632E
VELAL 294602N 0403821E
SITOD 292143N 0412313E
TOLDI 290329N 0415621E
TAMRO 283838N 0424047E
NOTLI 281200N 0433714E
LOXOM 275648N 0440832E
MOGON 273847N 0444554E
EMARO 273342N 0451330E
DEBOL 272116N 0461843E
*Note 7 (DEBOL-REXOD)
MAANI 270812N 0473152E
*Note 8 (OB, OO)
GESOR 270322N 0475751E
NADEN 265250N 0484448E
DASVA 264551N 0492301E
OTERA 264110N 0493841E
NAGTO 263717N 0495137E
RABKA 263531N 0495728E
SIBGA 263416N 0500134E
LADNA 262749N 0502245E
ELOS0 262409N 0503551E
GOLKO 262149N 0504404E
ASTAD 261812N 0505646E
LUBET 261441N 0510347E
TOTIS 261119N 0511027E
RASDI 260425N 0512407E
VELAM 255426N 0514347E
VUTAN 255016N 0515218E
RESAR 253707N 0522328E
ALSEM 252703N 0524322E
OVONA 252443N 0524739E
PUTIB 251900N 0525755E
BOXOT 251039N 0531817E
KAPUM 245815N 0533450E
BOSEV 245013.3N 0540448.8E
MOGIM 244053N 0542820E
IMLIP 243648N 0543549E
ELEPO 243211N 0544410E
SIXIV 242009N 0550439E
KANIP 241040N 0552042E
LABRI 240344N 0553842E
EGROK 235253N 0560126E
LAKLU 232235N 0570401E
GEVED 230105N 0575111E
TOLDA 224008N 0583624E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-62

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
	REXOD 211230N 0613830E
N319	DERBO 292542N 0611701E ZAHEDAN (ZDN) 292912.3N 06054065.7E KUVAV 313426N 0585747E IMPAT 322451N 0580856E ROXEK 331123N 0572138E TABAS (TBS) 334021.2N 05653310.9E RABER 343656N 0555902E ITELO 353534N 0550052E ODKAT 354650N 0544146E DASHT-E-NAZ (DNZ) 3638543.6N 0531120.4E DASEL 371113N 0522020E RIGAN 373543N 0514052E ULDUS 380000N 0510100E (NASIL 390100N 0495100E)
N320	KISAL 101811N 0232526E GINKA 124701N 0250831E BOXIG 155958N 0272606E TAVNA 174808N 0283938E LAMAB 182601N 0290548E NUBAR 220000N 0313824E
N321	TIKAT 122418N 0353812E BOPID 163948N 0335142E BILAL 184044N 0330227E NUBAR 220000N 0313824E
N323	PEKEM 224648N 0535942E DAVLU 224136N 0533310E MEDPO 222421N 0520751E
N324	ALNUG 213009N 0500453E PURDA 210805N 0510329E METNO 201418N 0524050E MIPUB 200004N 0530607E GOBRO 193622N 0534741E ASTUN 180832N 0551040E
N430	TARBO 244351N 0574637E *Note: 7 (TARBO - ITLOB) ITLOB 244325N 0590701E
N438	LITAN 333456.28N 03437598.80E KALDE (KAD) 3348276.70N 03529109.53E CHEKA (CAK) 3418024.84N 0354200159.64E KLEYATE (RA) 343510N 0360010E
N440	MOBON 274414N 0552513E *Note 7 (GABKO-MOBON) BOSOS 264325N 0554311E RADEB 261140N 0554719E GABKO 260404N 0554755E
N558	DEKUM 043742N 0293936E

6.5A-63

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
	LOROG 093551N 0295448E NABUS 110003N 0295910E DATIM 152833N 0301323E ASRAV 172442N 0301943E
N563	(KATBI 193133N 065002E) REXOD 211230N 0613830E *Note 8 (OB, OM) *Note 7 (REXOD-ALPOB) EMURU 221357N 0585338E TULBU 230005N 0571827E MEKNA 233309N 0560815E KURTA 234205N 0554900E SODEX 234954N 0553202E ELUDA 235107N 0552905E NOBTO 235525N 0551840E SIGMO 240710N 0545837E VUXOD 242005N 0543625E UMIBU 242331N 0543027E KUGTO 243231N 0542224E BOSEV 245013.3N 05404498.8E ITKEV 250104N 0534526E KUSBA 251634N 0532847E TAGDU 252258N 0532153E IMGUX 252950N 0531428E ALPOB 254218N 0530055E TOTLA 263806N 0504301E RULEX 264529N 0501745E SILNO 264026N 0475745E GIBUS 255724N 0472829E
N565	KAMEL 322000N 036440E ZELAF 325700N 0380000E
N567	SOMAD 372645N 0543255E LOVEN 363926N 0553355E IBRAV 362041N 0555430E MUSEG 354656N 0562631E IMKUK 345602N 0571346E TASLU 342531N 0574131E BIRJAND (BJD) 325821.7N 05912010.5E
N568	AVONO 092606N 0335418E DEDVA 102746N 0333134E SUVRI 135436N 0321800E TOVIL 175557N 0304439E ATMUL 220000N 0290530E
N569	~~BONUM 221252N 0393805E~~ ~~RABTO 221608N 0400326E~~ ~~VEMEM 221554N 0400118E~~ ~~LOTOS 220000N 0503912E~~ *Note 7 (LOTOS-GOLNI) TOKRA 220925N 0553350E *Note 7 (GISKA-TOKRA) SUTLI 220121N 0560404E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-64

LOWER/UPPER AIRSPACE	
Designator	Significant Points
1	2
	TOPSO 215653N 0562043E MOGOK 215057N 0564236E KEBAS 214330N 0570948E GISKA 213503N 0574014E UMILA 211555N 0584738E GOLNI 210014N 0594130E LOTAV 203700N 0605700E
N570	*Note 5 (ITURA-MIDSI) ITURA 232351N 0580720E *Note 7 (ITURA-IVIVA) IVIVA 245945N 0574958E KATUS 251600N 0574700E GIGAB 253708N 0573231E NOVSU 263407N 0573849E BONIK 264444N 0562651E MOBET 264406N 0560908E GHESHM ISLAND (KHM) 264547.4N 05554287.6E SERDU 264715N 0545757E ROSUM 264741N 0543637E LAVAN ISLAND (LVA) 264843.4N 0532121.4E DURSI 271219N 0520144E KAVAM 265737N 0515818E MIDSI 264142N 0515442E
N571	(DOGET 210703N 0660001E) PARAR 222630N 0630700E *Note 7 & 8 (PARAR-ALPOB) KIPOL 230410N 0612903E RAGMA 232301N 0603846E SODEB 234747N 0593023E VUSET 235540N 0590812E TOVDI 240733N 0584021E KIROP 243000N 0574700E ASNIB 243949N 0572105E MENSA 245750N 0563249E LUBAT 250223N 0561749E ENEGA 250556N 0560601E RUKOR 250823N 0554603E IVOXI 25124039.6N 0552513.4E TUDIS 251009N 0550825E SENPA 252000.4959.6N 05432110.5E RUDUK 252408N 0541650E ULIVA 252647N 0540611E SISOB 253150N 0534509E PURLI 253644N 0532436E ALPOB 254218N 0530055E SOLOB 262241N 0513132E MEDMA 263412N 0505454E TOTLA 263806N 0504301E RULEX 264529N 0501745E SILNO 264026N 0475745E KUTEM 264359N 0473521E BOPAN (BPN) 270314N 0452642E
N572	ROTEL 264015N 0502149E

6.5A-65

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
	*Note 7 (ROTEL-DASUT) EGMOR 264211N 0502907E DAVRI 264936N 0505732E TORBO 265223N 0511024E SEVNI 264401N 0513815E SOGAN 263915N 0515408E MURUB 262455N 0523751E DASUT 261832N 0531108E
N574	ATMUL 220000N 0290530E ASRAV 172442N 0301943E KASAB 134346N 0304233E KISOV 100955N 0310359E JUBA (JUB) 045234N 0313559E
N629	TARDI 243418N 0560915E *Note 7 (TARDI-TOTOX) NOSMI 241757N 0563002E BOTAM 240227N 0565320E ELIVA 235335N 0570634E MUSUK 234320N 0572148E IVAKU 232919N 0574103E GEPOT 231446N 0580053E GIDAN 230104N 0582232E LOXOP 223722N 0594548E TOTOX 215030N 0622230E
N636	MAGRI 385408N 0462300E ARDABIL (ARB) 381857.5N 0482605.4E UMER0 375524N 0501514E ULEXI 374344N 0510631E RIGAN 373543N 0514052E GORGAN (GGN) 365545.7N 0542233.3E SABZEVAR (SBZ) 361011.0N 05734154.9E LOXED 355854N 0580609E PAMTU 351006N 0610806E
N638	~~KING KHALED (KIA) 245310N 0464534E~~ ~~OVEKU 250955N 0445701E~~ ~~MADINAH (PMA) 243251N 0394219E~~
N685	DEBOL 272116N 0461843E *Note 7 (DEBOL-LAKLU) *Note 8 (TAGSO-TOSNA) MAANI 270812N 0473152E GESOR 270322N 0475751E NADEN 265250N 0484448E DASVA 264551N 0492301E DAMMAM/KING FAHD (KFA) 262951N 0494643E NARMI 261802N 0501939E BAHRAIN (BHR) 261530N 0503919E TULUB 260644N 0510041E DENV0 260452N 0510509E PATOM 255821N 0511836E EMISA 254658N 0514207E KAPAX 254218N 0515118E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-66

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	ORSIS 252801N 0521636E ENANO 252348N 0522559E TOSNA 251612N 0524116E UMEVU 250545N 0530653E KAPUM 245815N 0533450E GIDOB 244445.3N 0535953.6E *Note 8 (OO) SUVDU 243501N 0542410E RURAL 243045N 0543156E ODKUN 242608N 0544017E NAPMA 241250N 0550312E ORNEL 240312.7N 0551942.4E RETAS 235754N 0553423E KOBIM 233309N 0562701E PUTSO 232037N 0565322E LAKLU 232235N 0570401E
N687	KING KHALID (KIA) 245310N 0464534E TAKTI 252153N 0474340E KINIB 254108N 0482317E MIBRA 255654N 0485053E DEMKA 261008N 0491310E SETBA 261346N 0491921E DAMMAM/KING FAHAD (KFA) 262951N 0494643E SIBGA 263416N 0500134E *Note 7 (SIBGA-TORBO) ROTEL 264015N 0502149E ~~EGMOR 264210.81N 0502906.73E~~ ~~DAVRI 264936.05N 0505731.88E~~ ~~TORBO 265222.68N 0511024.30E~~
N694	~~KING KHALID (KIA) 245310N 0464534E~~ ~~TORKI 261400N 0463103E~~ ~~SIBLI 265459N 0462334E~~ ~~AKODI 275012N 0461320E~~ ~~HAFR AL BATIN (HFR) 281949N 0460746E~~
N697	MENLI 294700N 0315206E SISIK 293600N 0324106E *Note 7 (NWB-SISIK) NUWEIBAA (NWB) 290156N 0344016E *Note 7 (NWB-KITOT above FL350) KITOT 290205N 0345050E NAGIP 284206N 0361133E RABUG 283622N 0363402E DAXEM 283224N 0364923E NABEK 283030N 0365643E SOBAS 275600N 0390453E REVAB 273424N 0405710E HAIL (HIL) 272530N 0414059E *Note 7 (NARMI-HIL) LOSEL 272135N 0422545E NALBU 271420N 0434206E PASIT 271011N 0442253E ALKIR 270758N 0444343E BOPAN (BPN) 270314N 0452643E

6.5A-67

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	ANTER 270212N 0453359E *Note 8 (BPN-TORBO) SIBLI 265459N 0462334E LUGAL 264603N 0472235E MEDGO 264433N 0475257E LABLI 264522N 0482100E TAYMA 264556N 0484212E DAMMAM/KING FAHD (KFA) 262951N 0494643E NARMI 261802N 0501939E BAHRAIN (BHR) 261530N 0503919E *Note 7 (BAHR-TORBO) GOLKO 262149N 0504404E TOSTA 262746N 0504913E MEDMA 263421N 0505454E VEDOS 264106N 0510045E SODAK 264634N 0510530E TORBO 265223N 0511024E
N700	*Note 5 (ULDUN-DOH) ULDUN 262429N 0560924E KAVEG 261608N 0552434E MENDI 254955N 0550522E DAPER 254522N 0545731E *Note 7 (DAPER-DOH-DAPER) KUSBA 2516343.60N 0532847.40E RORON 2520532.80N 05309165.60E OVONA 252443.20N 052474039.60E DOHA/HAMAD (DOH) 251500459.66N 05136354.80E
N702	*Note 5 (TUMAK-ROTOX) TUMAK 255031N 0531108E *Note 7 (TUMAK-RAGAS) VEDOM 260109N 0524456E ORLUP 260651N 0523216E VELAK 261307N 0521821E LABOP 261907N 0520429E ALTOM 262230N 0515639E BOPOV 262430N 0515043E ALMOK 262832N 0513840E GITBO 263527N 0511750E VEDOS 264106N 0510045E MOGAS 264800N 0503909E TOLMO 265504N 0502927E EGLIT 270256N 0502006E TOKMA 270939N 0501159E ORSOL 272135N 0500208E ITNAS 274644N 0493957E GODRI 280257N 0494308E
N703	PASAM 273045N 0345542E NEOM BAY (NEM) 275555N 0351733E TABUK/PRINCE SULTAN BIN ABDULAZIZ (TBK) 282153N 0363637E NABEK 283030N 0365643E RANRI 283919N 0371730E ASTUM 290628N 0382237E LABAD 291922N 0385411E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-68

LOWER/UPPER AIRSPACE	
Designator	Significant Points
1	2
	ODBAT 293221N 0392626E AL JOUF (AJF) 294722N 0400418E GIBAM 300018N 0401632E VELOT 300703N 0402257E GADLI 302312N 0403821E ARAR (AAR) 305429N 0410832E
N704	IMRAD 260506N 0354444E WEJH (WEJ) 261046N 0362917E NADIK 261815N 0374637E RABDA 262048N 0381440E HALAIFA (HLF) 262603N 0391609E MUPVI 262943N 0403437E LAKRO 263051N 0410241E DAXAP 262142N 0430228E GASSIM/PRINCE NAIF BIN ABDULAZIZ (GAS) 261753N 0434647E NAGSA 261811N 0443117E LABIS 261815N 0451755E PUSLA 261758N 0461706E LOROX 261751N 0463021E MAGALA (MGA) 261720N 0471225E MUSRI 261647N 0474137E
N705	MISUK 290507N 0290621E *Note 7 (SALUN-MISUK- ~~TORBO~~) BOPIX 295154N 0282438E MUPSO 310034N 0272139E MERSA MATRUH (MMA) 311911N 0271320E SALUN 340000N 0242700E
N707	KATOD 283141N 0475554E *Note 7 (KATOD-KITUB) COPPI 275033N 0474359E EMENI 273234N 0473848E RADGI 272640N 0473708E MAANI 270812N 0473152E LUGAL 264603N 0472235E MAGALA (MGA) 261720N 0471225E AVOBO 260334N 0470719E ESRAT 255117N 0470247E RIYADH/KING KHALED (KIA) 245310N 0464534E MUNTO 235345N 0463459E DEBAS 231059N 0462728E KITUB 224922N 0462342E MIDKA 222633N 0461148E LABSI 221126N 0460358E WADI AL DAWASIR (WDR) 203019N 0451219E
N708	RASNO 342000N 0212758E EL BEDIA (LAB) 324641N 0220113E *Note 7 (LAB-DITAR) MKILY 315900N 0222000E OBNUS 295400.60N 0232848E DITAR 265903N 0250000E
N709	ROTEL 264015N 0502149E

6.5A-69

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	SIBGA 263416N 0500134E DAMMAM/KING FAHD (KFA) 262951N 0494643E SETBA 261346N 0491921E DEMKA 261008N 0491310 MIBRA 255654N 0485053E
N710	BOPIX 295154N 0282438E KIVIL 293845N 0284415E TAKRI 292503N 0290432E
N711	MISRATA (MIS) 321852N 0150440E CIBIA 324012N 0160112E SOLUN 325912N 0170000E DOLFI 331248N 0174312E TUNAR 332448N 0182212E FARUJ 333124N 0184354E RAMLI 334300N 0192300E RASNO 342000N 0212758E
N713	RASKA 190732N 0390329E *Note 7 (RASKA-JDW) EGMEG 205130N 0383336E JEDDAH/KING ABDULAZIZ (JDW) 214244N 0390723E
N715	TONVO 250500N 0563200E *Note 7 (UMEVU-TONVO) LUBAT 250223N 0561749E IMPED 2458254.5N 0560406.2E UKVAK 245147N 0553329E GEVIV 244118N 0545000E IMLIP 243648N 0543549E KUGTO 243231N 0542224E UKILI 2438165.5N 0535636.4E ALNEV 244601N 0534122E KAXOB 245423N 0532450E UMEVU 250545N 0530653E
N717	DASUT 261832N 0531108E VEKEL 261929N 0535738E MIRIT 262013N 0545411E ORPEN 263119N 0552008E GHESHM ISLAND (KHM) 264547.4N 0555428.76E
N718	ITRAX 241248N 0554749E *Note 7 (MCT - ITRAX) LOPIL 235642N 0561400E IVETO 233520N 0570704E ALMOG 233524N 0574940E MUSCAT (MCT) 233528.04N 0581536.48E
N720	PORT SUDAN (PSD) 192404N 0371430E FEREB 183430N 0375818.60E ULONI 172536N 0385842E
N722	DATRI 244239N 0513407E RASBO 243342N 0512817E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-70

LOWER/UPPER AIRSPACE	
Designator 1	Significant Points 2
	LADBO 242004N 0511411E SITER 241107N 0485443E
N764	NOBSU 171554N 04313158E LABDO 164842N 0442032E IMDEN 162101N 0452744E LOPAD 161651N 0453738E MEGPA 160017N 0461653E PAPOR 154322N 0465652E DEKMA 152226N 0474553E PAXUD 145436N 0485045E MUKALLA (RIN) 144015.30N 0492329.30E XABIL 142924N 0494809E NOTBO 142609N 0495530E ~~ORBAT~~ IMPAG 140638N 0503924E GESIX 134440N 0512823E KAVAN 133250N 0515431E RAPDO 132317N 0521532E KEDAV 125553N 0531509E SOCOTRA (SCT) 123748.8075N 0535428.7068E SUHIL 120000N 0550000E (AVELI 112201N 0560800E)
N767	PARAR 222630N 0630700E *Note 7 (PARAR-ELIGO) VUSIN 225940N 0605510E ATBED 230352N 0603752E ELIGO 232458N 0590848E
N881	RASKI 230330N 0635200E SETSI 230412N 0614410E KIPOL 230410N 0612903E *Note 7 (TULBU-KIPOL) ATBED 230352N 0603752E AMBOS 230324N 0595405 MUSRU 230256N 0592223E OBTIN 230216N 0585920E GIDAN 230104N 0582232E GEVED 230105N 0575111E TULBU 230005N 0571827E
N929	~~DASLO 254537N 0523029E~~ *Note 7 & 8 to (DASLO-GIBUS) ~~NAGOG 255214N 0521615E~~ ~~BONAN 260201N 0515505E~~ ~~VEDED 260558N 0514628E~~ ~~SOGAT 262029N 0511443E~~ ~~TOSTA 262746N 0504913E~~ ~~DANAG 264438N 0494856E~~ ~~NADNA 264245N 0485309E~~ ~~SILNO 264026N 0475745E~~ ~~ASKOK 262623N 0474809E~~ ~~MUSRI 261647.0N 0474137.0E~~ ~~GIBUS 255724.0N 0472829.0E~~
N982	SARKI 342000N 0131447E

6.5A-71

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2

*Note 7 (MIS-SARKI)
ODGAX 333755N 135256E
MISRATA (MIS) 321852N 0150440E
KALIJ 313300N 0160000E
SIRTE (SRT) 310333N 163552.20E
DAHRA (DHR) 292803N 175554E
ARRIG 272930N 0200112E
KUFRA (KFR) 240912N 231831.20E

P32 (VANIX 344939N 0212327E)
EKLIS 342000N 0202855E
RAMLI 334300N 0192300E
ORGON 325245.60N 0184052.20E
CILBA 311800N 0172400E
DERNI 301328.20N 016401500E
HON (HON) 290800N 0155700E
ALGAF 281000N 0151600E
LOSAD 275441.40N 0150522.80E
SEBHA (SEB) 265944N 0142735E

P126 (SUDIK 352428.80N 0143028.80)
*Note 7 (GARIN-SUDIK)
LUMED 342000N 0144203E
SAMAK 332412N 0145236E
MISRATA (MIS) 321852N 0150440E
NAMWA 312542N 0151824E
NJEIM 305533.60N 0152736E
HON (HON) 290800N 0155700E
FUGHA 281001N 0160541E
HORUJ 270906N 0161442E
TMISA 262548N 0162054E
NADED 250000N 0163602.40E
GARIN 220000N 0170636E

P128 (DJERBA (JBA) 335238.40N 0104617.40E)
TANLI 332938N 0113000E
*Note 7 (LAB-TANLI)
AMWAJ 332842N 0123754E
HITAN 332736N 0132624E
SAMAK 332412N 0145036E
OJAAJ 331548N 0170000E
DOLFI 331248N 0174312E
PUFER 325901N 0194748E
EL BEDIA (LAB) 324641N 0220113E
LOSUL 314100N 0250800E

P146 RASHT (RST) 371935.48N 0493657.4E
GODNA 382033N 0465457E
MURID 382744N 0463525E
SIBVU 384444N 0454657E
REXUS 385624N 0451332E
AGINA 391924N 0440512E
(AGRI (ARI) 393845.49N 04301387.50E)

P300 KALDE (KAD) 334827.70N 03529109.53E
LATEB 340154N 03624043.60E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-72

LOWER/UPPER AIRSPACE	
Designator 1	Significant Points 2
P302	MIDSI 264142N 0515442E DASDO 285401N 285401N
P304	~~EMISO 231734N 0562307E~~ ~~DEMKI 224941N 0562308E~~ ~~NAMVA 223309N 0562223E~~ ~~TOPSO 215653N 0562043E~~ ~~KUROV 211627N 0561853E~~ ~~VELIK 203322N 0561656E~~
P307	SERSA 251945N 0553118E *Note 7 (SERSA-VAXIM) PAVAG 251546N 0554042E ITBON 251426N 0555257E KULBA 251326N 0560153E NOLSU 251248.0N 05607387.8E TONVO 250500N 0563200E PURNI 243804N 0574354E *Note 8 (OO) KUNUS 241927N 0583226E ALSAS 240054N 0591955E DERTO 235033N 0594746E VAXIM 231900N 0611100E SETSI 230412N 0614410E PARAR 222630N 0630700E
P309	AVONO 092606N 0335418E BOTOK 102859N 0334548E SODIL 105401N 0334204E ELULA 143253N 0330853E KUVTI 163152N 0325025E SOGAD 171404N 0324125E NUBAR 220000N 0313824E
P310	RASNO 342000N 0212758E RAMLI 334300N 0192300E FARUJ 333124N 0184354E TUNAR 332448N 0182212E DOLFI 331248N 0174312E SOLUN 325912N 0170000E CIBIA 324012N 0160112E MISRATA (MIS) 321852N 0150440E
P312	MUKALLA (RIN) 144015.30N 0492329.30E ULDIB 141148N 0485422E AMBOD 133357N 0481527E DATEG 123549N 0471627E TIMAD 115500N 0463500E (EGROV 112042N 0455900E)
P313	VATEN 153358N 0323312E KAREP 151838N 0313308E ASNON 150818N 0305312E DELAM 144001N 0290644E DEBOX 144424N 0281037E

6.5A-73

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	GAMAR 150042N 0240843E IPONO 150624N 0222436E
P315	NUBAR 220000N 0313824E SOMAK 190301N 0314717E MEROWE (MRW) 1824498.84N 0314948.95E ITOMO 102133N 0322108E IMDUR 074114N 0323107E
P316	~~SALALLAH (SLL) 170259.35N 05406576.91E~~ ~~*Note 7 (OO)~~ ~~DAXAM 171612N 0544715E~~ ~~*Note 7 (DAXAM MCT)~~ ~~KAPOP 174544N 0550930E~~ ~~GAGLA 180505N 0552410E~~ ~~NALTI 182012N 0553431E~~ ~~DEDSO 185811N 0560041E~~ ~~GIVNO 195011N 0563059E~~ ~~MOBAB 201032N 0564415E~~ ~~GISKA 213503N 0574014E~~ ~~RADAX 220809N 0580230E~~ ~~MUSCAT (MCT) 233528.04N 0581536.48E~~
P318	KABLA 035959N 0322130E JUBA (JUB) 045234N 0313559E
P319	DAROR 270244N 0495815E *Note 7 (DAROR-DASUT) RAMSI 270249N 0500714E GASSI 270257N 0502229E VELOG 270215N 0503056E TOSDA 270005N 0505629E OBTAR 265934N 0510309E
~~M600~~ P320	TUMAK 255031N 0531108E *Note 7 (TUMAK-KUMBO) VEDOM 260109N 0524456E ORLUP 260651N 0523216E VELAK 261307N 0521821E LABOP 261907N 0520429E ALTOM 262230N 0515639E BOPOV 262430N 0515043E ALMOK 262832N 0513840E GITBO 263527N 0511750E VEDOS 264106N 05100445E MOGAS 264800N 0503909E RAKAK 265221N 0502618E RAMSI 270249N 0500714E ORNAK 272854N 0493248E SOLEM 275229N 0491136E KUMBO 281705N 0485526E
P322	AVONO 092606N 0335418E SITIK 092556N 0310809E DEMTI 093203N 0264506E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-74

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
	ALMAM 093345N 0244451E MONAN 093300N 0234000E
P323	(DONSA 143518N 0651136E) GIDAS 1420040N06000006E TOKPU 145122N 05711034E DAPAB 151115N 0552354E NODMA 1526036N 0533359E NANRI 160754N 0521603E ENADO 153333N 0532015E DAVRA 155918N 0523209E TAKMI 160542N 0522012E AL GHADAH (GDA) 16117.00N 0520942.99E SIMKO 161821N 0515526E OBTAS 164633N 0505756E KEBER 170444N 0502029E THAMD 171700N 0495500E KANEM 173700N 0492655E ALNES 181818N 0482811E KUTMA 182927N 0481202E GERUG 185530N 0473402E DAVLO 192343N 0465227E WADI AL DAWASIR (WDR) 203019N 0451219E
P324	ELGENIENA (GNA) 132824N 0223207E HAMID 140400N 0254023E DELAM 144001N 0290644E
P425	~~DAHRAN (DHA) 261538N 0500824E~~ *Note 8 to ALSER ~~BAHRAN (BAH) 261551N 0503855E~~ ~~DAVOV 262255N 0504012E~~ ~~DATGO 262957N 0504130E~~ ~~TOTLA 263806N 0504301E~~ ~~MEMKO 264611N 0504427E~~ ~~BOXOG 265403N 0504553E~~ ~~ALSER 271100N 0504900E~~
P430	DOHA/HAMAD INTL (DOH) 251459.66N 05136354.80E (DOH) 251459N 0513635E *Note 7 & 8 (DOH-ALTOM) to MIDS BAYAN 252926N 0514849E *Note 7 to MIDS (BAYAN-ALTOM) KAPAX 254218N 0515118E VUTAN 255016N 0515218E ALVEN 255418N 0515315E BONAN 260201N 0515505E RAMKI 261138N 0515625E ALTOM 262230N 0515639E
P440	EMIXI 242105N 0520019E *Note 7 (ALGUX-EMIXI) ELIGA 242121N 0530148E ASRAT 242114N 0535944E ALGUX 242247N 0541209E

6.5A-75

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
P513	BUBAS 245938N 0570003E GERAR 240600N 0573616E MIXAM 234139N 0575523E MUSCAT (MCT) 233528.04N 0581536.48E
P517	WAFRA (KFR) 283715N 0475729E DEKOB 283135N 0475106E *Note 7 (DEKOB-EMARO) GOVAL 281211N 0472908E DUSBO 280616N 0465254E KAPAG 280355N 0463845E NONLU 275921N 0461137E KING SAUD AIR BASE (KMC) 275250N 0453321E EMARO 273342N 0451330E
P550	ALVEN 255418N 0515315E BONAN 260201N 0515505E *Note 7 (ALVEN-SYZ) MODOG 261012N 0515935E LABOP 261907N 0520429E KUMLA 262609N 0520822E RAGAS 263537N 0521337E KAPIP 264322N 0521403E PEGET 270434N 0521515E MIXEM 271520N 0521556E LAGSA 283306N 0522056E SHIRAZ (SYZ) 293225.46N 0523520.19.6E REXEB 295208N 0520923E YASOUJ (YSJ) 304136.0N 0513324.4E RASLA 331202N 0493409E RIGOX 350618N 0475636E TUGEL 361220N 0470444E LAKLI 373730N 0455519E VUVAG 382529N 0452926E BORES 382829N 0452137E DASIS 385435N 0441230E
P552	DATEG 123549N 0471627E SEPRO 132824N 0475035E ULAXI 141524N 0482317E RASBA 144124N 0484128E BOSAX 144740N 0484553E PAXUD 145436N 0485045E DEMNA 151652N 0490626E RALMO 153824N 0492155E GINBO 160349N 0494017E KEBER 170444N 0502029E ITELI 171310N 0502605E IMPOS 183137N 0511848E
P555	OBVOM 241503N 0515552E LONUT 241520N 0530149E IMKUD 241513N 0535956E RAPNO 241452N 0541559E ATUDO 241708.0N 0543432.0E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-76

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
P556	ASKON 061745N 0262537E PEDOS 094018N 0290715E SISOR 124543N 0313859E ELULA 143253N 0330853E IMLAS 173413N 0354541E BOGUM 200636N 0380300E
P557	NUBAR 220000N 0313806E *Note 7 (NABSI-NUBAR) ALKED 222152N 0313052E ORLEX 225732N 0311859E DESDO 251932N 0303034E VUTAB 252648N 0302802E IMLAX 252924N 0302707E MEVDA 254818N 0302029E DAVIX 262034N 0300904E TUDSI 264114N 0300128E MISUK 290507N 0290621E LOTOB 293510N 0290601E OBRAN 302957N 0290522E GOMGO 311152N 0290446E NABSI 314353N 0290419E
P558	SODEX 234954N 0553202E *Note 7 (TULBU-SODEX) DOLFI 233253N 0555024E KUNGO 230034N 0565850E TULBU 230005N 0571827E
P559	RASLI 315424N 0383648E TURAIF (TRF) 314136N 0384408E *Note 7 (TRF-VUTEB) KAVID 303552N 0401147E GADLI 302312N 0403821E DELNI 300448N 0411627E TOKLU 294213N 0420220E LUDEP 290948N 0430646E RASMO 285713N 0433119E LOTOK 280834N 0450402E KING SAUD AIR BASE (KMC) 275250N 0453321E BOTEP 274420N 0461425E RADGI 272640N 0473708E ALPOT 271841N 0480511E *Note 8 (ULOVO-NAPLO) SILBA 270554N 0485301E KURKA 270449N 0491636E EGREX 270433N 0492158E DAROR 270244N 0495815E RAMSI 270249N 0500714E GASSI 270257N 0502229E KOBOK 265839N 0503349E DEBEN 265254N 0504856E DAVRI 264936N 0505732E SODAK 264634N 0510530E DANOB 263946N 0512640E BOTOB 263350N 0514505E

6.5A-77

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	ROSAN 263129N 0515220E KUMLA 262609N 0520822E ASPAK 262115N 0522257E UKUBU 261428N 0524039E TOMSO 260611N 0530214E NALPO 255602N 0532945E SOKAK 255131N 0534251E KIVUS 254522N 0540032E PUSOT 253919N 0542011E AMBOV 253439N 0543512E VUTEB 2536454.6N 0545149.4E
P560	~~PORT SUDAN (PSD) 311743N 0321416E~~ ~~BOGUM 200736N 0380360E~~ ~~AL BAHA (BHA) 2017833N 04137845E~~ ~~KITAP 224928N 0522923E~~
P560	RAMLI 334300N 0192300E *Note 7 (RAMLI-OLMAX) OLMAX 342000N 0180750E
P561	~~BENINA (BNA) 320728N 0201513E~~ ~~KATAB 292501N 0290506E~~
P562	~~DEESA 294509N 0364102E~~ ~~ENABI 290739N 0385650E~~ ~~TAMRO 283938N 0424147E~~ ~~LOTOK 280857N 0450512E~~
P563	~~HAIL (HIL) 272630N 0414159E~~ ~~PASAM 273145N 0345642E~~ ~~HURGHADA (HGD) 271140N 0334847E~~
P563	MITIGA (MTG) 325338N 0131619E *Note 7 (MTG-LUMED) ODGAX 333755N 135256E LUMED 342000N 0144203E
P565	KAFIA 084400N 0233100E LOPON 100606N 0240338E GINKA 124701N 0250831E HAMID 140400N 0254023E EGSUM 185726N 0274545E ATMUL 220000N 0290530E
P566	VATEN 153358N 0323312E KAREP 151838N 0313308E ASNON 150818N 0305312E DELAM 144001N 0290644E ~~ELFASHER (FSR) 133554.09N 02518110.66E~~ ILBIB 123242N 0222700E
P567	KAMAR 323900N 0604400E ~~BIRJAND (BJD) 3258210.7N 05912010.5E~~ PATEN 340825N 0572334E DAPIN 342034N 0570413

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-78

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	ALROT 351116N 0554136E ITELO 353534N 0550052E ODKAT 354650N 0544146E DASHT-E-NAZ (DNZ) 363854.6N 0531120.4E DASEL 371113N 0522020E RIGAN 373543N 0514052E ULDUS 380000N 0510100E (NETON 394542N 0481142E)
P568	EPLAS 040000N 0341148E KUNDI 083920N 0313819E PEBOR 095738N 0305437E RAMKO 102439N 0303926E JEBRA 125520N 0291349E DEBOX 144424N 0281037E BOXIG 155958N 0272606E ELUXO 182038N 0260126E ELOXO 183827N 0255031E EMAMU 191646N 0252654E ORNAT 200000N 0250000E
P570	(TEGOR 183503.39N 06230032.70E) KITAL 200300N 0601800E GOLNI 210014N 0594130E TAVKO 211519N 0593147E BONOM 213636N 0591800E EMURU 221357N 0585338E TOLDA 224008N 0583624E GIDAN 230104N 0582232E ITURA 232351N 0580720E MIXAM 234139N 0575523E
P572	KISAL 101811N 0232526E GAILY 123030N 0270639E VATEN 153358N 0323312E
P573	ELIMO 342000N 0162210E *Note 7 (ELIMO-BNA) RZAAM 324818N 0191536E BENGHAZI BENINA (BNA) 320728N 0201513E
P574	(BOLIS 203333N 0650002) TOTOX 215030N 0622230E LOSIM 223513N 0603238E KAXEM 225103N 0595243E MUSRU 230256N 0592223E PAROK 231030N 0590245E *Note 7 (PAROK-SERSA) KUSRA 23472426N 0582611E MIXAM 234139N 0575523E DAPOK 235956N 0572959E EMATA 242309N 0565721E SOLUD 243223N 0564421E PUXIL 244117N 0563145E GISMO 244743N 0562236E MIVEK 245240N 0561516E IMPED 2458254.5N 0560406.2E

6.5A-79

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	NORGA 250352N 0555415E RUKOR 250823N 0554603E SERSA 251945N 0553118E TOVIV 253302N 0551942E KUMUN 254000N 0551512E *Note 4 (KUMUN-PAPAR) PAPAR 264000N 0542700E SHIRAZ (SYZ) 293225.46N 0523520.196E ASNIT 303854N 0520948E OBTUX 312223N 0515242E LOXAK 314454N 0514344E EGPAT 323330N 0512409E IMRAG 325142N 0511643E PEKAM 332904N 0510118E EGVEL 344258N 0503005E SAVEH (SAV) 3501076.8N 05022176.9E SOGOL 350829N 0503128E RUDESHUR (RUS) 3526443.7N 0505419.3E TEHRAN (TRN) 354149.4N 05117021.6E NAGMO 360214N 0512055E DANEB 362001N 0512408E NOSHAHR (NSR) 363946.4N 0512751.4E ULEXI 374344N 0510631E ULDUS 380000N 0510100E (IBRUT 413524N 0510354E)
P634	~~LALDO 251806N 0563600E~~ *Note 7 ~~ATBOR 251007N 0551947E~~
P693	AL AHSA (HSA) 2516445N 0492903E LADBO 242004N 0511411E *Note 8 to BUNDU BATHA (BAT) 241257N 0512707E DEMTA 241926N 0513533E BUNDU 250024N 0522924E
P699	TUKSI 252006N 0560525E *Note 7 (TUKSI-BAHR) PAVAG 251546N 0554042E IVOXI 25124039.6N 0552513.4E TUDIS 251009N 0550825E EGTAG 250856N 0545652E NABIX 251241.4N 0543147.3E MOBUL 251559N 0541841E VEGEK 251837N 0540803E RAGDO 252212N 0535106E OXARI 252535N 0533458E IMGUX 252950N 0531428E ORMID 253354N 0525434E *Note 8 (ORMID-KFA) DASLO 254537N 0523029E ALKAN 255214N 0521615E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-80

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	BONAN 260201N 0515505E VEDED 260558N 0514628E KUNDO 261631N 0512325E SOGAT 262029N 0511443E RIKET 261952N 0510954E ASTAD 261812N 0505646E BAHRAIN (BHR) 261530N 0503919E NARMI 261802N 0501939E ~~KING FAHAD (KFA) 262153N 0494910E~~
P700	*Note 5 (ROTOX-DENVO) ROTOX 283323N 0494809E *Note 7 (DENVO-ROTOX) GEPUT 281307N 0493423E DAMUR 280137N 0492638E GIRSI 274126N 0493311E ORDAN 271706N 0495442E RAMSI 270249N 0500714E LOTOR 264854N 0502200E EGMOR 264211N 0502907E DESBU 263240N 0503241E ELOS0 262409N 0503551E BAHRAIN (BHR) 261530N 0503919E TULUB 260644N 0510041E DENVO 260452N 0510509E
P702	LOTIN 342000N 0150959E *Note 7 (LOTIN-NAWRS) REXUN 333206N 0141539E NAWRS 325324N 0133148E
P703	NARMI 261802N 0501939E DAMMAM/KING FAHD (KFA) 262951N 0494643E TAYMA 264556N 0484212E
P705	ULIKA 251545N 0503849E *Note 7 (ULIKA-KIA) SALWA 251538N 0503048E AL AHSA (HSA) 251645N 0492903E KIREN 251447N 0490724E GOLNO 251155N 0483658E KOB0X 250716N 0474946E DEGLA 250243N 0472847E RIYADH/KING KHALED (KIA) 245310N 0464534E
P706	ABRAM 342000N 0123816E *Note 7 (ABRAM-NAWRS) SKATE 334500 0130018E SHELL 3320224N 0131530E NAWRS 325324N 0133148E
P707	DEMGO 120258N 0483040E ALMIL133844N 0501022E IMPAG 140638N 0503924E KIRAD143953N 0511241E

6.5A-81

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	NODLI 150301N 0513549E DAVRA 155918N 0523209E KAPET 163322N 0530614E
P708	LONOS 283027N 0491713E ORGEL 281312N 0494614E DATEN 273118N 0501832E REVAX 272026N 0502651E GETAL 270410N 0504040E DEBEN 265254N 0504856E RASDI 260425N 0512407E VELAM 255426N 0514347E VUTAN 255016N 0515218E RESAR 253707N 0522328E ALSEM 252703N 0524322E OVONA 252443N 0524739E
P709	VARIG 342000N 0134350E *Note 7 (VARIG-ZAW) DISOL 334113N 0131428E ZAWIA (ZAW) 324643N 0123847E
P710	PASAM 273045N 0345542E GEPAG 275526N 0351738E
P711	GOBRO 193622N 0534741E GEROL 201443N 0532243E DAXUT 203706N 0530802E IVABO 204749N 0530058E EGSAB 212446N 0523634E SILBU 214512N 0522304E VATIX 215522N 0521638E DEGPA 221801N 0520227E LABDU 222457N 0515807E MIGMA 225035N 0512749E
P712	NARMI 261802N 0501939E *Note 7 (NARMI-KIA) SETBA 261346N 0491921E BOSIV 261258N 0490837E EMUSA 261101N 0484317E GETOT 260646N 0481025E AKRAM 255036N 0475133E ETBAS 253451N 0473318E RIYADH/KING KHALED (KIA) 245310N 0464534E
P713	ROTOX 283323N 0494809E *Note 5 & 7 (PATOM-ROTOX) GODRI 280257N 0494308E ITNAS 274644N 0493957E ORSOL 272135N 0500208E TOKMA 270939N 0501159E OVUPI 265320N 0502727E OBMON 263832N 0504125E EGPUD 262904N 0505019E LUBET 261441N 0510347E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-82

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	PATOM 255821N 0511836E
P715	KUVER 280925N 0500600E *Note 7 (MESVI-KUVER) ALNIN 283306N 0501036E KHARK ISLAND (KHG) 291550.0N 05019010.7E MESVI 311057N 0500006E
P718	PAXER 345612N 0551237E ITELO 353534N 0550052E SOMAD 372645N 0543255E
P720	TIKAT 122418N 0353812E EMITA 142130N 0334442E
P721	DUDRI 190000N 0520000E *Note 7 (DUDRI-MEDMO) MEDMO 194837N 0521027E
P723	ULADA 264527N 0501624E *Note 7 (ULADA-MEDGO) KASES 264538N 0495709E ALVAP 264547N 0493524E DASVA 264551N 0492301E TAYMA 264556N 0484212E LABLI 264522N 0482100E MEDGO 264433N 0475257E
P751	(ARLOS 343731N 0225959.40E) AMIBO 345604.7N 213602.4E METRU 340000N 0250900E *Note 7 (KUNKI-METRU) MERSA MATRUH (MMA) 311911N 0271320E DASUM 310802N 0273234E TAKRI 292503N 0290432E KUNKI 290726N 0291949E ASYUT (AST) 270152N 0310157E LUXOR (LXR) 254458N 0324607E DANOG 251341N 0330905E UMINI 234900N 0341006E ALEBA 220000N 0352700E TOMRU 204411N 0361950E PORT SUDAN (PSD) 192404.12N 0371430.21E *Note 1 [ASMARA] - *Note 1 151704N 0385403E TOKAR 180624N 0374812E DEKRA 123924N 0431544E PARIM 123142N 0432712E ARABO 123852N 0440401E DIRAK 124211N 0442113E ADEN (KRA) 124952.209N 0450125E RABOL 125856N 0454119E MIXAN 132222N 0472427E SEPRO 132824N 0475035E AMBOD 133357N 0481527E SOKEM 134235N 0485329E PAXED 135027N 0492759E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-83

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	XANLO 135653N 0495628E ORBATIMPAG 140638N 0503924E RIGAM 143932N 0530414E DAPAB 151115N 0552354E ANGAL 1614046N 06000046E (MAMIG 161404N 0600004E)
P752	PATOG 180241N 0464631E ALROG 173458N 0464651E SEVSA 172925N 0464655E NADKI 171417N 0464703E ALSIR 165804N 0471248E UKPAD 165415N 04718498.60E ALSOD 1642043.60N 0473753.40E NADAK 161935.40N 0481259.40E DANIN 1605443.80N 04834387.80E SAYUN (SYN) 1557432.64N 0484710.18E
P753	ASKET 181905N 0470113E NITPO 174554N 0472624E PADUR 172958N 0473825E TASBI 165853N 0481118E XALTA 163546.20N 0483545E GIBAX 162047N 0485137E SAYUN (SYN) 155743N 0484710E
P891	MUSRI 261647N 0474137E *Note 7 (MUSRI-KUA) MEDGO 264433N 0475257E GESOR 270322N 0475751E KEDAT 272149N 0475901E IVOBA 274138N 0480219E KEBOK 274951N 0480341E KUNRU 283220N 0481050E KUWAIT (KUA) 291457N 0475717E
P899	MIXAM 234139N 0575523E *Note 7 (MIXAM-KUPSA) VELOD 234611N 0573435E PAXIM 240245N 0561631E ITRAX 241248N 0554749E VAVIM 241535.4N 05536232.9E ROVOS 241825.0N 0552143.0E SIXIV 242009N 0550439E UMIBU 242331N 0543027E MEKRI 2431232.8N 0535500.0E *Note 8 (OB) KUMSI 245050N 0523619E MEKMA 245430N 0522506E KUPSA 250445N 0521151E
P975	(LEKRO 3716398.80N 0405817.30) LESRI 370420N 0411348E SIDNA 363458N 0414159E TUBEN 351724N 0425434E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-84

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	MUTAG 343003N 0433834E *Note 7 (MUTAG-LONOS) SOGUM 341212N 0435454E PUTSI 333200N 0443700E SINKA 332137N 0444753E NOLDO 324932N 0452129E KATUT 323737N 0453439E DENKI 322228N 0455122E ILMAP 351724N 0460921E ULDUR 305023N 0472958E SIDAD 295231N 0482944E EGVAL 292448N 0484545E SESRU 290900N 0485450E DANAL 285128N 0490450E IMDOX 283455N 0491438E LONOS 283027N 0491713E ~~ORGEL 281312N 0494614E~~ ~~DATEN 273118N 0501832E~~ ~~REVAX 272026N 0502651E~~ ~~GETAL 270409N 0504039E~~ ~~LOSI 270118N 0504208E~~ ~~BOXOG 265403N 0504553E~~ ~~NABOS 264354N 0505145E~~ ~~TOTIS 261119N 0511026E~~
R2	ATMUL 220000N 0290527E TULOP 252209N 0262226E DITAR 265903N 0250000E ARADA 304636N 0213348E BENGHAZI BENINA (BNA) 320728N 0201513E
~~R205~~	~~ANARAK (ANK) 333215N 0534347E~~ ~~BIRJAND (BJD) 325821N 0591200E~~
R219	KUKLA 341438.34N 034444.76.8E KALDE (KAD) 3348276.70N 03529109.53E
R401	(EKBEL 112256N 0550000E) SUHIL 120000N 0550000E BOTEM 135413N 0551418E DAPAB 151115N 0552354E KIVEL 165306N 0553633E ERDAX 175903N 0554458E DEDSO 185811N 0560041E HAIMA (HAI) 195813.3N 05616510.82E VELIK 203322N 0561656E *Note 7 (VELIK-GABKO) ALNUN 211625N 0561041E SUTLI 220121N 0560404E DATBU 222243N 0560054E KATAK 224811N 0555708E LABSA 230153N 0555505E DOLFI 233253N 0555024E KURTA 234205N 0554900E MUSAP 241754N 0555245E PEDOG 242225.4N 05553343.7E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-85

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	GIDIS 243600.0N 0555600.0E ANVIX 244655.0N 0555616.0E NORGA 250352N 0555415E ITBON 251426N 0555257E MISEG 252134N 0555205E ITLAP 254925N 0555010E ASNEK 255631.0.7N 0554905.4.7E GABKO 260404N 0554755E
R402	~~LAKLU 232235N 0570401E~~ ~~KUNGO 230034N 0565850E~~ ~~NALKI 224928N 0565614E~~ ~~*Note 7 (NALKI HAI)~~ ~~MOGOK 215057N 0564236E~~ ~~TUBSA 204029N 0562626E~~ ~~HAIMA (HAI) 195813.31N 05616510.82E~~
R462	(BIVIN 250350N 0614744E) METBI 245556N 0612816E DENDA 244230N 0605451E EGTAL 243458N 0603724E ASLOM 242113N 0600552E MIXOL 240523N 0592959E ALSAS 240054N 0591955E VUSET 235540N 0590812E *Note 7 (VUSET-MIXAM) MIXAM 234139N 0575523E
R611	KHARTOUM (KTM) 153358.7.93N 0323312.16E EMITA 142130N 0334444E TIKAT 122418N 0353812E
R650	ASRAB 254726N 0330619E KUSAT 264748N 0333617E HURGHADA (HGD) 271040N 0334747E IMLUX 273131N 0340323E SHARM EL SHEIKH (SHM) 275953N 0342448E DELNA 283040N 0343212E NUWEIBAA (NWB) 290156N 0344016E NALSO 293210N 0345242E
R652	ULINA 292451N 0345818E METSA 292707N 0345903E BAKIR 294053N 0350708E QATIM 295600N 0351600E LOXUS 301300.90N 0352600E LOSIL 304851.20N 0354741.34E QATRANEH (QTR) 311454.44N 0360334.31E EGLOT 3116576.94N 0363214.16E KULDI 311847.07N 0363214.16E KIPAS 312324N 0370641E GURIAT (GRY) 312445N 371712E OBROD 312943N 0374158E TURAIF (TRF) 314136N 0384408E OVANO 314801N 0390951E *Note 7 (OVANO-GIBUX)

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-86

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	DAXAN 320512N 0393719E KASIR 323954N 0403112E GIBUX 330500N 0411100E RAPLU 332300N 0414530E GEPAP 334906N 0422851E MUTAG 343003N 0433834E DAVAS 351724N 0451235E
R654	MAGRI 385408N 0462300E DARUN 383339N 0464235E GODNA 382033N 0465457E BUDED 375313N 0472032E DAMOS 372619N 0474521E ZANJAN (ZAJ) 3646476.8N 04821121.9E TULGU 362836N 0484235E SAVEH (SAV) 3501076.8N 05022176.9E EGVEL 344258N 0503005E PEKAM 332904N 0510118E ESFAHAN (ISN) 334449.4N 05149410.8E LADAL 322226N 0525543E TOVTA 320528N 0534421E YAZD (YZD) 3153521.6N 05416587.7E BOMUN 313648N 0544555E UKVEV 310557N 0553718E ALMOB 303434N 0562824E KERMEN (KER) 301658.4N 0565632.3E ALKUL 295152N 0571535E PEDUK 285920N 0575447E NABOX 281630N 0582601E LADPA 265331N 0592514E DUGLI 264014N 0593431E NAGES 262451N 0594514E EGPER 255210N 0600737E CHAH BAHAR (CBH) 2526421.9N 06024521.7E EGPIC 250811N 0603730E DENDA 244224N 0605451E
R655	(KOBEN 344437N 0340624E) BALMA 342856.30N 0350302.30E CHEKA (CAK) 3418021.81N 0354200159.64E CEDAR 341713.20N 0360004.30E LEBOR 341556N 0363514E KARIATIN (KTN) 341248N 0371551E FIRAS 335218N 0375512E TANF (TAN) 332900N 0383920E
R659	TEHRAN (TRN) 354149.4N 05117021.6E *Note 7 (ISN-TRN) BOXAM 343749N 0515147E VAVIN 341709N 0520247E DAPOG 333744N 0522331E *Note 3 (DAPOG-SYZ) ESFAHAN (ISN) 324449.4N 05149410.8E GIDEN 320039N 0520026E GESIP 314556N 0520359E KAVOT 304111N 0521922E

6.5A-87

LOWER/UPPER AIRSPACE

Designator	Significant Points
1	2
	SHIRAZ (SYZ) 2932254.6N 052352019.6E LAGSA 283306N 0522056E KATAG 282346N 0521841E *Note 7 (KATAG-EMISA) DURSI 271219N 0520144E KAVAM 265737N 0515818E MIDSI 264142N 0515442E *Note 8 (MIDSI-DOH) SOGAN 263915N 0515408E ROSAN 263129N 0515220E BOPOV 262430N 0515043E RABLA 261506N 0514834E VEDED 260558N 0514628E VELAM 255426N 0514347E EMISA 254658N 0514207E DOHA/HAMAD (DOH) 251500459.66N 05136354.80E
R660	(ERZURUM (ERZ) 395724N 04112265.70E) DASIS 385435N 0441230E BORES 382829N 0452137E VUVAG 382529N 0452926E TABRIZ (TBZ) 3808543.5N 04612476.6E RAKED 375621N 0470712E BUDED 375313N 0472032E RALGO 372840N 0490112E RASHT (RST) 3719354.8N 0493657.4E DEDLA 365620N 0500044E NABAX 360955N 0504816E TEHRAN (TRN) 354149N 0511702E
R661	DULAV 385700N 0453800E RABDI 384804N 0454431E SIBVU 384444N 0454657E TABRIZ (TBZ) 3808543.5N 04612476.6E RUDAD 374045N 0465741E ZANJAN (ZAJ) 3646476.8N 04821124.9E SUTBU 363324N 0484732 MIVAK 355915N 0495324E RUDESHUR (RUS) 3526443.7N 0505419.3E IMAM KHOMAINI (IKA) 3524354.8N 05110432.5E VARAMIN (VR) 3520343.6N 05138143.8E DEHNAMAK (DHN) 351515N 0524312E
R674	SABEL 185158N 0520339E LOTEL 180926N 0514103E PASUL 180341N 0513803E GOGRI 170752N 0510857E OBTAS 164633N 0505756E RARBA 161021N 0503920E UKORA 152407N 0501547E NAKAD 150056N 0500402E DANAN 144010N 0495334E XABIL 142924N 0494809E EMABI 141627N 0494139E PAXED 135027N 0492759E DEMGO 120258N 0483040E

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5A

6.5A-88

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
R775	DEDLI 224232N 0373719E DASPA 230121N 0370841E SEDVA 235813N 0354006E ELELI 251854N 0332934E LUXOR (LXR) 254458N 0324607E
R777	DANAK 160800N 0412900E LAKNA 160000N 0420000E GOBLO 154050N 0432550E IMKAR 153511N 0435039E SANA'A (SAA) 1530002959.60N 04413110.60E PAVEN 144602N 0441112E EGNOL 140745N 0440929E TAIZ (TAZ) 13415049.53N 04408198.98E ARABO 123852N 0440401E TORBA 121036N 0440206E
R778	DITAR 265903N 0250000E KUFRA (KFR) 240912N 231831.20E TONBA 213518N 0195112E (ILDOR 200937.20N 180119.20E)
R784	KUSEN 251828.0N 0562340.0E *Note 7 (ORSAR-KUSEN) EMOPI 252620.0N 0560900.0E ALSIL 252911.4N 0554639.4E TOVIV 253302N 0551942E ALRAR 254058.2N 0550149.4E GONVI 25424039.8N 05456310.5E TATLA 254753N 0544008E EMOTA 255254N 0542414E GIBIB 255507N 0541712E ORSAR 260430N 0535730E LEVNA 261535N 0533857E EGMIT 263340N 0530825E *Note 8 (OM) PEGET 270434N 0521515E DURSI 271219N 0520144E IMDAT 274100N 0511100E ALNIN 283306N 0501036E NANPI 290457N 0493157E *Note 7 (SIDAD-NANPI) DESLU 292800N 0490150E SIDAD 295231N 0482944E
R785	TURAIF (TRF) 314146N 0384408.40 RASLI 315424N 0383648E KAREM 325110.40N 0380324.38E ZELAF 325700N 0380000E ABBAS 332610N 0374320E BASEM 333352N 0373938E KARIATAIN (KTN) 341248N 0371551E BRAVO 344118N 0363500E BANIAS (BAN) 351362N 0355729E

6.5A-89

LOWER/UPPER AIRSPACE

Designator 1	Significant Points 2
	DELTA 351228N 0354916E NIKAS 351136N 0354300E
R794	ULDUS 380000N 0510100E ULEXI 374344N 0510631E NOSHAHR (NSR) 363946N 0512751E DEHNAMAK (DHN) 3515145N 0524312E
R799	~~IMPOS 1831367N 0511848 E~~ ~~PASUL 180341N 0513803E~~ ~~TONRO 165850N 0522235E~~ ~~ASMAK 162327N 0524634E~~ ~~ENADO 153333N 0532015E~~
R845	(LIRMI 341435.40N 0111059.40E) GASRI 335609N 0113000E CLAMS 331700N 0120800E ZAWIA (ZAW) 324643N 0123847E MIZDA (IZD) 312709N 0130038E GHERIAT (GRT) 302341N 0133509E

c) Originated by: The ATM SG/8 meeting (Amman, Jordan, 07 – 10 November 2022)

d) Intended date of implementation: As soon as practicable after approval

e) Originator's Comments

The changes proposed herein are the result of work undertaken by the MIDANPIRG ATM SG/8 meeting; and the coordinating with MID States and airspace users. The Proposal for Amendment takes also into consideration the remaining ATS route challenges and issues as well as the airspace restructuring projects in the MID Region to enhance the ATS route network efficiency and availability during normal and contingency situations.

f) Secretariat's Comments

The proposal consolidates the previously approved proposal for amendments related to ATS routes as well as the input received from States and international organizations. The task was initiated by the ATM SG/4 meeting (Amman, Jordan, 29 April – 03 May 2018), finalized by the ATM SG/8 meeting (Amman, Jordan, 07 – 10 November 2022), endorsed by the MIDANPIRG/20 meeting (Muscat, Oman, 14-17 May 2023) and facilitated by the Secretariat.

g) Proposal circulated to following States and Organizations:

Bahrain

Egypt

Cyprus

Greece

Iraq

Iran, Islamic Republic of

Israel

Jordan

Kuwait

Lebanon

Libya

Malta

Oman

Qatar

Saudi Arabia

Sudan

Syrian Arab republic

United Arab Emirates

Yemen

**International
Organizations:**

CANSO

EUROCONTROL

IATA

IFALPA

IFATCA

APPENDIX 6.5B

MID REGION ROUTE CHALLENGES

No.	ATS route and Challenge Description	Target date	Action	Champion and relevant FIR(s)	Supported by	Status / remarks
1.	A403, this route is divided in two parts inside Libya: - GRT to BRACK is available - BRACK to SEB interrupted - SEB to TUMMO (FIR boundary) with designator A403F is available and extended in FTTT. It's not in Regional ATS route table		To add ANP 5LNC BRACK has been already allocated to USA, so Libya should change 5LNC	ATM SG, Libya	MID AIM SG	
2.	A418 was from PAPAR to KUMUN deleted		Subject to deficiency	ATM SG, Iran, UAE	MID AIM SG	
3.	A424 was from LOVEK to LOTAN deleted		Subject to deficiency	ATM SG, KSA, Iraq	MID AIM SG	
4.	B15 is from BALMA (FIR boundary) to KRD It's not in Regional ATS route table		To add ANP	ATM SG, Lebanon	MID AIM SG	
5.	G2 is from ELIKA to KAD It's not in Regional ATS route table		To add ANP	ATM SG, Lebanon	MID AIM SG	
6.	G202 was from DAM to KAD entirely deleted. The segment between ELIKA to KAD was renamed		Subject to deficiency	ATM SG, Syria, Lebanon	MID AIM SG	
7.	G665 segment between AAR to ABD is not available		Subject to deficiency	ATM SG, Iraq	MID AIM SG	
8.	G667, segment between ABD and ALSAM was removed in Baghdad FIR (it's a deficiency against Iraq)		Subject to deficiency	ATM SG, Iraq	MID AIM SG	
9.	G795 was from BSR to RAF deleted		Subject to deficiency	ATM SG, Iraq	MID AIM SG	

No.	ATS route and Challenge Description	Target date	Action	Champion and relevant FIR(s)	Supported by	Status / remarks
10.	L53 is established from GENEX (FIR boundary) extended inside of Israel and beyond		To add ANP	ATM SG, Jordan, Saudi Arabia	MID AIM SG	
11.	L417 is established from VUSEB to MUTAG which entirely located in Baghdad FIR MUTAG-NADOX was deleted		Change the ATS route designator (non-regional) Deletion from ANP Regional ATS route table	ATM SG, Iraq	MID AIM SG	
12.	L513 Waypoints MALLA, ADRAA, RDIMA, SWIDA		Such 5LNCs do not exist in ICARD and apparently are invented points. They shall not be used in official ICAO documentation as never reserved for Syria.	ATM SG, Syria	AIM SG	
13.	L602, this has the following segments: GEPAP-ELEXI (Baghdad/Damascus FIR boundary) has been suspended in Baghdad FIR			ATM SG, Syria, Iraq	MID AIM SG	
14.	L715 is established from GIBUX to LOVEK which entirely located in Baghdad FIR		Change the ATS route designator (non-regional)	ATM SG, Iraq	MID AIM SG	
15.	L718 is established from ALPET to INB (Two FIRs)		To add ANP	ATM SG, Iraq	MID AIM SG	
16.	M203 is established from PUSTO to ILMAP which entirely located in Baghdad FIR		Change the ATS route designator (non-regional)	ATM SG, Iraq	MID AIM SG	
17.	M703 is established from GADSI to PASIP (FIR boundary)		To add ANP	ATM SG, Iraq	MID AIM SG	
18.	M861 was from ELEXI to DRZ removed			ATM SG, Syria	MID AIM SG	
19.	P134 (PfA by EUR/NAT) from MON (Tunis) to MTG (Libya)		To establish and add ANP	ATM SG, Libya	MID AIM SG	Requested by EUR/NAT office and coordinated

6.5B-3

No.	ATS route and Challenge Description	Target date	Action	Champion and relevant FIR(s)	Supported by	Status / remarks
	Mitiga – NAZDE [340000N 0122235E] - RISER [342000N 0120603E] – (BIRSA) – (Monastir)					between Malta and Libya,
20.	P574 was from PAPAR to KUMUN FIR boundary deleted		- Subject to deficiency	ATM SG, Iran, UAE	MID AIM SG	
21.	P751, this route divided in two parts: - BRN to TOKAR (FIR boundary) - DEKRA (FIR boundary) ANGAL (FIR boundary) The deleted segment is named as A451/UA451 in Asmara FIR		Change the ATS route designator	ATM SG, Eritrea, Ethiopia	MID AIM SG	
22.	T800 is from DOH to ULDUN (Two FIRs)		To add ANP Change the ATS route designator	ATM SG, Bahrain, Iran, Qatar,	MID AIM SG	
23.	Jordan QAA1 instead of QAA AMN01 instead of AMN QTR01 instead of QTR		5LNC should be changed	ATM SG	AIM SG	
24.	Syria Non-compliant SIDs/STARs such as NOVEMBER, KILO, LIMA, GOLF, DELTA, etc. ... Damascus STARs named BRAVO, LIMA, KILO, SIERRA, TANGO SID to TAN (TANF) is named TANF		5LNC should be changed	ATM SG	AIM SG	
25.	B535 5LNC TAMIM duplicated with B411 in Jordan		Change 5LNC	Change 5LNC	Change 5LNC	

APPENDIX 6.5C

AMENDMENT PROPOSAL

PROPOSAL FOR AMENDMENT OF THE ICAO
MID AIR NAVIGATION PLAN (DOC 9708), VOLUME II

(Serial No. MID-II-22/01-ATM)

- a) **Plan:** MID Air Navigation Plan Volume II – Part IV-ATM
Specific Regional Requirements
- b) **Proposed amendment:** Editorial note: Amendments are arranged to show “deleted text” using
strikeout (~~text to be deleted~~), and “added text” with grey shading (text to be inserted)

TABLE ATM II-MID-2 – MID SSR CODE ALLOCATION LIST

- 1) **Amend** requirements for SSR code 0200-0277, 0400-0477, 1101-1177, 1200-1277, 1300-1377, 1500-1577, 2001-2077, 2100-2177, 2300-2377, 2400-2477, 2700-2777, 3200-3277, 3500-3577, 3700-3777, 4400-4477, 4600-4677, 5000-5077, 5100-5177, 6000-6077, 6100-6177, 6500-6577, 6600-6677 and 7400-7477.
- 2) **Add;** no SSR code was added to the list.
- 3) **Delete;** no SSR code was deleted from the list.

4) TABLE ATM II-MID-2 – MID SSR CODE ALLOCATION LIST

Code	AMMAN	BAGHDAD	BAHRAIN	BEIRUT	CAIRO	DOHA	DAMASCUS	EMIRATES	JEDDAH	KHARTOUM	KUWAIT	MUSCAT	SANA'A	TEHRAN	TRIPOLI
0001-0077 ²															
0101-0177 ¹										T					
0200-0277 ¹									D	T					
0300-0377 ²															
0400-0477 ²	D							D		D					
0500-0577 ¹								T							
0600-0677 ¹					D			D			D				
0700-0777 ¹	T														
1001-1077 ¹		T													
1101-1177 ¹	D							D						D	
1200-1277 ¹		D	D							D		D			
1300-1377 ¹		D						D	D					D	D

MIDANPIRG/20 & RASG-MID/10-REPORT
APPENDIX 6.5C

6.5C-2

Code	AMMAN	BAGHDAD	BAHRAIN	BEIRUT	CAIRO	DOHA	DAMASCUS	EMIRATES	JEDDAH	KHARTOUM	KUWAIT	MUSCAT	SANAA	TEHRAN	TRIPOLI
1400-1477 ¹											T				
1500-1577 ¹						T									
1600-1677 ¹					T										
1700-1777 ¹								T							
2001-2077 ³															F
2100-2177 ¹			D			T									
2200-2277 ¹			T												
2300-2377 ¹					D									T	
2400-2477 ¹	D														T
2500-2577 ¹				D					D						
2600-2677 ¹			T												
2700-2777 ¹		D	D		D			D							
3000-3077 ¹							D		D					D	
3100-3177 ¹									T						
3200-3277 ¹			F			T									
3300-3377 ¹					T										
3400-3477 ¹								T							
3500-3577 ¹									D			T			
3600-3677 ¹														T	
3700-3777 ¹			D		D						D		D		
4000-4077 ¹												T			
4100-4177 ¹									D					D	
4200-4277 ¹									T						
4300-4377 ¹				T											
4400-4477 ⁴			F												
4500-4577 ¹									T						
4600-4677 ¹						D				D		D			
4700-4777 ¹												T			
5000-5077 ⁴									D					T	
5100-5177 ¹														F	
5200-5277 ¹									T						
5300-5377 ³															
5400-5477 ¹														T	
5500-5577 ³															
5600-5677 ¹									D					D	
5700-5777 ¹							T								

6.5C-3

Code	AMMAN	BAGHDAD	BAHRAIN	BEIRUT	CAIRO	DOHA	DAMASCUS	EMIRATES	JEDDAH	KHARTOUM	KUWAIT	MUSCAT	SANAA	TEHRAN	TRIPOLI
6000-6077 ¹								D		Đ					
6100-6177 ¹					D								D	D	
6200-6277 ¹								T							
6300-6377 ¹									D					D	
6400-6477 ³															
6500-6577 ⁴						D						Đ			
6600-6677 ⁴												Đ			
6700-6777 ²															
7001-7077 ¹													T		
7100-7177 ²															
7200-7277 ¹		T													
7300-7377 ¹					T										
7400-7477		Đ													
7501-7577 ²															
7613-7677 ²															
7701-7775 ²															

T: codes allocated for Transit use

D: codes allocated for Domestic use

 ¹ Series allocated to the MID Region and Assigned to MID States

 ² MID Region SSR Reserve List for Domestic use

 ³ MID Region SSR Reserve List for Transit use

c) Originated by:

The ATM SG/8 meeting (Amman, Jordan, 07 – 10 November 2022)

d) Intended date of implementation:

As soon as practicable after approval

e) Originator's Comments

The changes proposed herein are the result of work undertaken by the MIDANPIRG ATM SG/8 meeting; and the coordinating with MID States to minimize impact of SSR Code duplication to misidentification of air traffic.

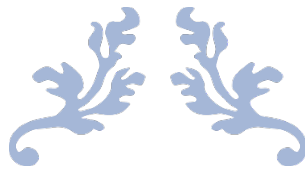
In addition, based on ANC resolution C-DEC 225/10 and establishment of Doha FIR/SRR, it is required to allocated separate SSR codes for transit and domestic operation of Doha FIR.

f) Secretariat’s Comments

The ICAO Secretariate was fully engaged in the work of the ATM SG and coordination with states and therefore, fully support this amendment.
The task was initiated by the ATM SG/7 meeting (Virtual, 15 – 18 November 2021), finalized by the ATM SG/8 meeting (Amman, Jordan, 07 – 10 November 2022), endorsed by the MIDANPIRG/20 meeting (Muscat, Oman, 14-17 May 2023) and facilitated by the Secretariat.

g) Proposal circulated to following States and Organizations:

Bahrain	Lebanon	Yemen
Egypt	Libya	<u>International</u>
Cyprus	Malta	<u>Organizations:</u>
Greece	Oman	CANSO
Iraq	Qatar	EUROCONTROL
Iran, Islamic Republic of	Saudi Arabia	IATA
Israel	Sudan	IFALPA
Jordan	Syrian Arab republic	IFATCA
Kuwait	United Arab Emirates	



POST IMPLEMENTATION REVIEW OF AIR TRAFFIC AND AIRSPACE MANAGEMENT DURING FIFA WORLD CUP 2022



MIDANPIRG FWC2022 Task Force
February 2023
V1.0

CONTENTS

1.	Summary	2
2.	Introduction	2
	History and background	2
	Scope and objectives	2
3.	MIDANPIRG FWC2022 Task Force	3
	Establishment of the Task Force	3
	Team members	3
4.	Challenges	3
	Identifying the Challenges	3
	A) The need for Airspace structure enhancements	3
	B) The need for ATFM solution	3
5.	FWC2022 MID RVSM Airspace Assessment by the MIDRMA	3
6.	Airspace Capacity Enhancements	4
7.	ATFM IMPLEMENTATION	4
	Establishment of the Doha ATFM Unit	4
	Supporting Tools	4
8.	Action Plan	4
	Scope of the action plan	4
	Key activities and Action items	4
	Implementation checklist	5
9.	Airspace Users' Engagement and Consultation	5
	Periodic meetings to address operational issues	5
	Development of online tool	5
10.	Outcomes, deliverables and results	5
11.	Recommendations	5
	Attachment A: FWC2022 TF Terms of Reference	i

1. SUMMARY

Given the expected significant traffic growth expected during the FWC2022 event, hosted in Doha, Qatar, during the period 20 November to 18 December 2022, the MIDANPIRG Decision established the FWC2022 to develop a regional plan to accommodate the expected demand for the MID Region ATS route structure and airspaces in a safe and efficient manner. The task force developed an Action Plan to support the MID Regions States and ensure the readiness of the ATS units to accommodate the expected demand. The Action Plan was developed with all MID States and representatives from the International and Regional Organizations and Industry. It included an evaluation of the current ATS Route structure within the Region and Airspace Enhancement projects within the MID FIRs. Furthermore, the implementation of ATFM solution in Doha airports, which required coordination with the other MID States.

After implementing the Action Items, it was reported that the traffic during the event, which reached 50% more than the normal traffic within Doha TMA and reached 360% on adjacent FIRs, was managed as planned with no major issues to be reported.

2. INTRODUCTION

History and background

One of the key challenges faced by Air Navigation Service Providers (ANSPs) and airlines is how to increase airspace capacity without compromising safety. New air traffic management (ATM) development paradigms aimed for doubling the airspace capacity two times while increasing safety by a factor of 10, by 2030.

Given the continued growth in air transportation globally, specifically, within the MID Region; which is known for its attractive destinations, beside the hosting of global events like FWC2022; the mix of Airspace Users' capabilities are also observed within the Region. Airspace enhancements projects continue to enhance capacity, as the Region lacks the implementation of an ATFM solution, however, there is an initiative by the Region to implement multi-nodal ATFM concept as a first step of implementation. The development of the regional requirements, documents and guidance material was recently completed, and the MID States started the training and building capacity for ATFM implementation on a national level, however, the FWC2022 event was sooner than the agreed timelines of training for ATFM implementation.

Scope and objectives

The scope of this study is to evaluate the development of regional plans and implementation of the Action Items within the FWC2022 Action Plan by the different stakeholders, related to Airspace and Air Traffic Management. It includes the success, challenges, limitations and other lessons learned; the objective of this review is to develop a list of recommendations that will be available for future similar events within the Region.

3. MIDANPIRG FWC2022 TASK FORCE

Establishment of the Task Force

The FWC2022 TF was established by the MIDANPIRG/16 (2016) through Decision, according to its ToR, at Attachment A. The main task of the FWC2022 TF is to address the coordination between ANSPs, Airspace Users and regulators, on local, regional and interregional levels, to accommodate traffic demand in a safe and efficient manner.

Team members

The task force is composed of experts from States, Regional and International Organizations and Industry.

4. CHALLENGES

Identifying the Challenges

The identified challenges are split into two parts:

A) The need for Airspace structure enhancements

The Airspace structure in the MID Region is diverse, some FIRs are modern and efficient, while others are legacy and due for revision. Enhancement projects are already ongoing, but the timelines of the FWC2022 precluded the regional Airspace enhancement projects. To overcome this issue, the MIDRMA was tasked to develop RVSM Airspace assessment based on the traffic data forecasted for the FWC2022.

B) The need for ATFM solution

The State of Qatar has identified the need for ATFM solution for traffic arriving and departing to/from airports within the Doha FIR.

The ATFM implementation within the MID Region was identified as regional target and the ATFM TF has developed a Concept of Operations CONOPS, however the timelines of the implementation plan extended beyond the FWC2022.

5. FWC2022 MID RVSM AIRSPACE ASSESSMENT BY THE MIDRMA

One of the MIDRMA tasks includes the development of Safety Monitoring Report which is developed on an annual basis. This is based on a Traffic data sample collected from all MID States for a particular month and Large Height Deviation Reports during the year.

The MIDRMA was also tasked to develop a FWC2022 RVSM Airspace Assessment, based upon the forecasted traffic data provided by the State of Qatar. This forecast was a challenge as it depended upon the results of the matches especially during the elimination phase of the tournament. The MIDRMA used all the historical LHD data, as it was found impractical to forecast these events. Additionally, the MIDRMA used the nominal annual growth of the traffic (apart from COVID-19 impact). The forecasted traffic together with the LHDs were used with the other standard parameters to develop a worst-case scenario showing a model for Vertical Collision Risk computation and graphically represented this for the impacted FIRs within the MID Region.

The results of the assessment, based on worst-case scenario data, showed that new hotspots and bottlenecks were created. The assessment results were shared with the concerned States/ANSPs to take the necessary measures, including changes in the traffic orientation schema; establishment of ATS routes/conditional Routes; and enhanced LoAs.

6. AIRSPACE CAPACITY ENHANCEMENTS

The State of Qatar developed new terminal procedures, including SIDs, STARs and independent parallel approaches. The new structure has significantly increased the efficiency within the Doha TMA which lead to enhanced capacity.

Additionally, many airspace enhancement projects were developed and published within Amman, Cairo and Jeddah FIRs.

7. ATFM IMPLEMENTATION

Establishment of QCAA ATFM Regulation QCAR 098 of 2022The State of Qatar enacted Qatar Civil Aviation Regulation (QCAR) 098 of 2022 regarding the implementation of Air Traffic Flow Management and the establishment of the Air Traffic Flow Management Unit which became effective on the 08 September 2022.

Establishment of the Doha ATFM Unit

The establishment of the Doha ATFM Unit enabled daily collaborative decision making calls and publication of the ATFM daily plan. This was disseminated via e-mail and online via the ATFM tool.

Data collection from Airport Operators and airport slot coordinators was found crucial along with ATC flight plans.

Supporting Tools

QCAA has deployed an ATFM system that shows the traffic demand versus available capacity. When required ATFM measures may be applied.

8. ACTION PLAN

Scope of the action plan

The FWC2022 Action Plan was developed by the TF members, reviewed during the TF meetings and updated/amended as required. The implementation of the Action items was monitored by MIDANPIRG.

Key activities and Action items

1. Development of reports and status monitoring to the MIDANPIRG
2. Developing MID RVSM Airspace assessment
3. Developing FWC2022 Roadmap and Operation Plan
4. Providing Forecasted traffic movements
5. Development and deploying the ATFM concept and training sessions
6. Familiarization and experience sharing activities with previous FWC hosting States/ANSPs

Implementation checklist

Several Airspace enhancement projects were initiated based on the results of the MIDRMA Assessment, which required a checklist to monitor the different activities required to complete the projects and issuing of Aeronautical Information Publications, in a harmonized manner. The checklist was presented and endorsed by the MIDANPIRG/19.

9. AIRSPACE USERS' ENGAGEMENT AND CONSULTATION

Periodic meetings to address operational issues

Many coordination meetings were held with IATA and Airspace Users using online (virtual) teleconferencing tools, to exchange operational data and raise operational issues.

Development of online tool

IATA AME in coordination with the ICAO MID Office developed an online platform to connect the Airspace Users with Airspace managers to swiftly address the common operational issues.

10. OUTCOMES, DELIVERABLES AND RESULTS

1. Action Plan with timelines and assignee to implement roadmap and operational plan for the event.
2. Establishment of ATFM procedures and training
3. Recommendations to avoid challenges in similar future events

11. RECOMMENDATIONS

The following list of recommendations are emanating from the TF members, to be available for future similar events:

Recommendation 1: Major events within the MID Region require regional involvement by the States regulatory side, ANSPs and Airspace Users to ensure the safe and efficient management of Air Traffic and Airspaces. Given the success of the FWC2022, the FWC2022 Action Plan could be reused as base line for similar event.

Recommendation 2: The collaboration with Airspace Users, aeronautical data providers is essential in planning and implementing major events. However last-minute changes are to be expected and this may impact flight planning.

Note: Adherence to the AIRAC Cycle calendar compliance shall be duly considered. Publications of NOTAM should be closely coordinated with Airspace users and adjacent States, where required.

Recommendation 3: Using the available resources, the MIDRMA could provide an assessment to identify the hotspots, bottlenecks and other areas of enhancements to be provided to relevant State, based on the current ATS Route structure, historical and forecasted data. The enhancements in ATS routing could be made on a temporary basis to accommodate the traffic demand during the subject event.

Recommendation 4: The implementation of advanced technologies and solutions will always require training to ensure successful implementation. Training support might be

required for other concerned States (where cross-border implementation deemed necessary).

Recommendation 5: Coordination with Airport Operators / airport slot coordinators will enhance the planning and calculation of the demand on Airspace.

Recommendation 6: Establishment of National coordination committee will support the implementation and alignment between different entities within the State.

Recommendation 7: The harmonization of Aeronautical Information Publication from different States is required to ensure successful implementation.

Recommendation 8: Operational arrangements and special parts of LoAs to be developed, for temporary usage during a special event.

Recommendation 9: Airspace capacity calculation is a requirement, the airspace enhancements will increase the capacity, while regulating the traffic demand will increase the effectiveness of operations.

Recommendation 10: The implementation of ATFM measures for traffic movements bound to specific airport or State will enhance safety and efficiency of flight operations and regulate the traffic demand on the related airspaces.

Note: the establishment of ATFM services (MID Doc 014 refer), including the collection and sharing the operational data will significantly enhance the planning and operation of ATS units.

- END -

ATTACHMENT A: FWC2022 TF TERMS OF REFERENCE

TERMS OF REFERENCE (TOR) OF THE MIDANPIRG FIFA WORLD CUP 2022 TASK FORCE (FWC2022 TF)

1. OBJECTIVES AND SCOPE

- 1.1 The Task Force will be expected to apply the performance-based approach through a collaborative manner to address the most strategic decisions to reach the following:
- a) A sufficient coordination between the Air Navigation Service Providers (ANSPs), airports, airspace users and regulators;
 - b) A sufficient coordination at local, regional and inter-regional levels to accommodate safely and efficiently the expected significant increase of traffic; and
 - c) A defragmented approach from an operational perspective to achieve (gate-to-gate, city pairs, and an oriented track system) which leads to more than optimum flight and airport operations efficiency.
- 1.2 The Task Force shall support the MID Region ATFM System once established.

2. TERMS OF REFERENCE OF THE TASKFORCE

- 2.1 Develop and follow-up the implementation of FWC2022 Action Plan to accommodate the expected high increase of traffic, in a safe and efficient manner, taking into consideration similar experiences from other regions.
- 2.2 Address other major events and develop action plan(s) to accommodate the changes in traffic flows as required.
- 2.3 Define explicit and implicit strategic objectives (e.g. improved safety, increased air traffic capacity, improved efficiency, and mitigation of airspace congestion impact).
- 2.4 Identify operational and technical requirements including proposals for airspace management changes and amendment to the MID ATS Route Network to accommodate the air traffic through the establishment of temporary routes as required.
- 2.5 Develop the concept of collaborative decision-making at the strategic, tactical and pre-tactical levels, which would be implemented before and during the World Cup event.
- 2.6 Suggest methods for increased interaction between airspace providers in order to make sure that the network effects of any trajectory selection are properly incorporated in the decisions.
- 2.7 Develop collaborative regional mechanism for the implementation of ATFM solutions/measures such as Ground Delay Program (GDP), which would be implemented for departures from airports in the region.

- 2.8 Assess the operational performance of the ATM network by its capability to accommodate demand through realistically modeled network nodes, i.e. airports and airspace volumes.
- 2.9 The Task Force shall work in close coordination with the ATFM TF to avoid duplication of efforts.

3. COMPOSITION

- 3.1 The World Cup 2022 Task Force is composed of experts from:
 - a) MIDANPIRG Member States;
 - b) India, FAA, AACO, ACAO, AEROTHAI, CANSO, EUROCONTROL and IATA; and
 - c) other representatives from States, Organizations and Industry may be invited on ad-hoc basis, when required.
- 3.2 ICAO MID Office will act as the Secretary of the Task Force.

4. WORKING PROCEDURES

- 4.1 Qatar shall act as the Chairman of the Task Force.
 - 4.2 In order to effectively perform its tasks and responsibilities, the Task Force will meet as required in order to achieve its objectives.
 - 4.3 A Core Team might be established to follow-up with the concerned State(s) and air operators the conduct of safety and operational assessments and provide support as appropriate.
 - 4.4 The Chairperson, in close co-operation with the Secretary, shall make all necessary arrangements for the most efficient working of the Task Force. The Task Force shall at all times conduct its activities in the most efficient manner possible with a minimum of formality and paperwork (paperless meetings). Permanent contact shall be maintained between the Chairperson, Secretary and Members of the Task Force to advance the work. Best advantage should be taken of modern communications facilities, particularly video-conferencing (Virtual Meetings) and e-mails.
 - 4.5 Face-to-face meetings will be conducted when it is necessary to do so.
-

INTERNATIONAL CIVIL AVIATION ORGANIZATION



**MID REGION
ATM CONTINGENCY PLAN**

Version [25.0 \(Draft\)](#) [May 2022](#)[2023](#)

This concept was developed by the ICAO MID ATM SG.

Approved by MIDANPIRG/20 and published by the
ICAO MID Office, Cairo

INTERNATIONAL CIVIL AVIATION ORGANIZATION

**MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)**

MID-REGION ATM CONTINGENCY PLAN

EDITION APRIL, 2016

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontier or boundaries.

RECORD OF AMENDMENTS

The MID Region ATM contingency plan should be reviewed and updated by the ATM Sub-Group and presented to MIDANPIRG for endorsement.

The table below provides a means to record all amendments. An up-to-date electronic version of the Plan will be available on the ICAO MID Regional Office website.

<u>Edition Date</u>	<u>Description</u>	<u>Pages Affected</u>
<u>15 July 2014</u>	<u>First edition</u>	• <u>Focal Points</u> • <u>Status of Contingency Agreements</u>
<u>26 November 2014</u>	<u>Second edition</u>	• <u>Focal Points</u> • <u>Introduction</u> • <u>Chapter 2 (CCT)</u>
<u>11 June 2015</u>	<u>Third edition</u>	• <u>Chapter 2 (CCT)</u> • <u>Chapter 2 Notification Procedure</u>
<u>20 April 2016</u>	<u>Fourth edition</u>	• <u>Focal Points</u> • <u>Editorials</u>
<u>Xx Feb 2023</u>	<u>Fifth edition</u>	<u>All pages</u>

~~MID REGION AIR TRAFFIC MANAGEMENT CONTINGENCY PLAN~~

TABLE OF CONTENTS

EXCLUSION OF LIABILITY.....	
FOREWORD.....	
RECORD OF AMENDMENTS.....	
INTRODUCTION.....	<u>INTRODUCTION</u>
CHAPTER 1: MID STATES' CONTINGENCY PLAN	
CHAPTER 2: COMMON PROCEDURES.....	
CHAPTER 3: AIR TRAFFIC MANAGEMENT.....	
CHAPTER 4: AIRSPACE AND ALTERNATIVE ROUTINGS.....	
CHAPTER 5: MID REGION ATM VOLCANIC ASH CONTINGENCY PLAN	

GLOSSARY

Abbreviations and Acronyms
Terminology and Definition

CHAPTER 1: INTRODUCTION

CHAPTER 2: MID STATES' CONTINGENCY PLAN REQUIREMENT

States requirements
State focal points
States contingency notification
Traffic Information Broadcast by Aircraft (TIBA)

CHAPTER 3: COMMON REGIONAL PROCEDURES

General
Composition and task of Contingency Coordination Team (CCT)

CHAPTER 4: AIR TRAFFIC MANAGEMENT

ATS responsibility
Separation
Level restriction
Other measures
Transition to contingency plan
Transfer of control and coordination

CHAPTER 5: AIRSPACE AND ALTERNATIVE ROUTINGS

CHAPTER 6: MID REGION ATM VOLCANIC ASH CONTINGENCY PLAN

[APPENDIX A: STATE FOCAL POINTS](#)

[APPENDIX B: STATUS OF CONTINGENCY AGREEMENTS IN THE MID REGION](#)

[ATTACHMENT A: MID REGION ATM VOLCANIC ASH CONTINGENCY PLAN](#)

[ATTACHMENT B: MEASURES TAKEN BY QCAA AND ATS UNITS DURING COVID-19](#)

Draft

1. GLOSSARY

1.1 Abbreviations and Acronyms

<u>ACC</u>	<u>Area Control Centre</u>
<u>AIM</u>	<u>Aeronautical Information Management</u>
<u>ATC</u>	<u>Air Traffic Control</u>
<u>ATFM</u>	<u>Air Traffic Flow Management</u>
<u>AU</u>	<u>Airspace User</u>
<u>CCT</u>	<u>Contingency Coordination Team</u>
<u>CDR</u>	<u>Conditional Route</u>
<u>CNS</u>	<u>Communication, Navigation and Surveillance</u>
<u>FIR</u>	<u>Flight Information Region</u>
<u>GNSS</u>	<u>Global Navigation Satellite System</u>
<u>LOA</u>	<u>Letter of Agreement</u>
<u>MIDANPIRG</u>	<u>MID Air Navigation Planning and Implementation Regional Group</u>
<u>PBN</u>	<u>Performance-based Navigation</u>
<u>RNAV</u>	<u>Area Navigation</u>
<u>RVSM</u>	<u>Reduced Vertical Separation Minimum</u>
<u>TDS</u>	<u>Traffic Data Sample</u>

1.2 Terminology and Definition

Air traffic flow management (ATFM). A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

Air traffic management (ATM). The dynamic, integrated management of air traffic and airspace (including air traffic services, airspace management and air traffic flow management) — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

Air traffic management system. A system that provides ATM through the collaborative integration of humans, information, technology, facilities, and services, supported by air and ground- and/or space-based communications, navigation and surveillance.

Conditional route (CDR). A non-permanent ATS route or portion thereof which can be planned and used under specified conditions.

A Conditional Route may have more than one category, and those categories may change at specified times:

- a) Category One - Permanently Plannable CDR: CDR1 routes are in general available for flight planning during times published in the relevant national Aeronautical Information Publication (AIP). Updated information on the availability in accordance with conditions published daily AUP notification.
- b) Category Two - Non-Permanently Plannable CDR: CDR2 routes may be available for flight planning. Flights may only be planned on a CDR2 in accordance with conditions published daily AUP notification, and
- c) Category Three - Not Plannable CDR: CDR3 routes are not available for flight planning; however, ATC Units may issue tactical clearances on such route segments.

Global navigation satellite system (GNSS). A worldwide position and time determination system that includes one or more satellite constellations, aircraft receivers and system integrity monitoring, augmented as necessary to support the required navigation performance for the intended operation.

Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Regional ATS route. An ATS route shall be considered as the MID regional ATS route network provided that:

- a) Cross-bordered (at least initiate/terminate from FIR boundary);
- b) Route designator shall be assigned in accordance with Annex 11, Appendix 1 and the ICAO Codes and Routes Database (ICARD) requirement; and
- a)c) Published in ICAO Air Navigation Plan (ANP)- Middle East Region (Doc 9708), Volume II, Table ATM II-MID-1 MID Region ATS Route Network.

FOREWORD

~~This Document is for guidance only. Regulatory material relating to the MID Regional aircraft operations is contained in relevant ICAO Annexes, PANS/ATM (Doc.4444), Regional Supplementary Procedures (Doc.7030), States AIPs, and current NOTAMs, bulletin, and other related publications which should be read in conjunction with the material contained in this Document.~~

~~Guidelines for contingency measures for application in the event of disruptions of air traffic services and related supporting services were first approved by the Council on 27 June 1984 in response to Assembly Resolution A23-12, following a study by the Air Navigation Commission and consultation with States and international organizations concerned, as required by the Resolution. The guidelines were subsequently amended and amplified in the light of experience gained with the application of contingency measures in various parts of the world and in differing circumstances.~~

~~————— The purpose of the guidelines is to assist in providing for the safe and orderly flow of international air traffic in the event of disruptions of air traffic services and related supporting services and in preserving the availability of major world air routes within the air transportation system in such circumstances.~~

~~————— The MID Regional Air Traffic Management Contingency Plan is primarily for the information to operators and pilots planning and conducting operations in MID Region. The intent is to provide a description of the arrangements in place to deal with a range of contingency situations.~~

~~————— This Contingency Plan has been developed with the approval of the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG); a MID Regional planning body established under the auspices of the International Civil Aviation Organization (ICAO). This Group is responsible for developing the required operational procedures; specifying the necessary services and facilities and; defining the aircraft and operator approval standards employed in the MID Region.~~

~~RECORD OF AMENDMENTS~~

[illegible]

CHAPTER 1

INTRODUCTION

1.1 The various circumstances surrounding each contingency situation preclude the establishment of exact detailed procedures to be followed. The purpose of this plan is to assist in providing for the safe and orderly flow of international air traffic in the event of disruptions of air traffic services and related supporting services and in preserving the availability of major world air routes within the air transportation system in such circumstances.

1.2 The MID Regional Air Traffic Management Contingency Plan is primarily for the information to operators and pilots planning and conducting operations in MID Region. The intent is to provide a description of the arrangements in place to deal with a range of contingency situations.

1.3 The MID Region Air Traffic Management (ATM) Contingency Plan has been developed to ensure, to the extent possible, the continued safety of air navigation in the event of disruption or potential disruption of Air Traffic Services and related supporting services in the MID Region, in accordance with the provisions of ICAO Annex 11 – Air Traffic Services, Chapter 2, paragraph 2.3.29 and its Attachment C. The Plan might be also activated in cases when airspace users decided to circumnavigate airspace(s) due to ~~conflict zones, weather, etc. or due to a perceived risk to the safety of flight~~ with a minimum of disruption to flight operations- cCaused by man-made or natural events, which might have negative impact on provision of ATS services on the relevant FIR i.e. CNS equipment failure (fully or partially) consequences increase significantly not only decrease airspace capacity over that FIR, but also significantly increase and change the flow of the traffic the air traffic in other airspace(s).

1.4 The total aircraft movements to,/-from and within the Middle East Region are estimated to increase from some 976400 in 2010 to slightly above 5204000 in 2030 at an average annual growth rate of 8.7 per cent over the same period.

~~The table shows the aircraft movements forecast to the year 2030:~~

	Actual	Forecast	Average Annual Growth
	2010	2030	2010-2030 (per cent)
AFR-MEA	68588	446722	9.8
ASIA-MEA	261359	1384191	8.7
EUR-MEA	276285	977855	6.5
INTRA MEA	349324	2287506	9.9
NAM-MEA	20843	107917	8.6
TOTAL	976399	5204191	8.7

~~Contingency Routing (CR) has been developed and contained in the Plan based on the major traffic flows through the MID Region, taking into consideration the movements' number between City Pairs. Activation of these routes is described in para XXX.~~

~~This Plan is designed to provide alternative routes for the Regional and International traffic flows between destinations within the MID Region, and connections to/from Asia, Africa, and Europe, which will allow aircraft operators to circumnavigate airspace(s) in the MID Region, as deemed necessary, or due to a perceived risk to the safety of flight with a minimum of disruption to flight operations.~~

~~These alternative routes (Contingency Routing – CR) are based mainly on the existing route network or established earlier for this purpose. Concerned States, in consultation with airspace users, might establish temporary routes to be able to accommodate extra traffic in a safe manner.~~

~~It is recognized that operators may incur economic penalties during application of the contingency scenarios. Therefore, air traffic flow measures would be implemented as deemed necessary.~~

~~The ICAO MID Regional Office will coordinate with ICAO HQ and the concerned Regional Offices any amendment to the Regional Contingency Plan.~~

~~The appropriate ICAO Regional Office will distribute this contingency plan to all relevant States and international organizations within their regions.~~

~~This Document is available to users through the ICAO MID website https://portal.icao.int/RO_MID/Pages/eDocs.aspx https://www.icao.int/MID/MIDANPIRG/Pages/MID_Docs.aspx.~~

~~In order to maintain the effectiveness of the Plan, Stakeholders are encouraged to provide the ICAO MID Regional Office (icaomid@icao.int) with their comments/suggestions and updates, on periodical basis.~~

~~On the other hand, MID Region States are encouraged to develop their national contingency plan based on this document, and to share it with ICAO MID and adjacent FIRs/ ATC units for activation in case major disruption of the services occurs (for example in case of weather disaster).~~

MID Region ATM Contingency Focal Points

~~The List of the MID Region ATM Contingency Focal Points is at **Table 1**. This list should be reviewed and updated, as appropriate.~~

Table 1.MID-Region ATM-Contingency Focal Points

NAMES	PHONE (WORK)	PHONE (HOME)	MOBILE PHONE	FAX	E-MAIL	OTHER CONTACT DETAILS
BAHRAIN						
Mr. Saleem Mohammed Hasan	9731732 1117		973 39608860	973-17321 9966	saleemmh@caa.gov.bh	Bahrain ACC Duty Supervisor r Tel: 973-1732 1081/1080 Fax: 973-1732 1029 Email: bahate@caa.gov.bh
EGYPT						
Mr. Moatassem Baligh	202-265 7849	202-639 1792	010016952 52	202-268 0627	moatassem_5@hotmail.com	
IRAN						
Mr. Masoud Nikbakht DG of ATM Department	98-21-445 44101		98-912326 3905	9821- 44544102	masoudnikbakht@gmail.com	<i>Note: During New Year Holidays in Iran (20 March—5 April) or for any urgent message Contact Tehran ACC on +9821- 44544116</i>
Mr. Ahmad Kavchfiroz Deputy Director of Tehran ACC	9821- 44544119		989123230 447	9821- 44544102	ahmadkavchfiroz@gmail.com	

NAMES	PHONE (WORK)	PHONE (HOME)	MOBILE PHONE	FAX	E-MAIL	OTHER CONTACT DETAILS
IRAQ						
Mr. Fadhil Getea Director-ATS	9641813337 0		964 782884499 8		ate@iraq caa.com	
JORDAN						
Mr. Nayef Al Marshoud Director, ATM	9626 489 7729	962-5 3862584	962 797498992 962 777789470	9626 4891 266	nayefmar shoud@h otmail.co m datm@ca rc.gov.jo	
KUWAIT						
Mr. Adel S. Boresli Director—Air Navigation	965 24710268		965990365 56	965 24346221	as.buresli @dgca.g ov.kw	
LEBANON						
Mr. Kamal Nasserddine Chief Air Navigation Dept.	+961-1 628178		+961 71309409	+961-1 629023	ATM@b eirutairp ort.gov.l b-	AFTN OLBAZPZX
LIBYA						
Mr. Mohamed E. Bakar Director of ATM	218-61-360 5535		218-91-219 4477	218-21 360-5535	mohame d.bakar @caa-go v.ly	
OMAN						
Mr. Mubarak Gheilani Director-ATS	+968-24-354 867		+968-9507 6157		m.alghel ani@pac a.gov.om	
SAUDI ARABIA						
Mr. Waleed M. Madanii	(966-12) 671-7717 Ext 1818		966-50-567 4867	9662 6401005	waleedm adani@g aca.gov.e om	
SUDAN						

NAMES	PHONE (WORK)	PHONE (HOME)	MOBILE PHONE	FAX	E-MAIL	OTHER CONTACT DETAILS
Mr. Abubakr Elsiddig Elamin	2491837849 64		249912146 745	24918378 4964	abubakrteo@live.com	ATM—Director ANS P.O. Box 137 code 11112, Khartoum, Sudan
SYRIA						
Mr. Hassan Hamoud ATM Director	0096311540 10180	0096311 6460395	-00963 988235106	963 11 54010180 1	ans@sca.a.sy hamoud-hasan@yahoo.com	P.O.BOX:6257 Damascus, Syria

NAMES	PHONE (WORK)	PHONE (HOME)	MOBILE PHONE	FAX	E-MAIL	OTHER CONTACT DETAILS
UNITED ARAB EMIRATES (UAE)						
Mr. Ahmed Al Jallaf Assistant Director General, ANS, GCAA	9712-599 6888		97150-614 9065	9712-599 6883	aljallaf@szc.gcaa.ae	9712-599-6999 SCZ
Mr. Hamad Al Belushi Director ATM	971-2 5996830		+971-50 616-4350	971-2 5996836	hbelushi@szc.gcaa.ae	
YEMEN						
Mr. Abdullah Abdulwareth Aleryani	967-1- 345403	967-1- 344254	967777190 602	967-1- 345403	ernlabd@gmail.com	D.G-ACC/FIC
Mr. Ahmed- Mohammed- Al-Koobati	967-1- 344675	967-1- 214375	967777241 375	967-1- 344047	CAMA70@yahoo.com	D-Air Navigation Operation
IATA						
Mr. George Rhodes	96-26-580 4200 Ext 1215			962-(6) 593-9912	rhodesg@iata.org SFOME.NA@iata.org	
ICAO MID						
Mr. Elie El Khoury (RO ATM/SAR)	202-2267 4840/5 ext 4120		+20102513 3360	202-2267 4843	ekhoury@icao.int icaomid@icao.int	
ICAO APAC						
Mr. Leonard Wicks (RO ATM)	662-537 8189-ext 152				lwicks@icao.int	

NAMES	PHONE (WORK)	PHONE (HOME)	MOBILE PHONE	FAX	E-MAIL	OTHER CONTACT DETAILS
ICAO ESAF						
Mr. Sebosese Machobane (RO-ATM)					Smachobane@icao.int	
ICAO EUR/NAT						
Mr. Sven Halle (RO/ATM)					shalle@icao.int	
ICAO WACAF						
Mr. Albert Taylor (RO/ATM)					Ataylor@icao.int	
ICAO Headquarters						
Mr. Chris Dalton (C/AMO)	1514 954- 6711				cdalton@icao.int	

CHAPTER 12

MID STATES' CONTINGENCY PLANS REQUIREMENTS

States requirements

1.1. As indicated in Annex 11, Chapter 2, Para 2.32 as well as material related to contingency planning indicated in Annex 11, Attachment C, States Air traffic services authorities shall develop and promulgate contingency plans for implementation in the event of disruption, or potential disruption, of air traffic services and related supporting services in the airspace for which they are responsible for the provision of such services. Such contingency plans shall be developed with the assistance of ICAO MID as necessary, in close coordination with the air traffic services authorities responsible for the provision of services in adjacent portions of airspace and with airspace users concerned. The States contingency plans should include be supported by contingency agreement with adjacent ACCs as well as regional arrangements, to be implemented in the event of natural disasters, military conflicts or public health emergencies.

1.2. States should include in their contingency plans provisions related to the spread of communicable diseases such as COVID-19, based on the ICAO guidance related to the Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation (CAPSCA).

The State(s) responsible for providing air traffic services and related supporting services in particular portions of airspace is (are) also responsible, in the event of disruption or potential disruption of these services, for instituting measures to ensure the safety of international civil aviation operations and, where possible, for making provisions for alternative facilities and services. To that end the State(s) should develop, promulgate and implement appropriate contingency plans. Such plans should be developed in consultation with other States and airspace users (AUs) concerned and with ICAO MID, as appropriate, whenever the effects of the service disruption(s) are likely to affect the services in adjacent airspace.

1.2.1.3. The responsibility for appropriate contingency action in respect of airspace over the high seas continues to rest with the State(s) normally responsible for providing the services until, and unless, that responsibility is temporarily reassigned by ICAO to (an) other State(s).

1.4. States should periodically review their national contingency plan and coordinate any amendments with neighbouring States and ICAO MID Office. And to provide an updated plan to the ICAO MID Regional Office.

1.3.1.5. The State contingency plan shall include an authorization to the CCT team (including ICAO MID Regional Office) to activate the plan and CCT when upon confirmation received from States focal point as mentioned in Appendix A that the current State/ANSP is subject to significant degradation or disruption unable to which is necessary to perform the expected level of provide the services.

1.4. MID States' Contingency Plans are available at the ICAO MID Regional Office and the status of contingency agreements in the MID Region is at Table 2.

States Focal Points

1.6 The List of the MID States ATM Contingency Focal Points is at Appendix A. This list should be reviewed and updated, as appropriate (at least one a year through ATM SG meeting).

States contingency notification

1.7 In **Limited-Service** situations: the individual States/ANSP will decide upon the level of notification necessary and take action as required to cascade the information.

1.8 In **No Service situations**: it is likely that the ATC facility involved will be subject to evacuation. In this instance, the States/ANSP should issue NOTAMs and broadcast on appropriate frequencies that contingency procedures have been initiated. The notification process employed by individual States/ANSPs should be detailed in their national plan. However, the general format will be as the following example of the type of information which may be promulgated:

NOTAM

“Due to emergency evacuation of [ATC unit] all ATC services are terminated. Flights within ([States]) FIR should continue as cleared and contact the next ATC unit as soon as possible. Flights not in receipt of an ATC clearance should land at an appropriate airfield or request clearance to avoid [State] FIR. Flights should monitor (defined frequencies).”

Broadcast an evacuation message on appropriate frequencies:

“Emergency evacuation of [ATC unit]) is in progress. No air traffic control service will be provided by [ATC unit]. Use extreme caution and monitor [control frequencies], emergency frequencies and air to air frequencies. Contact the next air traffic control unit as soon as possible”.

1.9 In the event that the CAA is unable to issue the NOTAM, the (alternate) CTA/UTA/FIR will take action to issue the NOTAM of closure airspace upon notification by corresponding CAA or the ICAO MID Regional Office.

Traffic Information Broadcast by Aircraft (TIBA) procedures

1.10 States should consider procedures have been developed in accordance with the Traffic Information Broadcast by Aircraft (TIBA) recommended by ICAO, Annex 11 – Air Traffic Services, Attachment B.

Table 2. Status of Contingency Agreements in the MID Region

STATE	CORRESPONDING STATES			REMARKS*
BAHRAIN	☒ ~~IRAN~~ ☒ ~~KUWAIT~~	☒ ~~QATAR~~ ☒ ~~SAUDI ARABIA~~	☒ ~~UAE~~	Completed
EGYPT	☒ ~~GREECE~~ ☒ ~~JORDAN~~	☒ ~~LYBIA~~ ☒ ~~CYPRUS~~	☒ ~~SAUDI ARABIA~~ ☒ ~~SUDAN~~	Completed
IRAN	☒ ~~ARMENIA~~ ☐ ~~AZERBAIJAN~~ ☐ ~~TURKMENISTAN~~ ☐ ~~AFGHANISTAN~~	☒ ~~BAHRAIN~~ ☒ ~~IRAQ~~ ☐ ~~KUWAIT~~ ☒ ~~OMAN~~	☒ ~~PAKISTAN~~ ☒ ~~TURKEY~~ ☒ ~~UAE~~	7/11
IRAQ	☒ ~~IRAN~~ ☐ ~~JORDAN~~	☐ ~~KUWAIT~~ ☐ ~~SAUDI ARABIA~~	☐ ~~SYRIA~~ ☐ ~~TURKEY~~	1/6
JORDAN	☒ ~~EGYPT~~ ☐ ~~IRAQ~~	☐ ~~ISRAEL~~ ☒ ~~SAUDI ARABIA~~	☐ ~~SYRIA~~	2/5
KUWAIT	☒ ~~BAHRAIN~~ ☐ ~~IRAN~~	☐ ~~IRAQ~~	☒ ~~SAUDI ARABIA~~	2/4
LEBANON	☐ ~~CYPRUS~~	☐ ~~SYRIA~~		0/2
LIBYA	☐ ~~ALGERIA~~ ☐ ~~CHAD~~ ☒ ~~EGYPT~~	☐ ~~MALTA~~ ☐ ~~NIGER~~	☐ ~~SUDAN~~ ☐ ~~TUNIS~~	1/7
OMAN	☐ ~~INDIA~~ ☒ ~~IRAN~~	☐ ~~PAKISTAN~~ ☐ ~~SAUDI ARABIA~~	☒ ~~UAE~~ ☒ ~~YEMEN~~	3/6
QATAR	☒ ~~BAHRAIN~~	☐ ~~SAUDI ARABIA~~	☒ ~~UAE~~ ☒ ~~Iran~~	2/3
SAUDI ARABIA	☒ ~~BAHRAIN~~ ☒ ~~EGYPT~~ ☐ ~~ERITREA~~ ☐ ~~IRAQ~~	☒ ~~JORDAN~~ ☒ ~~KUWAIT~~ ☐ ~~OMAN~~ ☐ ~~QATAR~~	☐ ~~SUDAN~~ ☒ ~~UAE~~ ☐ ~~YEMEN~~	5/11
SUDAN	☐ ~~CENTRAL AFRICAN~~ ☐ ~~CHAD~~ ☒ ~~EGYPT~~	☐ ~~ERITREA~~ ☐ ~~ETHIOPIA~~ ☐ ~~LIBYA~~	☐ ~~SAUDI ARABIA~~ ☐ ~~SOUTH SUDAN~~	1/8
SYRIA	☐ ~~IRAQ~~ ☐ ~~JORDAN~~	☐ ~~LEBANON~~ ☐ ~~CYPRUS~~	☐ ~~TURKEY~~	0/5
UAE	☒ ~~BAHRAIN~~ ☒ ~~IRAN~~	☒ ~~OMAN~~ ☐ ~~QATAR~~	☒ ~~SAUDI ARABIA~~	4/5
YEMEN	☐ ~~DJIBOUTI~~ ☐ ~~ERITREA~~ ☐ ~~ETHIOPIA~~	☐ ~~INDIA~~ ☒ ~~OMAN~~ ☐ ~~SAUDI ARABIA~~	☐ ~~SOMALIA~~	1/7

☒ Agreement Signed ☐ Agreement NOT Signed *Signed Agreements / Total No. of required Agreements

CHAPTER 23

COMMON REGIONAL PROCEDURES

General

2.1 ICAO MID office is responsible to monitor the status of MID States' Contingency Plans with adjacent FIRs and provide update information in **Appendix B** to ATM SG for review, action and follow up.

2.2 This Plan is developed to provide **at least 3 alternative** routes for each Regional and International traffic flows between destinations within the MID Region, and connections to/from Asia, Africa, and Europe, which will allow aircraft operators to circumnavigate airspace in the MID Region, as deemed necessary, due to a perceived risk to the safety of flight with a minimum of disruption to flight operations.

Note 1: based on States TDS reports and routing options to MIDRMA, MID Office is responsible to update regional routing options accordingly.

Note 2: to achieve the requirement in para 2.2, ICAO MID office based on ANP Volume II, Table I, ATS route table should provide MID region ATS route network gap analysis report to ATM SG and RDWG meetings to take the required decisions and actions.

2.3 These alternative routes including permanent and temporary as well as conditional route (CDR) are based mainly on the existing route network or established earlier for this purpose. Concerned States, in consultation with AUs, might establish additional temporary routes to be able to accommodate extra traffic in a safe manner.

Note: Regional ATS routes which are allocated for provision of service during contingency situation are available in ANP Volume II, Table I, ATS route table under the condition of "Note 5-CDR" which will be used during specified period by issuing required NOTAM.

2.4 It is recognized that operators may incur economic penalties during application of the contingency scenarios by imposing additional track miles or implementation of air traffic flow management measures when deemed necessary.

2.5 The ICAO MID Regional Office will coordinate with ICAO HQ and the concerned Regional Offices any amendment to the Regional Contingency Plan. Accordingly, the appropriate ICAO Regional Office will distribute this contingency plan to all relevant States and international organizations within their own regions.

2.6 This Document is available to users through the ICAO MID website <https://www.icao.int/MID/MIDANPIRG/Pages/MID-Docs.aspx>. In order to maintain the effectiveness of the Plan, Stakeholders are encouraged to provide the ICAO MID Regional Office (icaomid@icao.int) with their comments/suggestions and updates, on yearly basis.

2.7 For harmonization at national, regional, and global levels, MID Region States are encouraged to take into consideration of this document for development or update their national contingency plan, and to share it with ICAO MID and adjacent FIRs/ATC units for activation in case major disruption of the services occurs.

~~Implementation of the plan~~ **Composition and task of Contingency Coordination Team (CCT)**

2.8 A Contingency Coordination Team (CCT) to be established from the following members:

- ICAO (HQ and [MID Regional Offices](#) Focal points) and IATA as permanent members;
- States concerned [focal point\(s\)](#) as essential members; and
- Other [ICAO MID Regional Offices](#), Organizations, Agencies etc., when deemed necessary, as temporary members.

2.9 The main tasks of the CCT are as follows:

- ~~initiate action for the~~ [upon notification, activation/deactivation of the regional cContingency Plan](#) ~~arrangement;~~
- ~~monitor~~ continuously [monitor the progress of contingency status by using information from all available, valid, reliable and relevant sources;](#)
- [based on the States progress reports and challenges, take the required decision\(s\) and action\(s\) to manage/accommodate regional traffic flow in the safe and efficient manner.](#)
- ~~initiate action for the activation/deactivation of the Contingency Plan;~~
- arrange for the constant supply of relevant [operational and](#) aeronautical information to the ICAO Regional Offices and Headquarters;
- liaise with international/regional organizations as appropriate;
- [exchange up-to-date information with States directly concerned and States which are potential participants in contingency arrangements.](#)
- [Make a decision to deactivate CCT](#)

Note: For efficient communication between stakeholders, ~~the notification/coordination process at~~ [Table 3 Appendix C](#) ~~would should be used to facilitate coordination between ICAO MID and concerned members~~ [the challenges related to the implementation of contingency arrangements.](#)

2.10 ICAO MID Office is responsible to disseminate agreed contingency arrangement to States focal points and regional organizations for further coordination with the relevant parties i.e. ANSP, airlines and etc. ~~In the event of adoption of contingency procedures States/ANSPs will notify all affected agencies and operators appropriately. Using the available communication means (State letters, email, phone calls, social media (WhatsApp)).~~

2.1. ~~In Limited Service situations: the individual States/ANSP will decide upon the level of notification necessary and take action as required to cascade the information.~~

2.2. ~~In No Service situations: it is likely that the ATC facility involved will be subject to evacuation. In this instance the States/ANSP will should issue NOTAMs and broadcast on appropriate frequencies that contingency procedures have been initiated. The notification process employed by individual States/ANSPs is should be detailed in their national plan. However the general format will be as the following example of the type of information which may be promulgated:~~

NOTAM

~~“Due to emergency evacuation of ([States] ACC [ATC unit]) all ATC services are terminated. Flights within ([States] ACC) FIR should continue as cleared and contact the next ATC agency unit as soon as possible. Flights not in receipt of an ATC clearance should land at an appropriate airfield or request clearance to avoid [(State)] FIR. Flights should monitor (defined frequencies).”~~

Broadcast an evacuation message on appropriate frequencies:

~~“Emergency evacuation of ([Sates] ACC [ATC unit]) is in progress. No air traffic control service will be provided by [(States] ACC)[ATC unit]. Use extreme caution and monitor [(control frequencies)], emergency frequencies and air to air frequencies. Contact the next air traffic control unit as soon as possible”.~~

Traffic Information Broadcast by Aircraft (TIBA) procedures

The following communications procedures have been developed in accordance with the Traffic Information Broadcast by Aircraft (TIBA) procedures recommended by ICAO (Annex 11 – Air Traffic Services, Attachment C). These procedures should be applied when completing an altitude change to comply with the ATC clearance.

At least 5 minutes prior to the commencement of a climb or descent the flight should broadcast on the last assigned frequency, 121.5, 243.0 and 123.45 MHz the following:

~~“ALL STATION (callsign) (direction) DIRECT FROM (landfall fix) TO (oceanic entry point) LEAVING FLIGHT LEVEL (number) FOR FLIGHT LEVEL (number) AT (distance)(direction) FROM (oceanic entry point) AT (time)”~~

~~When the level change begins, the flight should make the following broadcast:~~

~~“ALL STATIONS (callsign) (direction) DIRECTION FROM (landfall fix) TO (oceanic entry point) LEAVING FLIGHT LEVEL (number) NOW FOR FLIGHT LEVEL (number).”~~

~~When level, the flight should make the following broadcast:~~

~~“ALL STATIONS (callsign) MAINTAINING FLIGHT LEVEL (number).”~~

Table 31. Notification/coordination process

Airspace Avoidance				
Airlines	Airline Actions	IATA Actions	ICAO MID Office	States/ ANSP
Monitor global activities that have an effect on flight operations. (currently in place)	NONE	NONE	NONE	NONE
Review state activity that requires airline safety and security review (currently in place)	Notify IATA as to effected FIR' and factors under review. (security and or safety)	When more than (30%) of airlines reporting, notify ICAO MID	Call for the Contingency Coordination Team (CCT)	NONE
Identify specific Factors and pending trigger events (currently in place)	inform IATA on review findings and possible trigger events	Inform CCT on findings and number of airlines reporting	Notify effected states/ANSP on number of airlines reviewing current activity	NONE
Event triggered: reviewing avoidance options and select avoidance scenario	Inform IATA of selected scenario and volume/initial timelines.	Inform CCT	Notify effected States/ANSP scenario and volume/timelines	Review scenario and give feedback on feasibility
48 Hours prior to activation of planned avoidance re-routes	Notify IATA	Notify CCT	Notify effected states/ANSP	Prepare NOTAMS and avoidance scenario
24 Hours prior to activation of planned avoidance re-routes	Notify IATA	Notify CCT	Notify effected states/ANSP	Publish NOTAMS

CHAPTER 34

AIR TRAFFIC MANAGEMENT

ATS Responsibilities

- 3.1. Tactical ATC considerations during periods of overloading may require re-assignment of routes or portions thereof.
- 3.2. Alternative routes should be designed to maximize the use of existing ATS route structures and communication, navigation and surveillance services.
- 3.3. In the event that ATS cannot be provided within ~~the (XXX)~~ any portion of airspace (CTA/UTA/FIR...), the Civil Aviation Authority shall publish the corresponding NOTAM indicating the following:
- a) Time and date of the beginning of the contingency measures;
 - b) Airspace available for landing and overflying traffic and airspace to be avoided;
 - c) Details of the facilities and services available or not available and any limits on ATS provision (e.g., ACC, APP, TWR and FIS), including an expected date of restoration of services if available;
 - d) Information on the provisions made for alternative services;
 - e) ATS contingency routes;
 - f) Procedures to be followed by neighbouring ATS units;
 - g) Procedures to be followed by pilots; and
 - h) Any other details with respect to the disruption and actions being taken that aircraft operators may find useful.

The ICAO MID Office will facilitate the communication with the concerned State.

~~3.4.3.1. In the event that the CAA is unable to issue the NOTAM, the (alternate) CTA/UTA/FIR will take action to issue the NOTAM of closure airspace upon notification by corresponding CAA or the ICAO MID Regional Office.~~

Separation

3.5.3.4. Separation criteria will be applied in accordance with the *Procedures for Air Navigation Services-Air Traffic Management* (PANS-ATM, Doc 4444) and the *Regional Supplementary Procedures* (Doc 7030).

Level Restrictions

3.6.3.5. Where possible, aircraft on long-haul international flights shall be given priority with respect to cruising levels.

Other measures

3.7.3.6. Other measures related to the closure of airspace and the implementation of the contingency scheme with the (XXX) CTA/UTA/FIR may be taken as follows:

- a) Suspension of all VFR operations;
- b) Delay or suspension of general aviation IFR operations; and
- c) Delay or suspension of commercial IFR operations.

Transition to Contingency Plan

3.8.3.7. During times of uncertainty when airspace closures seem possible, aircraft operators should expect to be diverted to an alternate aerodrome or be prepared for a possible change in re-routing while in en-route phase, familiarization of the alternative routes outlined in the contingency plan as well as what may be promulgated by a State via NOTAM or AIP; or by the CCT team.

3.9.3.8. In the event of airspace closure that has not been promulgated, ATC should, if possible, broadcast to all aircraft in their airspace, what airspace is being closed and to stand by for further instructions.

3.10.3.9. ATS providers should recognize that when closures of airspace or airports are promulgated, individual airlines might have different company requirements as to their alternative routings. ATC should be alert/alerted to respond to any request by aircraft and react commensurate with safety.

3.11.3.10. During the contingency operations, States concerned should take necessary measures to grant special over flight permissions to those flights avoiding the affected Airspace(s).

Transfer of Control and Coordination

3.12.3.11. The transfer of control and communication should be at the common FIR boundary between ATS units unless there is mutual agreement between adjacent ATS units. ATS providers should also review current coordination requirements in light of contingency operations or short notice of airspace closure.

Approval process of national contingency plan

CHAPTER 45

AIRSPACE AND ALTERNATIVE ROUTINGS

4.1. This Contingency Plan has been developed based on existing ATS routes and making use of appropriate contingency routes in the MID Region. Priority has been given to safety considerations and to ensuring that to the extent possible, ATC operations are not complicated. Temporary routes may be established where necessary.

4.2. The contingency routings are designed to take into consideration that disruptions to normal traffic flows have the potential to create an additional burden and complexity to ATC. Therefore, temporary contingency routes would be designed to be safe and instantly manageable by ATC. This may require additional track miles to be flown by the aircraft operator.

4.3. ~~The alternative routings were given “CR” designators based on various scenarios that may be implemented. It is to be highlighted that the scenarios drawn on the charts were developed based on the existing route network, and do not reflect new routes. Furthermore, one scenario could be used to avoid different FIRs, subject to users’ requirements. The scenarios are detailed in the Table 3 below:~~

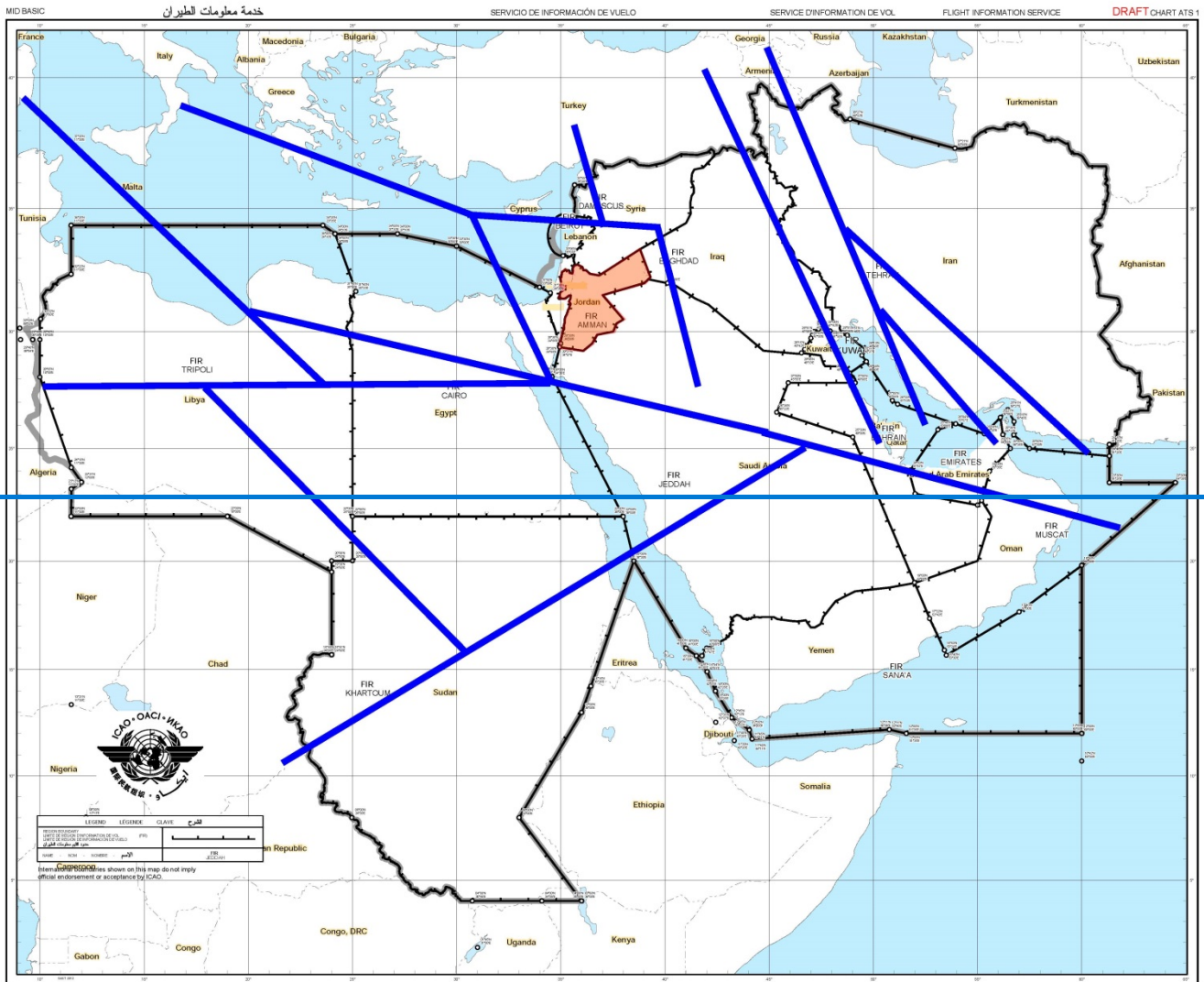
CR	FIR(s) to be Avoided	<u>Traffic Flows through the MID Region</u> <u>Alternative routings/FIRs Routing options</u>	Remarks
~~CR-1~~	Amman	<i>Eastern Europe from/to Asia</i> - Ankara, Baghdad, Jeddah - Ankara, Tehran - Ankara, Damascus, Baghdad, Jeddah <i>Western Europe from/to Asia</i> - Nicosia, Cairo, Jeddah - Nicosia, Beirut, Damascus, Baghdad, Jeddah <i>Northern Africa from/to Asia</i> - Cairo, Jeddah <i>Southern Africa from/to Asia</i> - Not Applicable	
~~CR-2~~	Baghdad <u>and</u> <u>Qatar</u>	<i>Eastern Europe from/to Asia</i> - Ankara, Tehran, (Kuwait) or (Bahrain) or (UAE) - Ankara, Damascus, Amman, Jeddah <i>Western Europe from/to Asia</i> - Nicosia, Beirut, Damascus, Amman, Jeddah - Nicosia, Damascus, Amman, Jeddah - Nicosia, Cairo, Jeddah <i>Northern Africa from/to Asia</i> - Cairo, Jeddah <i>Southern Africa from/to Asia</i> - Addis Ababa, (Asmara, Jeddah) or (Mogadishu, Sana’a)	
~~CR-3~~	Bahrain	<i>Eastern Europe from/to Asia</i> - Ankara, (Baghdad), Tehran, UAE, Muscat - Ankara, Baghdad, Jeddah, Sana’a, Muscat <i>Western Europe from/to Asia</i> - Nicosia, Beirut, Damascus, Amman, Jeddah, Sana’a; Muscat - Nicosia, Damascus, Amman, Jeddah - Nicosia, Cairo, Jeddah, Sana’a, Muscat <i>Northern Africa from/to Asia</i> - Cairo, Jeddah, Sana’a, Muscat <i>Southern Africa from/to Asia</i> - Khartoum, Jeddah, Sana’a, Muscat	

		Addis Ababa, Mogadishu, Sana'a, Muscat	
CR-4	Beirut, Damascus	Eastern Europe from/to Asia - Ankara, Baghdad Jeddah or Kuwait; - Ankara, Tehran Western Europe from/to Asia - Nicosia, Cairo, Jeddah Northern Africa from/to Asia - Cairo, Jeddah Southern Africa from/to Asia - Khartoum Addis Ababa, Mogadishu, Sana'a - Khartoum, Jeddah	
CR-5	Cairo	Eastern Europe from/to Asia Not Applicable Western Europe from/to Asia - Nicosia, Beirut, Damascus, Amman, Jeddah - Nicosia, Damascus, Baghdad; Kuwait, Bahrain, UAE - Malta, Tripoli, Khartoum, Jeddah - Malta, Tripoli, Khartoum, Asmara, Jeddah or Sana'a Northern Africa from/to Asia - Tripoli, Khartoum, Jeddah - Tripoli, Khartoum, Asmara, Jeddah or Sana'a - Algiers, Niamey, N'djamena, Khartoum, Asmara, Jeddah or Sana'a Southern Africa from/to Asia - Khartoum, Jeddah, Sana'a, Muscat - Addis Ababa, (Asmara, Jeddah) or (Mogadishu, Sana'a)	
CR-6	~~Iran~~ Tehran	Eastern Europe from/to Asia - Baku, Turkmenbashi, Ashgabat, Turkmenabad, Kabul, Karachi, Muscat or Delhi - Baghdad, Kuwait, Bahrain, UAE, Muscat - Nicosia Damascus Amman, Jeddah Western Europe from/to Asia - Nicosia, Beirut, Damascus, Amman, Jeddah - Nicosia, Cairo, Jeddah Northern Africa from/to Asia Not Applicable Southern Africa from/to Asia Not Applicable	
CR-7	Jeddah	Eastern Europe from/to Asia - Ankara, Baghdad, Kuwait, Bahrain, UAE, Muscat - Ankara, Damascus, Amman, Baghdad, Kuwait, Bahrain, UAE Western Europe from/to Asia - Nicosia, Beirut, Damascus, Amman, Baghdad, Kuwait, Bahrain,	

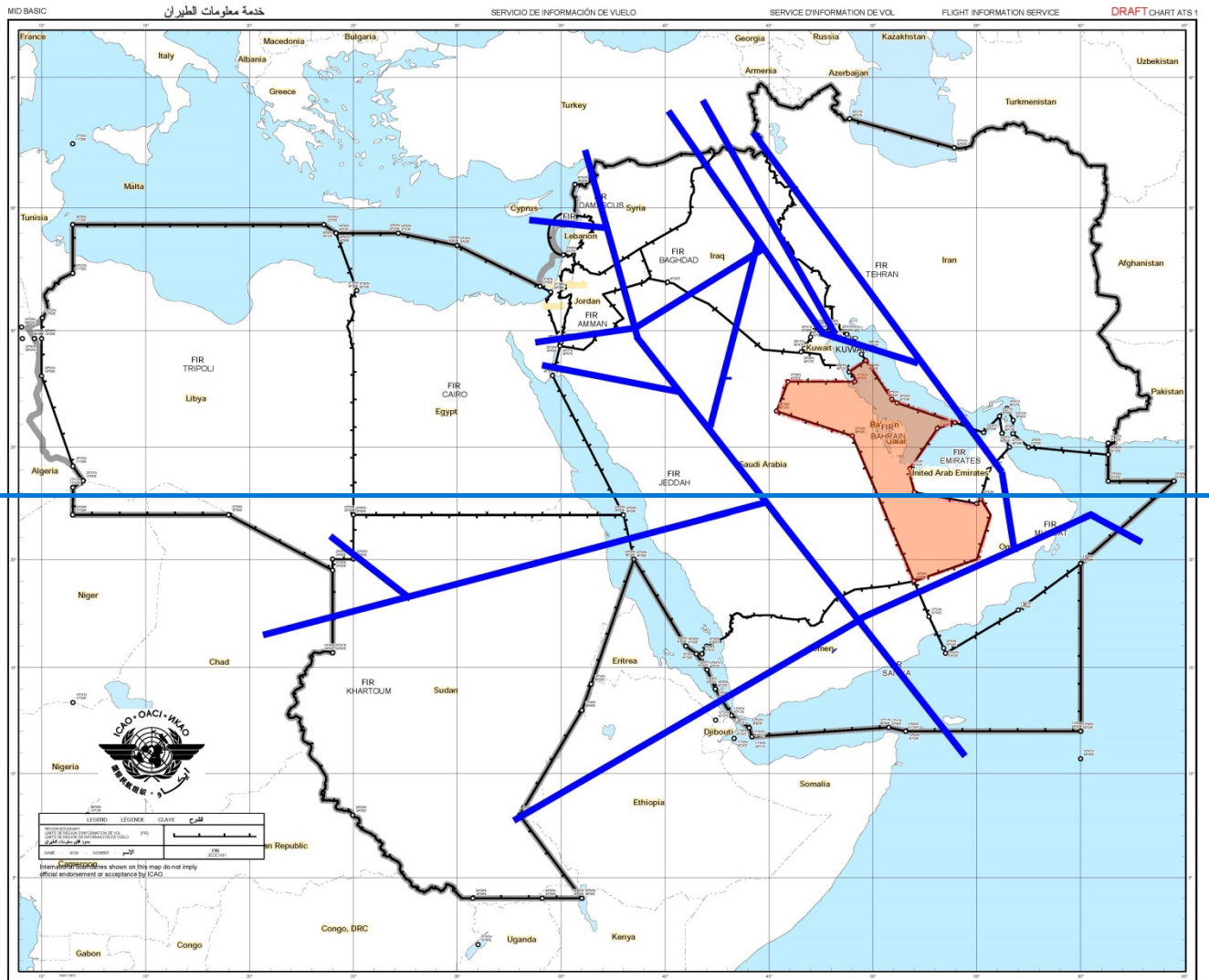
		- Athens or Nicosia, Cairo, Amman, Baghdad, Kuwait, Bahrain Northern Africa from/to Asia - Cairo, Khartoum, Asmara, Sana'a Southern Africa from/to Asia - Khartoum, Asmara, Sana'a - Addis Ababa, Mogadishu, Sana'a, Muscat	
CR-8	Khartoum	Eastern Europe from/to Asia Not Applicable Western Europe from/to Africa Not Applicable Northern Africa from/to Asia - Cairo, Jeddah - Tripoli, N'djamena, Brazzaville, Kinshasa, Entebbe, Nairobi Addis Ababa, Mogadishu, Sana'a, Jeddah or Muscat. Southern Africa from/to Asia - Kinshasa, Entebbe, Nairobi Addis Ababa, Mogadishu, Sana'a, Jeddah or Muscat	
CR-9	Muscat, UAE	Eastern Europe from/to Asia - Ankara, Baghdad, Jeddah, Sana'a Western Europe from/to Asia - Nicosia, Beirut, Damascus, Amman, Jeddah, Sana'a - Nicosia, Damascus, Amman, Jeddah - Nicosia, Cairo, Jeddah, Sana'a Northern Africa from/to Asia - Cairo, Jeddah, Sana'a Southern Africa from/to Asia - Khartoum, Jeddah, Sana'a - Addis Ababa, (Asmara Jeddah) or (Mogadishu, or Sana'a)	
CR-10	Sana'a	Eastern Europe from/to Asia - Ankara, Baghdad, Tehran, UAE, Muscat - Ankara, Baghdad, Jeddah, Bahrain, Muscat Western Europe from/to Asia - Nicosia, Beirut, Damascus, Amman, Jeddah, Bahrain; Muscat - Nicosia, Damascus, Amman, Jeddah, Bahrain; Muscat - Nicosia, Cairo, Jeddah, Bahrain; Muscat Northern Africa from/to Asia - Cairo, Jeddah, Bahrain; Muscat Southern Africa from/to Asia - Khartoum, Jeddah, Bahrain; Muscat - Addis Ababa, (Asmara Jeddah) or (Mogadishu, Mumbai, Muscat	
CR-11	Tripoli	Eastern Europe from/to Asia Not Applicable Western Europe from/to Africa Malta, Cairo, Khartoum Northern Africa from/to South Africa or Middle East	

		▪ Malta, Athens, or Nicosia to Cairo, Khartoum or Jeddah ▪ Tunis, Algiers, Niamey, N'djamena <i>Southern Africa from/to Asia</i> Not Applicable	
	<u>Doha</u>		

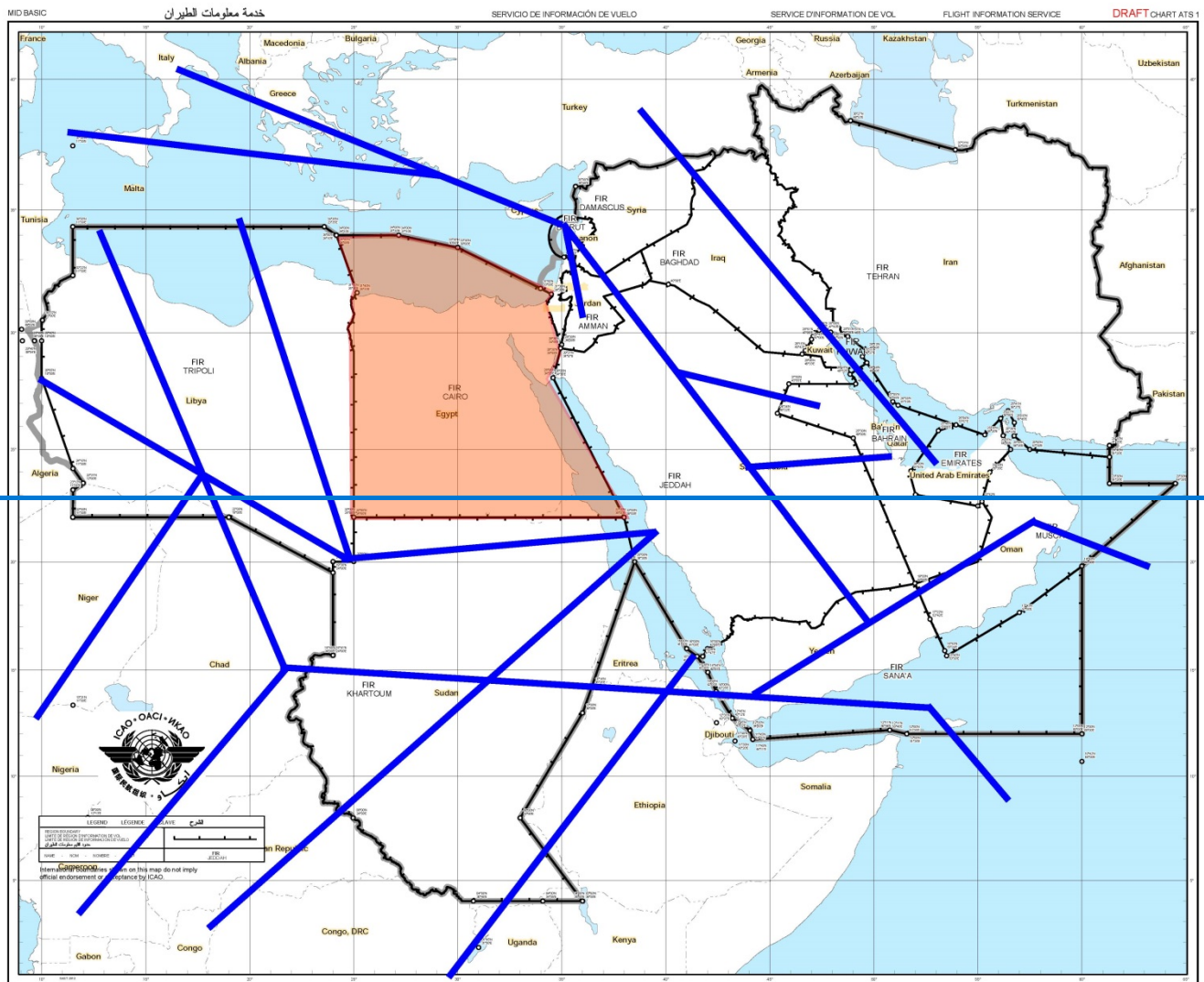
Table 3



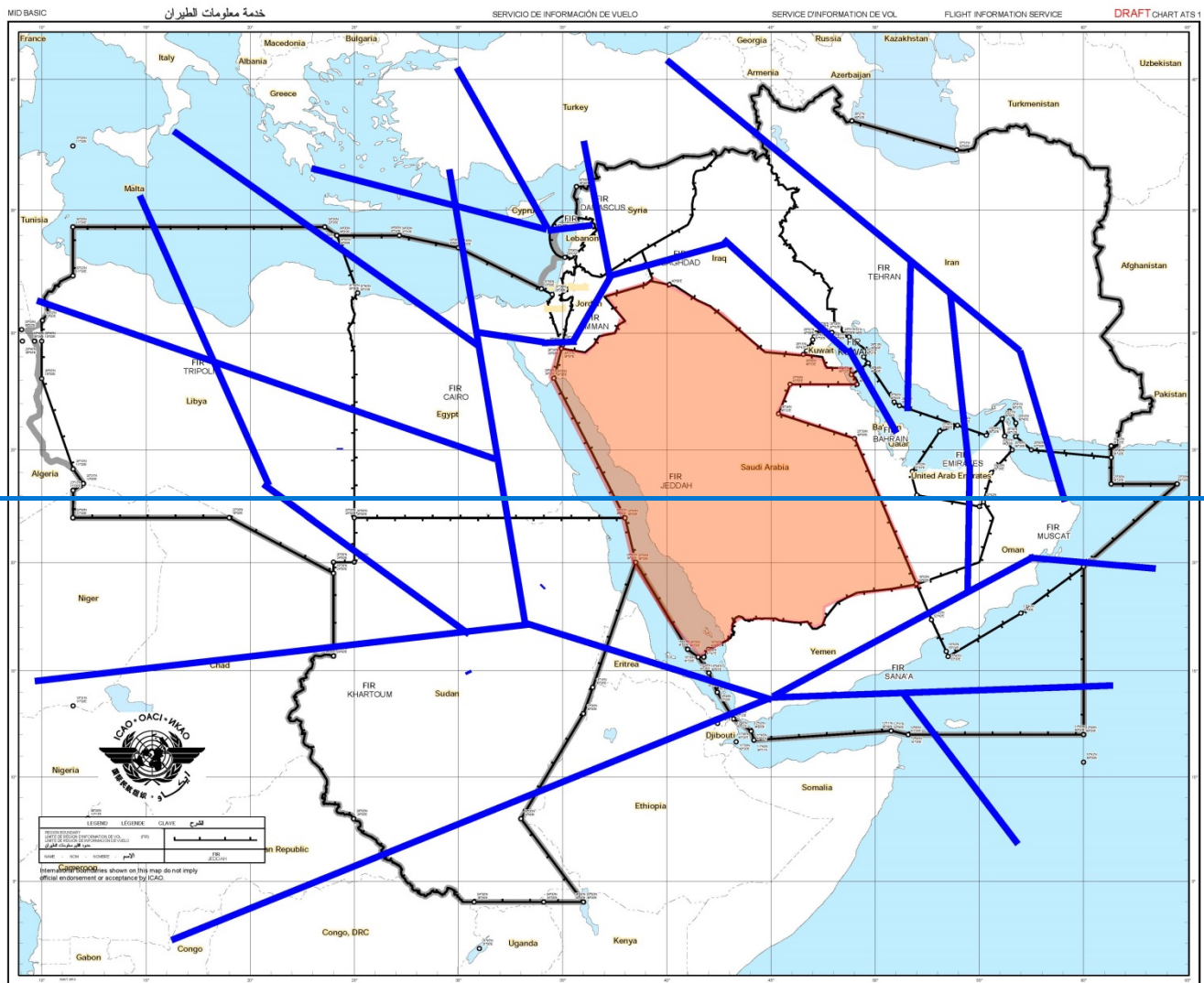
CR 1



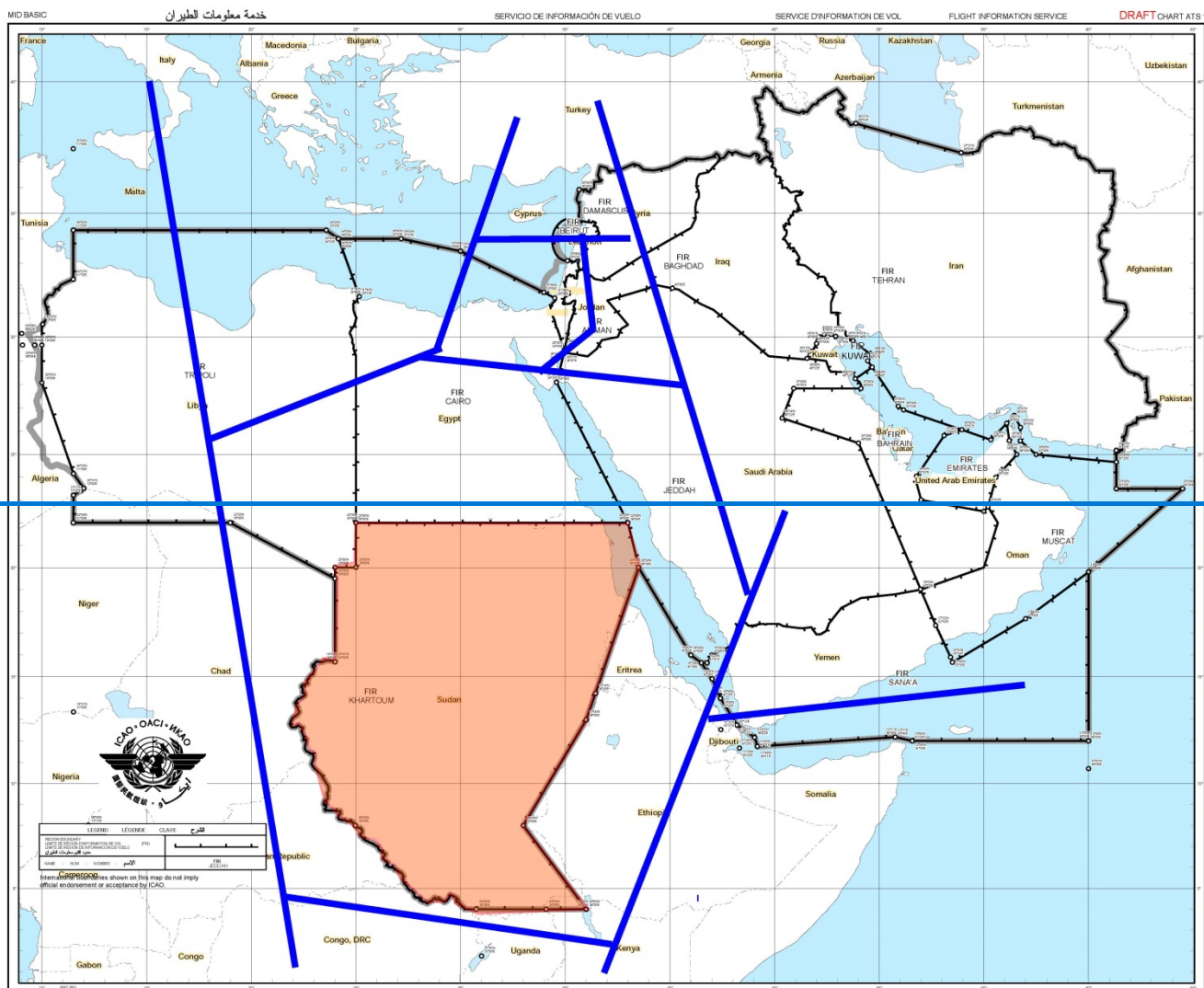
CR 3



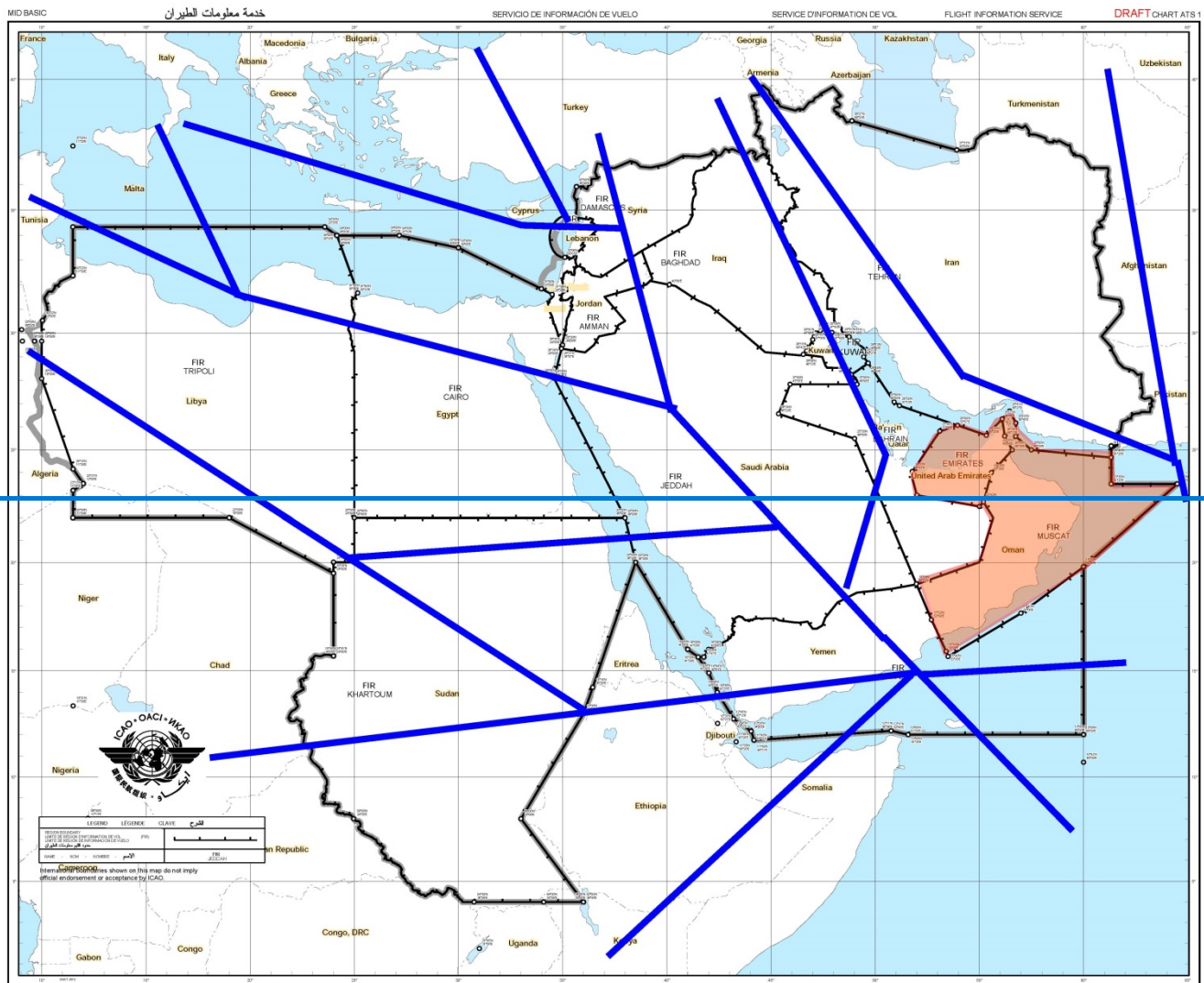
CR 5



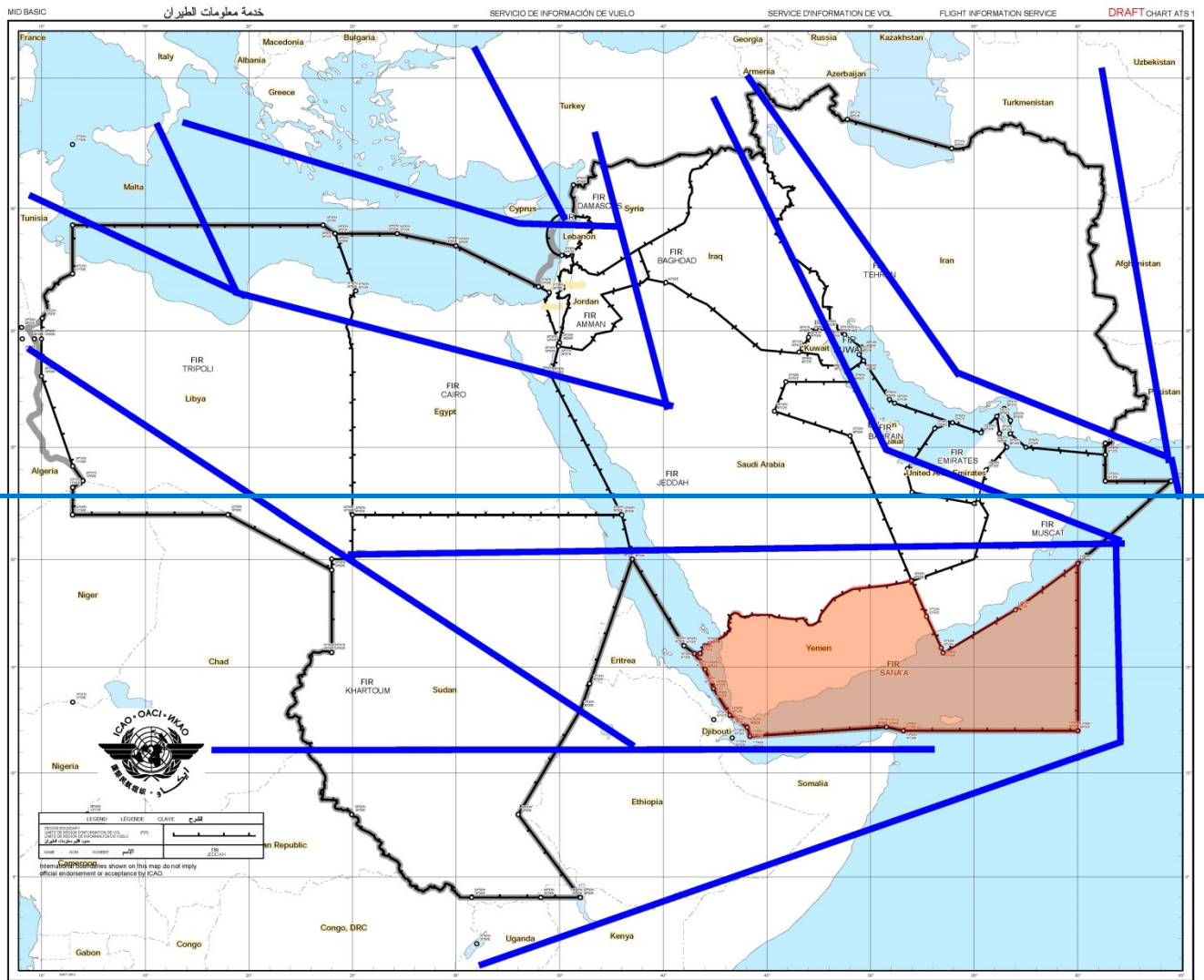
CR 7



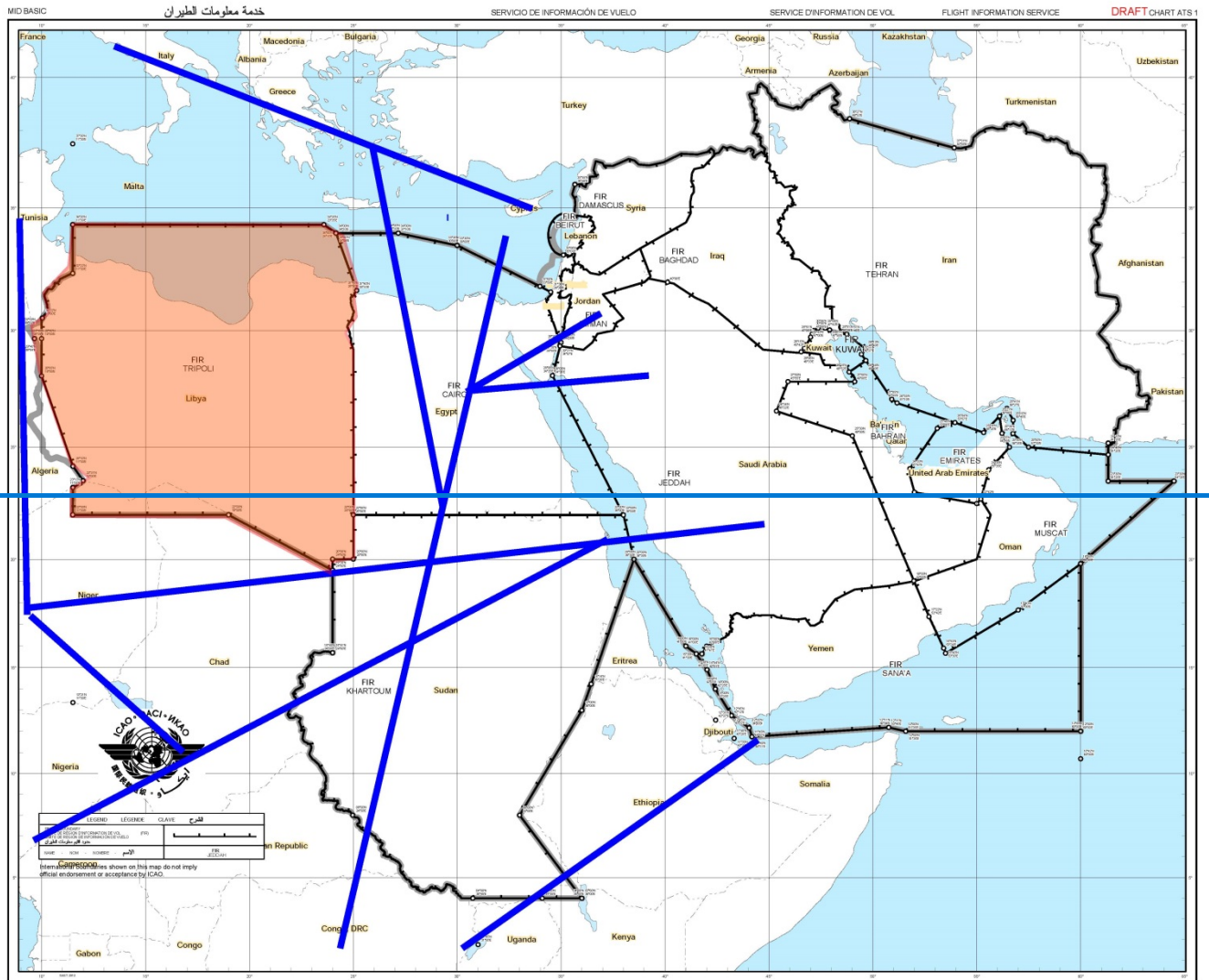
CR 8



CR 9



CR 10



CR 11

CHAPTER 56

MID REGION ATM ~~VOLCANIC~~VOLCANIC ASH CONTINGENCY PLAN

5.1. The MID Region ATM Volcanic Ash Contingency Plan (MID ATM VACP) was developed based on the VACP prepared by the International Volcanic Ash Task Force (IVATF) in August 2012. The MID ATM VACP sets out standardised guidelines and procedures for the provision of information to airlines and en-route aircraft before and during a volcanic eruption. The plan and its appendices are at **Attachment A** to this Document.

5.2. The MID ATM VACP includes the **pre-eruption**, **start of eruption**, **ongoing**; and **recovery** phases. It is to be highlighted that most MID States would practice the **ongoing** and **recovery** phases only as the **pre-eruption** and **start of eruption** phases would only apply to the States where volcanoes erupt. Furthermore, the MID Region would receive volcanic ash advisories and volcanic ash advisories in graphic form from the Volcanic Ash Advisory Center (VAAC) Toulouse.

5.3. Volcanic contamination, of which volcanic ash is the most serious, is a hazard for safe flight operations. Mitigating the hazards posed by volcanic ash in the atmosphere and/or at the aerodrome cannot be resolved in isolation but through collaborative decision making (CDM) involving all stakeholders concerned. During an eruption, volcanic contamination can reach and exceed the cruising altitudes of turbine-powered aircraft within minutes and spread over vast geographical areas within a few days. Encounters with volcanic ash may result in a variety of hazards including one or more of the following:

- a) the malfunction, or failure, of one or more engines leading not only to reduction, or complete loss of thrust but also to failures of electrical, pneumatic and hydraulic systems;
- b) the blockage of pitot and static sensors resulting in unreliable airspeed indications and erroneous warnings;
- c) windscreens rendered partially or completely opaque;
- d) smoke, dust and/or toxic chemical contamination of cabin air requiring crew to don oxygen masks, thus impacting verbal communication; electronic systems may also be affected;
- e) the erosion of external and internal aircraft components;
- f) reduced electronic cooling efficiency leading to a wide range of aircraft system failures;
- g) the aircraft may have to be manoeuvred in a manner that conflicts with other aircraft; and
- h) volcanic ash deposition on a runway may degrade aircraft braking performance, most significantly if the volcanic ash is wet; and in extreme cases, this can lead to runway closure.

5.4. Operators are required by ICAO Annex 6 – *Operation of Aircraft* to implement appropriate mitigation measures for volcanic ash in accordance with their safety management system (SMS), as approved by the State of the Operator/Registry. The guidelines provided in the MID ATM VACP document assume that the ICAO requirements regarding safety management systems have been implemented by the operators. Detailed guidance on Safety Risk Assessments (SRAs) for flight operations with regard to volcanic ash contamination can be found in the manual on *Flight Safety and Volcanic Ash – Risk Management of Flight Operations with Known or Forecast Volcanic Ash Contamination* (ICAO Doc 9974).

5.5. Distribution of applicable Aeronautical Information Services (AIS) and Meteorological (MET) messages related to volcanic ash are set out in relevant ICAO Annexes, specifically Annex 15–*Aeronautical Information Services* and Annex 3 – *Meteorological Service for International Air Navigation*.

5.6. Volcanic ash can also affect the operation of aircraft at aerodromes. Volcanic ash deposition at an aerodrome, even in very small amounts, can result in the closure of the aerodrome until all the deposited ash has been removed. In extreme cases, the aerodrome may no longer be available for operation at all, resulting in repercussions on the ATM system, e.g. diversions, revised traffic flows, etc.

5.7. Some aircraft types or engine technologies are more vulnerable to volcanic ash contaminants than others; therefore, any specific mitigation measures to be applied would have to take into account any such variance. Considering that a commercial aircraft travels about 150 km (80 NM) in 10 minutes and that volcanic ash can rise to flight levels commonly used by turbine-engine aircraft in half that time, a timely response to volcanic eruptions and volcanic ash in the atmosphere is essential.

5.8. It is imperative that information on the volcanic activity is disseminated as soon as possible. In order to assist staff in expediting the process of originating and issuing relevant AIS and MET messages, a series of templates should be available for different stages of the volcanic activity. For the list of ICAO registered volcanoes see the *Manual on Volcanic Ash*,

Radioactive Material and Toxic Chemical Clouds (ICAO Doc 9691). Volcanoes name, number and nominal position should be available at the State's International NOTAM office. Volcanic ash exercises (VOLCEX) should be conducted at a frequency determined by the ICAO Region concerned, in order to ensure the smooth implementation and effectiveness of the contingency plan in case of an actual volcanic eruption.

5.9. This document has been prepared, and is in line with a proposal for amendment to the *Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444)* paragraph 15.8 *Procedures for an ATC unit when a volcanic ash cloud is reported or forecast* — which is expected to become applicable in November 2014.

5.10. General considerations during the development of an ATM contingency plan for volcanic ash and anticipated flight crew issues when encountering volcanic ash are provided in **Appendices A** and **B**, respectively.

Draft

Appendix A

MID Region ATM Contingency Focal Points

<u>NAMES</u>	<u>PHONE (WORK)</u>	<u>PHONE (HOME)</u>	<u>MOBILE PHONE</u>	<u>FAX</u>	<u>E-MAIL</u>	<u>OTHER CONTACT DETAILS</u>
<u>BAHRAIN</u>						
Mr. Abdulla Al Qadhi	9731732 1116		973 36639955	973 17321 9966	aalqadhi@mtt.gov.bh	Bahrain ACC Duty Supervisor Tel: 973 1732 1081/1080 Fax : 973 1732 1029 Email : bahatc@caa.mtt.bh
<u>EGYPT</u>						
Mr. Moatassem Baligh	202 265 7849	202 639 1792	01001695252	202 268 0627	moatassem_5@hotmail.com	
<u>IRAN</u>						
Mr. Masoud Nikbakht DG of ATM Department	98 21 445 44101		98-912326 3905	9821 44544102	masoudnikbakht@gmail.com	Note.- During New Year Holidays in Iran (20 March – 5 April) or for any urgent message Contact Tehran ACC on +9821-44544116
Mr. Ahmad Kavehfirouz Deputy Director of Tehran ACC	9821 44544119		98912323044 7	9821 44544102	ahmadkavehfirouz@gmail.com	

<u>NAMES</u>	<u>PHONE (WORK)</u>	<u>PHONE (HOME)</u>	<u>MOBILE PHONE</u>	<u>FAX</u>	<u>E-MAIL</u>	<u>OTHER CONTACT DETAILS</u>
IRAQ						
Mr. Fadhil Getea Director ATS	96418133370		964 7828844998		atc@iraqcaa.com	
JORDAN						
Mr. Nayef Al Marshoud Director, ATM	9626 489 7729	962 5 3862584	962 797498992 962 777789470	9626 4891 266	nayefmarshoud@h otmail.com datm@carc.gov.jo	
KUWAIT						
Mr. Adel S. Boresli Director Air Navigation	965 24710268		96599036556	965 24346221	as.buresli@dgca.g ov.kw	
LEBANON						
Mr. Kamal Nasserddine Chief Air Navigation Dept.	+ 961 1 628178		+961 71309409	+961 1 629023	ATM@beirutairpo rt.gov.lb	AFTN OLBAZPZX
LIBYA						
Mr. Mohamed E. Bakar Director of ATM	218-61 360 5535		218-91 219 4477	218-21 360 5535	mohamed.bakar@c aa.gov.ly	
OMAN						
Mr. Mubarak Gheilani Director ATS	+968-24 354 867		+968 9507 6157		m.alghelani@paca. gov.om	
SAUDI ARABIA						
Mr. Waleed M. Madanii	(966-12) 671 7717 Ext 1818		966-50 567 4867	9662 6401005	waleedmadani@g ca.gov.com	
SUDAN						
Mr. Abubakr Elsiddig Elamin	24918378496 4		24991214674 5	249183784964	abubakratco@live. com	ATM Director ANS P.O. Box 137 code 11112, Khartoum, Sudan
SYRIA						
Mr.Hassan Hamoud ATM Director	00963115401 0180	00963116 460395	00963 988235106	963 11 540101801	ans@scaa.sy hamoud_hasan@y ahoo.com	P.O.BOX:6257 Damascus, Syria

<u>NAMES</u>	<u>PHONE (WORK)</u>	<u>PHONE (HOME)</u>	<u>MOBILE PHONE</u>	<u>FAX</u>	<u>E-MAIL</u>	<u>OTHER CONTACT DETAILS</u>
UNITED ARAB EMIRATES (UAE)						
Mr. Ahmed Al Jallaf Assistant Director General, ANS, GCAA	9712 599 6888		97150 614 9065	9712 599 6883	aljallaf@szc.gcaa.a e	9712 599 6999 <u>SCZ</u>
Mr. Muayyed Al Teneiji Senior Director ATM	971-2 5996830		+971 56 685 4505	971-2 5996836	mteneiji@szc.gcaa .ae	
YEMEN						
Mr. Abdullah Abdulwareth Aleryani	967-1-345403	967-1- 344254	96777719060 2	967-1-345403	ernlabd@gmail.co m	D.G ACC/FIC
Mr. Ahmed Mohammed Al- Koobati	967-1-344675	967-1- 214375	96777724137 5	967-1-344047	CAMA70@yahoo. com	D.Air Navigation Operation
IATA						
Mr. George Rhodes	96 26 580 4200 Ext 1215			962 (6) 593 9912	rhodesg@iata.org SFOMENA@iata. org	
ICAO MID						
Mr. Ahmad Amireh (RO ATM/SAR)	202 2267 4840/5 ext 4120		+2010502144 80	202 2267 4843	aamireh@icao.int icaomid@icao.int	
Mr. Ahmad Kaveh (RO ATM)	ext 4122		+2010321824 88		akaveh@icao.int	
ICAO APAC						
Mr. Leonard Wicks (RO ATM)	662 537 8189 ext 152				lwicks@icao.int	
ICAO ESAF						
Mr. Seboseso Machobane (RO ATM)					Smachobane@icao .int	
ICAO EUR/NAT						
Mr. Sven Halle (RO/ATM)					shalle@icao.int	
ICAO WACAF						
Mr. Albert Taylor (RO/ATM)					Ataylor@icao.int	
ICAO Headquarters						
Mr. Chris Dalton (C/AMO)	1514 954- 6711				cdalton@icao.int	

Appendix B

Table 2- Status of Contingency Agreements in the MID Region

<u>STATE</u>	<u>CORRESPONDING STATES</u>			<u>REMARKS*</u>
<u>BAHRAIN</u>	☒ <u>IRAN</u> ☒ <u>KUWAIT</u>	☒ <u>QATAR</u> ☒ <u>SAUDI ARABIA</u>	☒ <u>UAE</u>	<u>Completed</u>
<u>EGYPT</u>	☒ <u>GREECE</u> ☒ <u>JORDAN</u>	☒ <u>LYBIA</u> ☒ <u>CYPRUS</u>	☒ <u>SAUDI ARABIA</u> ☒ <u>SUDAN</u>	<u>Completed</u>
<u>IRAN</u>	☒ <u>ARMENIA</u> ☐ <u>AZERBAIJAN</u> ☐ <u>TURKMENISTAN</u> ☐ <u>AFGHANISTAN</u>	☒ <u>BAHRAIN</u> ☒ <u>IRAQ</u> ☐ <u>KUWAIT</u> ☒ <u>OMAN</u>	☒ <u>PAKISTAN</u> ☒ <u>TURKEY</u> ☒ <u>UAE</u>	<u>7/11</u>
<u>IRAQ</u>	☒ <u>IRAN</u> ☐ <u>JORDAN</u>	☐ <u>KUWAIT</u> ☐ <u>SAUDI ARABIA</u>	☐ <u>SYRIA</u> ☐ <u>TURKEY</u>	<u>1/6</u>
<u>JORDAN</u>	☒ <u>EGYPT</u> ☐ <u>IRAQ</u>	☐ <u>ISRAEL</u> ☒ <u>SAUDI ARABIA</u>	☐ <u>SYRIA</u>	<u>2/5</u>
<u>KUWAIT</u>	☒ <u>BAHRAIN</u> ☐ <u>IRAN</u>	☐ <u>IRAQ</u>	☒ <u>SAUDI ARABIA</u>	<u>2/4</u>
<u>LEBANON</u>	☐ <u>CYPRUS</u>	☐ <u>SYRIA</u>		<u>0/2</u>
<u>LIBYA</u>	☐ <u>ALGERIA</u> ☐ <u>CHAD</u> ☒ <u>EGYPT</u>	☐ <u>MALTA</u> ☐ <u>NIGER</u>	☐ <u>SUDAN</u> ☐ <u>TUNIS</u>	<u>1/7</u>
<u>OMAN</u>	☐ <u>INDIA</u> ☒ <u>IRAN</u>	☐ <u>PAKISTAN</u> ☐ <u>SAUDI ARABIA</u>	☒ <u>UAE</u> ☒ <u>YEMEN</u>	<u>3/6</u>
<u>QATAR</u>	☒ <u>BAHRAIN</u>	☐ <u>SAUDI ARABIA</u>	☒ <u>UAE</u> ☒ <u>Iran</u>	<u>2/3</u>
<u>SAUDI ARABIA</u>	☒ <u>BAHRAIN</u> ☒ <u>EGYPT</u> ☐ <u>ERITREA</u> ☐ <u>IRAQ</u>	☒ <u>JORDAN</u> ☒ <u>KUWAIT</u> ☐ <u>OMAN</u> ☐ <u>QATAR</u>	☐ <u>SUDAN</u> ☒ <u>UAE</u> ☐ <u>YEMEN</u>	<u>5/11</u>
<u>SUDAN</u>	☐ <u>CENTRAL AFRICAN</u> ☐ <u>CHAD</u> ☒ <u>EGYPT</u>	☐ <u>ERITREA</u> ☐ <u>ETHIOPIA</u> ☐ <u>LIBYA</u>	☐ <u>SAUDI ARABIA</u> ☐ <u>SOUTH SUDAN</u>	<u>1/8</u>
<u>SYRIA</u>	☐ <u>IRAQ</u> ☐ <u>JORDAN</u>	☐ <u>LEBANON</u> ☐ <u>CYPRUS</u>	☐ <u>TURKEY</u>	<u>0/5</u>
<u>UAE</u>	☒ <u>BAHRAIN</u> ☒ <u>IRAN</u>	☒ <u>OMAN</u> ☐ <u>QATAR</u>	☒ <u>SAUDI ARABIA</u>	<u>4/5</u>
<u>YEMEN</u>	☐ <u>DJIBOUTI</u> ☐ <u>ERITREA</u> ☐ <u>ETHIOPIA</u>	☐ <u>INDIA</u> ☒ <u>OMAN</u> ☐ <u>SAUDI ARABIA</u>	☐ <u>SOMALIA</u>	<u>1/7</u>

☒ Agreement Signed ☐ Agreement NOT Signed *Signed Agreements / Total No. of required Agreements

INTERNATIONAL CIVIL AVIATION ORGANIZATION



MID REGION ATM VOLCANIC ASH CONTINGENCY PLAN

MID REGION AIR TRAFFIC MANAGEMENT VOLCANIC ASH CONTINGENCY PLAN

TABLE OF CONTENTS

- 1. Terminology**
 - 1.1 Areas of Contamination
 - 1.2 Danger Areas
 - 1.3 Phases of an Event
- 2. Pre-eruption phase**
 - 2.1 General
 - 2.2 Originating ACC Actions
 - 2.3 Adjacent ACC Actions
 - 2.4 ATFM Unit Actions
- 3. Start of eruption phase**
 - 3.1 General
 - 3.2 Originating ACC Actions
 - 3.3 Adjacent ACC Actions
 - 3.4 ATFM Unit Actions
- 4. On-going eruption phase**
- 5. Recovery phase**
- 6. Air traffic services procedures**
- 7. Air traffic flow management procedures**

APPENDIX A	General guidance for the development of an ATM volcanic ash contingency plan
APPENDIX B	Anticipated flight crew issues when encountering volcanic ash
APPENDIX C	Communication and dissemination of pilots' reports of volcanic activity
APPENDIX D	SIGMET and NOTAM examples during volcanic ash

1. TERMINOLOGY

1.1. Areas of Contamination

1.1.1. Information on areas of observed and/or forecast volcanic ash in the atmosphere is provided by means of appropriate MET messages in accordance with Annex 3 – *Meteorological Service for International Air Navigation*.¹

1.2. Danger Areas

1.2.1. If it is considered that the volcanic event could pose a hazard to aviation, a danger area² may be declared by NOTAM. However, this option should only be applied over and in the proximity of the volcanic source. Normally, clearances will not be issued through the danger area unless explicitly requested by the flight crew. In this context it should be noted that the final responsibility for aircraft safety rests with the flight crew. Therefore, the final decision regarding route, whether it will be to avoid or proceed through an area of volcanic activity, is the flight crew's responsibility. Wherever this document discusses the possible establishment of danger areas, States are not prevented from establishing restricted or prohibited areas over the sovereign territory of the State if considered necessary by the State concerned.

1.2.2. Although it is the prerogative of the Provider State to promulgate a danger area in airspace over the high seas, it should be recognized that restrictions to the freedom of flight over the high seas cannot be imposed in accordance with the United Nations Convention on the Law of the Sea (Montego Bay 1982).

1.3. Phases of An Event

1.3.1. The response to a volcanic event that affects air traffic has been divided into four distinct phases in this document: Pre-Eruption, Start of Eruption, On-going Eruption and Recovery Phases as follows:

Pre-Eruption Phase (when applicable): The initial response, "raising the alert", commences when a volcanic eruption is expected.

Appropriate AIS and MET messages may be issued in accordance with Annex 15 and Annex 3 respectively, and disseminated to affected aircraft in flight by the most expeditious means. It should be noted that, sometimes volcanoes erupt unexpectedly without any alert being raised; hence the pre-eruption phase may be omitted.

Start of Eruption Phase (when applicable): The start of eruption phase commences at the outbreak of the volcanic eruption and entrance of volcanic ash into the atmosphere and mainly pertains to aircraft in flight. Appropriate AIS and MET messages may be issued as appropriate in accordance with Annex 15 and Annex 3 respectively, and a danger area may be declared by NOTAM. Normally, clearances will not be issued through the danger area unless explicitly requested by the flight crew.

On-Going Eruption Phase: The on-going eruption phase commences with the issuance of the first Volcanic Ash Advisory (VAA) containing information on the extent and movement of the volcanic ash cloud following completion of the previous reactive responses. Appropriate AIS and MET messages may be issued as appropriate in accordance with Annex 15 and Annex 3, respectively.

¹ Principally this will include volcanic ash advisory messages (issued by volcanic ash advisory centres) and SIGMET information on volcanic ash (issued by meteorological watch offices).

² Depending on the State's regulation, the area may be established as a "danger area", "restricted area" or "prohibited area". Over the high seas only "danger area" may be established.

Recovery Phase: The recovery phase commences with the issuance of the first VAA containing a statement that “NO VA EXP” (i.e. “no volcanic ash expected”) which normally occurs when it is determined that no volcanic ash is expected in the atmosphere and the volcanic activity has reverted to its pre-eruption state.

Note: These descriptions are amplified in Chapter 3 of this document.

1.3.2. Although the four distinct phases herein describe actions to be undertaken during an actual volcanic event, they are based on a theoretical scenario. Actual eruptions may not always be distinct with respect to ATM actions to be undertaken. Similarly, an eruption may occur without any pre-eruptive activity, or may cease and restart more than once. Hence, the first observation may be the presence of an ash cloud which is already some distance away from the volcano. It is essential that the contingency planning prepares the ATM system for an appropriate response depending on the actual conditions. Therefore, the “Pre-Eruption Phase” and “Start of Eruption Phase” described in this document are annotated “when applicable” in order to provide for flexibility in the application of the contingency plan in those parts of the world with insufficient volcano monitoring and alerting.

1.3.3. Flight crews are required to report observations of volcanic activity by means of a special air-report (Special AIREP). Arrangements should be put in place to ensure that such information is transferred without delay to the appropriate aeronautical institutions responsible for subsequent action. The communication and dissemination of pilot reports on volcanic activity is described in Appendix C.

2. PRE-ERUPTION PHASE

2.1. General

2.1.1. Where flight operations are planned in areas that are susceptible to volcanic eruptions, ATS units may expect to receive from flight crews the ICAO Volcanic Activity Report (VAR) form (published in the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444, Appendix 1).

2.1.2. The focus of this phase is to gain early recognition of volcanic events. This phase is frequently characterised by a very limited availability of information on the potential extent and severity of the impending eruption. The priority is to ensure the continued safety of aircraft in flight; this requires promulgating information as a matter of urgency. Notwithstanding the potentially limited extent of information available, the pre-eruption phase actions described below should be carried out for every expected eruption.

2.1.3. The initial response, “raising the alert”, commences when a volcanic eruption is expected. Initial awareness of the event may be by means of a Special AIREP/VAR and/or from information provided by meteorological or volcano-logical agencies. Arrangements in each State between designated volcano observatories, meteorological and air traffic management agencies should ensure that alerting information is provided expeditiously by the most appropriate means to provide continued safety of flight.

2.1.4. Emphasis is placed on raising awareness of the hazard and to protect aircraft in flight. The actions are based on well-prepared, well-exercised contingency plans and standard operating procedures. Aircraft are expected to clear or avoid the volcanic ash affected area based on standard operating procedures.

2.2. Originating ACC Actions (eruption expected in its own flight information region)

2.2.1. In the event of significant pre-eruption volcanic activity, which could pose a hazard to aviation, an area control centre (ACC)³, on receiving information of such an occurrence, should carry out the following:

³ Where the term “ACC” is used throughout this document, it is intended to also include all ATS facilities.

- a) ensure that appropriate AIS messages are originated in accordance with Annex 15. These must provide as precise information as is available regarding the activity of the volcano. It is imperative that this information is issued by the international NOTAM office and disseminated as soon as possible in accordance with the provisions of Annex 15;
- b) when so required by the State, define an initial, precautionary danger area in accordance with established procedures. The size of the danger area should encompass a volume of airspace in accordance with the information available, aiming to avoid undue disruption of flight operations;
 - i. if no such procedures have been established, the danger area should be defined as a circle with a radius of xxx km (xx NM)⁴. The circle should be centred on the estimated or known location of the volcanic activity;
 - ii. although ATC would not normally initiate a clearance through a danger area, it will inform aircraft about the potential hazard and continue to provide normal services. It is the responsibility of the pilot-in-command to determine the safest course of action.
- c) advise the associated MET service provider(s) in accordance with national/regional arrangements unless the initial notification originated from such provider(s), who will then inform the appropriate air traffic flow management (ATFM) units;
- d) alert flights already within the area concerned and offer assistance to enable aircraft to exit the area in the most expeditious and appropriate manner. Flight crews should be provided with all necessary information required to make safe and efficient decisions in dealing with the hazards in the defined area. Aircraft that are close to the area should be offered assistance to remain clear of the area. Flights which would be expected to penetrate the area should be re-cleared onto routes that will keep them clear;
- e) immediately notify other affected ACCs of the event and the location and dimensions of the area concerned. The ACC should also negotiate any re-routings necessary for flights already coordinated but still within adjacent Flight Information Regions (FIRs) and provide any information on potential implications on traffic flow and its capability to handle the expected traffic. It is also expected that adjacent ACCs will be asked to reroute flights not yet coordinated to keep them clear of the area. It should be noted that flight crews may make the decision not to completely avoid the area based on, for example, visual observations; and
- f) implement flow management measures if necessary to maintain the required level of safety.

Note 1. — In order to assist staff in expediting the process of composing the AIS messages, a series of templates should be available for this stage of the volcanic activity.

2.2.2. In addition to sending the relevant AIS messages to the normal distribution list, it will be sent to the relevant meteorological facilities.

2.3. Adjacent ACC Actions

⁴ The size of the area is to be agreed in the region concerned and should be based on local knowledge as regards the volcano concerned.

2.3.1. During the pre-eruption phase, ATC will not normally initiate clearances through a danger area; however, it will inform aircraft about the potential hazard and continue to provide normal services. Adjacent ACCs should take the following action to assist:

- a) when advised, re-clear flights to which services are being provided and which will be affected by the area; and
- b) unless otherwise instructed, continue normal operations and:
 - i. if one or more routes are affected by the area, suggest re-routings to the affected aircraft onto routes clear of the area; and
 - ii. maintain awareness of the affected area.

2.4. ATFM Unit Actions

2.4.1. The ATFM unit and the associated Volcanic Ash Advisory Centre (VAAC) will determine how their initial communications will take place on the basis of bilateral agreements. Upon reception of preliminary information on volcanic activity from the lead VAAC, the ATFM unit should initiate actions in accordance with its procedures to ensure exchange of information in order to support CDM between air navigation service providers (ANSPs), Meteorological Watch Offices (MWOs), VAACs and aircraft operators concerned.

3. START OF ERUPTION PHASE

3.1. General

3.1.1. This phase commences at the outbreak of a volcanic eruption, with volcanic ash being ejected into the atmosphere. The focus of the processes in this phase is to protect aircraft in flight and at aerodromes from the hazards of the eruption through the collection and use of relevant information.

3.1.2. In addition to relevant actions described under the pre-eruption phase, major activities of the start of eruption phase such as the issuance of relevant AIS and MET messages in accordance with Annex 15 and Annex 3, respectively and provision of information and assistance to airborne traffic. Danger areas will be declared via NOTAM, as appropriate. This phase will last until such time as the on-going eruption phase can be activated.

3.2. Originating ACC Actions (eruption in its own FIR)

3.2.1. The ACC providing services in the FIR within which the volcanic eruption takes place should inform flights about the existence, extent and forecast movement of volcanic ash and provide information useful for the safe and efficient conduct of flights.

3.2.2. If necessary, rerouting of traffic should commence immediately or may be in progress if the alerting time has been sufficient to facilitate activation of the pre-eruption phase. The ACC should assist in rerouting aircraft around the danger area as expeditiously as possible. Adjacent ACCs should also take the danger area into account and give similar assistance to aircraft as early as possible.

3.2.3. During the start of eruption phase, although ATC will not normally initiate a clearance through a danger area, it will inform aircraft about the hazard and will continue to provide normal services. It is expected that aircraft will attempt to remain clear of the danger area. However, it is the responsibility of the pilot-in-command to determine the safest course of action.

3.2.4. During the start of eruption phase the ACC should:

- a) ensure that a NOTAM is originated to define a danger area delineated cautiously so as to encompass a volume of airspace in accordance with the limited information available. In determining the area, information on upper winds should be taken into account, if available. The purpose is to ensure safety of flight in the absence of any prediction from a competent authority of the extent of contamination;
- b) maintain close liaison with MET facilities, who should issue appropriate MET messages in accordance with Annex 3;
- c) devise and update ATFM measures when necessary to ensure safety of flight operations, based on these forecasts and in cooperation with aircraft operators and the adjacent ACCs using the CDM process;
- d) ensure that reported differences between published information and observations (pilot reports, airborne measurements, etc.) are forwarded as soon as possible to the appropriate authorities to ensure its dissemination to all concerned;
- e) begin planning for the on-going eruption phase in conjunction with the aircraft operators, the appropriate ATFM unit and ACCs concerned; and
- f) issue appropriate AIS messages in accordance with Annex 15. Significant reductions in intensity of volcanic activity should take place during this phase and the airspace no longer is contaminated by volcanic ash. Otherwise, begin CDM planning for the on-going eruption phase in conjunction with aircraft operators, the appropriate ATFM unit and the affected ACCs.

3.3. Adjacent ACC Actions

3.3.1. During the start of eruption phase, adjacent ACCs should take the following actions:

- a) maintain a close liaison with the appropriate ATFM unit and the originating ACC to design, implement and keep up to date ATFM measures which will enable aircraft to ensure safety of flight operations;
- b) the adjacent ACC, in cooperation with the originating ACC and aircraft operators, should impose as required additional tactical measures to those issued by the appropriate ATFM unit;
- c) maintain awareness of the affected area; and
- e) begin planning for the on-going eruption phase in conjunction with the aircraft operators, the appropriate ATFM unit and ACCs concerned.

3.4. ATFM Unit Actions

3.4.1. During the start of eruption phase, depending on the impact and/or extent of the volcanic ash, the appropriate ATFM unit should organise the exchange of latest information on the developments with the associated VAACs, ANSPs, MWOs and operators concerned in order to support CDM.

4. ON-GOING ERUPTION PHASE

4.1. The on-going eruption phase commences with the issuance of the first volcanic ash advisory (VAA) by the lead VAAC which contains information on the extent and movement of the volcanic ash cloud in accordance with Annex 3 provisions.

Note 2 - Volcanic ash advisory information in graphical format (VAG) may also be issued by the VAAC, containing the same information as its text-based VAA equivalent.

4.2. The VAA/VAG should be used to:

- a) prepare appropriate AIS and MET messages in accordance with Annex 15 and Annex 3 provisions, respectively; and
- b) plan and apply appropriate ATFM measures.

4.3. The volcanic contamination may affect any combination of airspace; therefore, it is not possible to prescribe measures to be taken for all situations. Furthermore, it is not possible to detail the actions to be taken by any particular ACC. The following guidance therefore may prove useful during the on-going eruption phase but should not be considered mandatory or exhaustive:

- a) ACCs affected by the movement of the volcanic ash should ensure that appropriate AIS messages are originated in accordance with Annex 15. ACCs concerned and the appropriate ATFM unit should continue to publish details on measures taken to ensure dissemination to all concerned;
- b) depending on the impact and/or extent of the volcanic ash, the appropriate ATFM unit may take the initiative to organize teleconferences to exchange the latest information on the developments, in order to support CDM, with the VAACs, ANSPs and MWOs and operators concerned;
- c) ACCs and ATFM units should be aware that for the purposes of flight planning, operators could treat the horizontal and vertical extent of the volcanic ash contaminated area to be over-flown as if it were mountainous terrain; and
- d) any reported differences between published information and observations (pilot reports, airborne measurements, etc.) should be forwarded as soon as possible to the appropriate authorities (see Appendix C).

5. RECOVERY PHASE

5.1. The recovery phase commences with the issuance of the first VAA/VAG containing a statement that “NO VA EXP” (i.e. “no volcanic ash expected”) — which normally occurs when it is determined that the volcanic activity has reverted to its pre-eruption state and the airspace is no longer affected by volcanic ash contamination. Consequently, appropriate AIS messages should be issued in accordance with Annex 15.

5.2. ACCs and ATFM units should revert to normal operations as soon as practical.

6. AIR TRAFFIC CONTROL PROCEDURES

6.1. If a volcanic ash cloud is reported or forecasted in the FIR for which the ATS unit is responsible, the following actions should be taken:

- a) relay all pertinent information immediately to flight crews whose aircraft could be affected to ensure that they are aware of the ash cloud’s position and levels affected;
- b) request the intention of the flight crew and endeavour to accommodate requests for re-routing or level changes;
- c) suggest appropriate re-routing to the flight crew to avoid an area of reported or forecast ash clouds; and

- d) request a special air-report when the route of flight takes the aircraft into or near the forecast ash cloud and provide such special air-report to the appropriate agencies.

Note 3.— The recommended escape manoeuvre for an aircraft which has encountered an ash cloud is to reverse its course and begin a descent if terrain permits.

Note 4. — The final authority as to the disposition of the aircraft, whether to avoid or proceed through a reported or forecast volcanic ash cloud, rests with the flight crew.

6.2. When advised by the flight crew that the aircraft has inadvertently entered a volcanic ash cloud, the ATS unit should:

- a) take such action applicable to an aircraft in an emergency situation; and
- b) do not initiate modifications of route or level assigned unless requested by the flight crew or necessitated by airspace requirements or traffic conditions.

Note 5.— General procedures to be applied when a pilot reports an emergency situation are contained in Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444, Chapter 15, 15.1.1 and 15.1.2).

Note 6.— Guidance material concerning the effect of volcanic ash and the impact of volcanic ash on aviation operational and support services is provided in Chapters 4 and 5 of the Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (Doc 9691).

7. ATFM PROCEDURES

7.1. Depending on the impact and/or extent of the volcanic ash and in order to support CDM, the appropriate ATFM unit should organize the exchange of the latest information on the developments with the associated VAACs, ANSPs, MWOs and operators concerned.

7.2. The ATFM unit will apply ATFM measures on request of the ANSPs concerned. The measures should be reviewed and updated in accordance with updated information. Operators should also be advised to maintain watch for relevant AIS and MET messages for the area.

APPENDIX A

GENERAL CONSIDERATIONS DURING THE DEVELOPMENT OF AN ATM CONTINGENCY PLAN FOR VOLCANIC ASH

1. In a contingency plan relating to volcanic ash contamination, certain steps need to be taken to provide a coordinated and controlled response for dealing with an event of this nature. Responsibilities should be clearly defined to ATS personnel. The plan should also identify the officials who need to be contacted, the type of messages that are to be created, the proper distribution of the messages and how to conduct business.
2. ATS personnel need to be trained and be made aware of the potentially hazardous effects if an aircraft encounters a volcanic ash cloud. Some particular aspects include:
 - a) volcanic ash contamination may extend for hundreds, or even thousands of miles horizontally and reach the stratosphere vertically;
 - b) volcanic ash may block the pitot-static system of an aircraft, resulting in unreliable airspeed indications;
 - c) braking conditions at aerodromes where volcanic ash has recently been deposited on the runway will affect the braking ability of the aircraft. This is more pronounced on runways contaminated with wet ash. Flight crews and ATS personnel should be aware of the consequences of volcanic ash being ingested into the engines during landing and taxiing. For departure, it is recommended that pilots avoid operating in visible airborne ash; instead they should allow sufficient time for the particles to settle before initiating a take-off roll, in order to avoid ingestion of ash particles into the engine. In addition, the movement area to be used should be carefully swept before any engine is started;
 - d) volcanic ash may result in the failure or power loss of one or all engines of an aircraft; and
 - e) aerodromes with volcanic ash deposition may be declared unsafe for flight operations. This may have consequences for the ATM system.
4. The area control centre (ACC) in conjunction with ATFM units serves as the critical communication link between affected aircraft in flight and the providers of information during a volcanic eruption. During episodes of volcanic ash contamination within the FIR, the ACC has two major communication roles. First and most important is its ability to communicate directly with aircraft enroute which may encounter the volcanic ash. Based on the information provided in SIGMET information for volcanic ash and volcanic ash advisories (VAAs), and working with MWOs, ATS personnel should be able to advise the flight crew of which flight levels are affected by the volcanic ash and the forecast movement of the contamination. Through various communication means, ATS units have the capability to coordinate with the flight crew alternative routes which would keep the aircraft away from the volcanic ash cloud.
5. Similarly, through the origination of a NOTAM/ASHTAM for volcanic activity the ACC can disseminate information on the status and activity of a volcano even for pre-eruption increases in volcanic activity. NOTAM/ASHTAM and SIGMET, together with AIREPs, are critical to dispatchers for flight planning purposes. Operators need as much advance notification as possible on the status of a volcano for strategic planning of flights and the safety of the flying public. Dispatchers need to be in communication with flight crew enroute so that a coordinated decision can be made between the flight crew, the dispatcher and ATS regarding alternative routes that are available. The ACC should advise the ATFM unit concerning the availability of alternative routes. However, it cannot be presumed that an aircraft which is projected to encounter ash will be provided with the most desirable route to avoid the contamination. Other considerations

have to be taken into account such as existing traffic levels on other routes and the amount of fuel reserve available for flights which may have to be diverted to other routes to allow for the affected aircraft to divert.

6. The NOTAM/ASHTAM for volcanic activity provides information on the status of activity of a volcano when a change in its activity is, or is expected to be, of operational significance. They are originated by the ACC and issued through the respective international NOTAM office based on the information received from any one of the observing sources and/or advisory information provided by the associated VAAC. In addition to providing the status of activity of a volcano, the NOTAM/ASHTAM also provides information on the location, extent and movement of the ash contamination and the air routes and flight levels affected. NOTAM can also be used to limit access to the airspace affected by the volcanic ash. Complete guidance on the issuance of NOTAM and ASHTAM is provided in Annex 15 — *Aeronautical Information Services*. Included in Annex 15 is a volcano level of activity colour code chart. The colour code chart alert may be used to provide information on the status of the volcano, with “red” being the most severe, i.e. volcanic eruption in progress with an ash column/cloud reported above flight level 250, and “green” at the other extreme being volcanic activity considered to have ceased and volcano reverted to its normal pre-eruption state. It is very important that NOTAM for volcanic ash be cancelled and ASHTAM be updated as soon as the volcano has reverted to its normal pre-eruption status, no further eruptions are expected by volcanologists and no volcanic ash is detectable or reported within the FIR concerned.

7. It is essential that the procedures to be followed by ATS personnel during a volcanic eruption, as well as supporting services such as MET, AIS and ATFM, should be translated into local staff instructions (adjusted as necessary to take account of local circumstances). It is also essential that such local staff instructions form part of the basic training for all ATS, AIS, ATFM and MET personnel whose jobs would require them to take action in accordance with the procedures. Background information to assist the ACC or Flight Information Centre (FIC) in maintaining an awareness of the status of activity of volcanoes in their FIR(s) is provided in the monthly Scientific Event Alert Network Bulletin published by the United States Smithsonian Institution and sent free of charge to ACCs/FICs requesting it.

APPENDIX B

ANTICIPATED FLIGHT CREW ISSUES WHEN ENCOUNTERING VOLCANIC ASH

1. ATS personnel should be aware that flight crews will be immediately dealing with some or all of the following issues when they encounter volcanic ash:
 - a) smoke or dust appearing in the cockpit which may prompt the flight crew to don oxygen masks (could interfere with the clarity of voice communications);
 - b) acrid odour similar to electrical smoke;
 - c) multiple engine malfunctions, such as stalls, increasing exhaust gas temperature (EGT), torching, flameout, and thrust loss causing an immediate departure from assigned altitude;
 - d) on engine restart attempts, engines may accelerate to idle very slowly, especially at high altitudes (could result in inability to maintain altitude or Mach number);
 - e) at night, St. Elmo's fire/static discharges may be observed around the windshield, accompanied by a bright orange glow in the engine inlet(s);
 - f) possible loss of visibility due to cockpit windows becoming cracked or discoloured, due to the sandblast effect of the ash;
 - g) because of the abrasive effects of volcanic ash on windshields and landing lights, visibility for approach and landing may be markedly reduced. Forward visibility may be limited to that which is available through the side windows; and/or
 - h) sharp distinct shadows cast by landing lights as compared to the diffused shadows observed in clouds (this affects visual perception of objects outside the aircraft).
2. Simultaneously, ATS personnel can expect flight crews to be executing contingency procedures such as the following:
 - a) if possible, the flight crew may immediately reduce thrust to idle;
 - b) exit volcanic ash cloud as quickly as possible. The shortest distance/time out of the ash may require an immediate, descend and/or 180 degrees turn (if terrain permit);
 - c) don flight crew oxygen masks at 100 per cent (if required);
 - d) monitor airspeed and pitch attitude. If unreliable airspeed is suspected, or a complete loss of airspeed indication occurs (volcanic ash may block the pitot system), the flight crew will establish the appropriate pitch attitude;
 - e) land at the nearest suitable aerodrome; and
 - f) upon landing, thrust reversers may be used as lightly as feasible.

— — — — —

APPENDIX C

COMMUNICATION AND DISSEMINATION OF PILOT REPORTS OF VOLCANIC ACTIVITY

1. INTRODUCTION

1.1. ICAO Annex 3-*Meteorological Service for International Air Navigation* (paragraph 5.5, g and h) prescribes that volcanic ash clouds, volcanic eruptions and pre-eruption volcanic activity, when observed, shall be reported by all aircraft. The ICAO *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) contain detailed provisions on this special air report requirement in paragraphs 4.12.3 and 4.12.5, and the Volcanic Activity Report form in Appendix 1.

1.2. Experience has shown that reporting and sharing of information on volcanic ash encounters in accordance with the above mentioned provisions (in-flight and post-flight) varies across the world. The efficiency and quality of reporting currently depends heavily on regional characteristics and the level of regional integration. A high level of global harmonization is essential to achieve the desired level of implementation and consistency of the information.

2. PURPOSES OF VOLCANIC ASH REPORTING AND DATA COLLECTION

2.1. The main purposes for volcanic ash reporting and data collection are to:

- a) locate the volcanic hazards;
- b) notify immediately other aircraft (in-flight) about the hazard;
- c) notify other interested parties: ANSPs (ATC, AIS, ATFM), VAACs, MWO, etc. to ensure the consistent production of appropriate information and warning products in accordance with existing provisions; and
- d) analyse collected reports from the post-flight phase in order to:
 - identify areas of concern;
 - validate and improve volcanic ash forecasts;
 - improve existing procedures;
 - assist in defining better airworthiness requirements; and
 - share lessons learned, etc.

3. PHASE OF OPERATIONS

3.1. The roles and responsibilities of the participants in the collection, exchange and dissemination of the volcanic information are distinctly different in two distinct phases:

- a) in-flight; and
- b) post-flight.

3.2. The following section analyses these separately.

4. PARTICIPANTS IN THE REPORTING PROCESS, THEIR ROLES AND RESPONSIBILITIES

4.1. Identification of the participants as well as their roles and responsibilities in general, but specifically during the two different phases of operations, is an important element in improving collection, exchange and dissemination of volcanic information. The number of participants and their roles and responsibilities depends on the phase of operations (in-flight, post-flight), their position in the information chain within one of these two phases and national/regional arrangements. One of the main issues regarding participants' roles and responsibilities is that each of them is, at one time or another, both a data/information provider and user of the information.

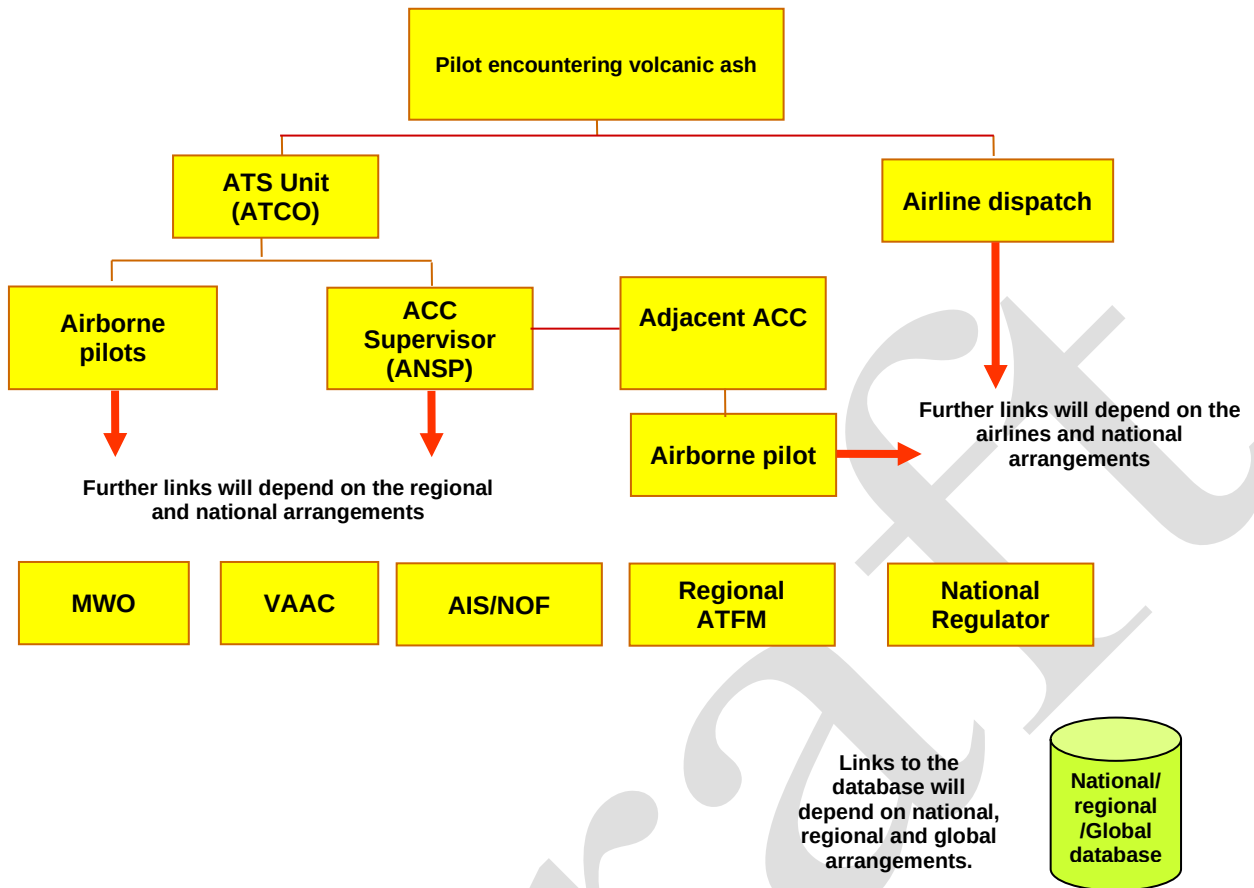
4.2. *In-Flight Phase*

4.2.1 Participants, Roles & Responsibilities:

Participants	Roles & Responsibilities
Pilots, civil and/or military, observing and/or encountering volcanic activity	To provide as much detailed information as possible about the type, position, colour, smell, dimensions of the volcanic contamination, level and time of the observation and forward VAR Part I immediately to the ATS unit with which the pilot is in radiotelephony (R/T) communication. Record the information required for VAR Part II on the appropriate form as soon as possible after the observation or encounter and file the report via data link, if available.
ATS unit receiving the information from the pilot encountering volcanic event	To ensure that information received by an air traffic controller from the pilot has been copied, clarified (if necessary), and disseminated to other pilots as well as to the ACC Supervisor. In addition, air traffic controllers could ask other pilots flying within the same area if they have observed any volcanic activity.
ATS unit/ACC Supervisor (if applicable) or other Air Navigation Service Provider responsible person	To use all means of communication and available forms to ensure that the information received from the air traffic controller has been: - passed on to the associated Meteorological organizations in accordance with national/regional arrangements; - fully and immediately disseminated across the organization, in particular to adjacent sectors and the associated NOTAM Office (NOF); - passed on to the neighbouring sectors and ACCs (if necessary); - passed on to the regional ATFM centre if existing (e.g. CFMU in Europe); - passed on to the national/regional authority responsible for the handling of contingency situations.
Neighbouring ANSPs (ACCs)	To ensure that information is provided to flight crews flying towards the area affected by the volcanic contamination; disseminated across the organization and the system prepared to cope with the possible changes of the traffic flows; and that the information is provided to the national authority responsible for the handling of contingency situations and passed on to the NOF and MWO as required.
MET Watch Office	To use the information originated by flight crews and forwarded by the ATS unit, in accordance with Annex 3.
VAAC	To use the information originated by flight crews, MWOs and other competent sources in accordance with Annex 3.
AIS / NOF	To publish appropriate AIS messages in accordance with Annex 15
ATFM unit or centre (if existing)	To ensure that information received is stored and made available for information to all partners in its area of responsibility (ANSPs, airlines, VAAC, MET etc.). As part of the daily activity, coordinate ATFM measures with ACCs concerned.

4.2.2 In-flight reporting – Sample Flow Chart of the volcanic ash information

4.2.2.1 The chart below is a graphical representation of a possible path of the in-flight volcanic ash information and may differ between regions depending on regional arrangements. It also gives the position of the volcanic ash participants in the reporting chain. The flow chart is not exhaustive and the path of the information can be extended and new participants could be added depending of the national and regional requirements:



4.3

Post-Flight Operations Roles & Responsibilities and order of reporting

Participants	Roles & Responsibilities
Civil and/or military pilots/airlines having observed or encountered an eruption or volcanic contamination	To file the volcanic ash report with as much detailed information as possible about the volcanic activity and/or encounter (position, colour, smell, dimensions, FL, time of observation, impact on the flight, etc.). Ensure that the VAR is filed and transmitted to the relevant recipients as soon as possible after landing (if not filed via data link already during the flight). Make an entry into the Aircraft Maintenance Log (AML) in case of an actual or suspected encounter with volcanic contamination.
ANSP	To provide a summary report of effects of the volcanic activity that affected its operations at least once per day to the national authority with as much detailed information as possible about the number of encounters, impact on air traffic management, etc.).
AOC Maintenance - Post flight Inspection	To report about the observation of the aircraft surfaces, engine, etc., and to provide the information to the national, regional or global central data repository, where applicable.

Investigation authority	All aeronautical service providers (including operators, ANSPs, airports, etc.) shall investigate the effects of a volcanic activity, analyse the information, search for conclusions, and report the investigation results and relevant information to the national supervisory authority and any central data repository.
National Authority	To handle the national central data repository and report to the regional/global central data repository if any. To analyse reports from its aeronautical service providers and take action as appropriate.
Regional Central Data Repository	To collect the national data and make them available to interested stakeholders under agreed conditions.
MWO	To use the national and regional information coming from national and regional central data repositories.
VAAC	To use the information originated by flight crews, and other competent sources to: a) validate its products accordingly and; b) improve the forecast.
Global Data Repository (and research institutes - where appropriate)	To analyse the information stored in the regional central data repository and provide the research outcomes for lessons learnt process.
Knowledge management (e.g. SKYbrary)	To use the post-flight lessons learnt and disseminate them to interested stakeholders.
ICAO	To review/revise ATM volcanic ash contingency plans.

4.4 Tools for presenting and sharing the volcanic ash information

4.4.1 To report, transmit and disseminate the volcanic ash encounter information, different types of tools can be used. The list below is provided to give ideas as to what tools can be used. It could also be split into regulatory and general information tools. At any case, it is not an exhaustive list and can be updated with new elements depending on regional experiences.

- a) Radiotelephony and Data link Communications;
- b) VAR;
- c) NOTAM/ASHTAM;
- d) SIGMET;
- e) VAA/VAG;
- f) Central data repository e.g. CFMU Network Operations Portal (NOP);
- g) Centralized web based sites with the regularly updated information and maps – e.g. <http://www.eurocontrol.int/>
- h) Teleconferences;
- i) Periodic Bulletins with the set of information defined by the data providers and data users; e.g. Smithsonian Institution Weekly Bulletin; and/or
- j) Centralized internet-based sites for the sharing of lessons learnt (Knowledge management – e.g. SKYbrary http://www.skybrary.aero/index.php/Main_Page).

APPENDIX D

SIGMET and NOTAM EXAMPLES DURING VOLCANIC ASH

Volcanic Ash (VA) Cloud (CLD) in Kuwait FIR

WVKW31 OKBK 030900
OKBK SIGMET 1 VALID 030900/031500 OKBK-
OKAC KUWAIT FIR VA CLD OBS AT 0840Z W OF E48 FL180/320 MOV E 45KT NC FCST1500Z VA CLD APRX E OF E4730=

Cancellation SIGMET as volcanic ash cloud exits Kuwait FIR into Tehran FIR (sooner than expected)

WVKW31 OKBK 031400
OKBK SIGMET 2 VALID 031400/031500 OKBK-
OKAC KUWAIT FIR CNL SIGMET 1 030900/031500 VA MOV TO OIIX FIR=

VA CLD in Cairo FIR

WVEG31 HECA 030900
HECA SIGMET 1 VALID 030900/031500 HECA-
HECC CAIRO FIR VA CLD OBS AT 0840Z N OF LINE N3140 E2510 - N29 E30 W OF LINE N3150 E3359 - N29 E30 FL100/290 MOV SE 35KT NC FCST1500Z VA CLD APRX N OF LINE N3140 E2510 - N2806 E3435=

Cancellation SIGMET as volcanic ash cloud exits Cairo FIR into Jeddah FIR (sooner than expected)

WVEG31 HECA 031330
HECA SIGMET 2 VALID 031330/031500 HECA-
HECC CAIRO FIR CNL SIGMET 1 030900/031500 VA MOV TO OEJD FIR=

Example NOTAM based on SIGMET issued for Cairo FIR

Q) HECC/QWWXX/IV/NBO/W/100/290/999
A) HECC B) 1311030900 C) 1311031500
E) ATM AND ACFT TAKE NECESSARY ACTION DUE TO VOLCANIC ASH AREA OF HIGH/MEDIUM CONTAMINATION (FROM VOLCANO ETNA 211060, 37.734N 015.004E) AS FOLLOWS:
3400N 2410E - 3140N 2510E - 2900N 3000E - 3150N 3359E - 3330N 3000E - 3400N 2710E - 3400N 2410E
F) FL100 G) FL290

Special Air-Reports on Volcanic Ash

Special air-reports on volcanic ash sent to ACCs should then be sent via AFTN to the relevant Meteorological Watch Office (MWO) which is forwarded to the relevant Volcanic Ash Advisory Centre (VAAC) – for MID Region that is VAAC Toulouse.

SPECIAL AIREP ☐ ACC ☐ MWO ☐ VAAC

Pilots should use the special air-reports format on volcanic ash as at Table A4-1 in Appendix 4 of ICAO Annex 3.

ATTACHMENT B

MEASURES TAKEN BY QCAA AND ATS UNITS DURING COVID-19

The COVID-19 Worldwide pandemic had a significant impact on a global air transport industry and the provision of air navigation services with a massive decrease in aircraft movements during this period. Several recommendations /guidelines for contingency measures for a navigation service provider by ICAO, Eurocontrol, CANSO AND IFATCA were subsequently published to ensure the health of employees, mitigate any safety risks associated with impacted services to ensure continuous and safe provision of air traffic services. QCAA/AND have been closely monitored the rapidly developing situation prior to COVID-19 being formally declared as a pandemic including the active engagement/discussion with the Qatar National pandemic preparation committee spearheaded by QATAR Ministry of Public Health. The QCAA/Air Navigation Department took extraordinary measures to prevent the infection of essential employees and maintain a continuous and safe Air Traffic Services with support and guidelines provided by the Qatar Ministry of Public Health and the Aerodrome Operator (MATAR). Measures taken by AND to prevent the infection of staff to ensure continuous provision of air traffic services include but are not limited to the following:

1. Limit facility access to essential personnel (ATCO and ATCA, ATSEPs to maintain the ATM/CNS critical system and equipment that directly supports Air Traffic Service by allowing administration staff to work from home. Non-essential training and visitors 'access was suspended. Exceptions were made for the ATCO's training to maintain their currency and some exceptions were agreed and approved with the QCAA Regulatory Authority.
2. The ATC roster was adapted to ensure that minimum staff was available. Excess staff, due to the reduction in traffic, would be on standby at home to avoid crowded operational rooms. Standby teams were established in the event of any emergency situation/late notice staffing requirements and were rostered as additional cover.
3. Health and Safety measures were implemented such as the installation of hydro alcoholic distributors in the operational buildings, provision of wipes to disinfect the equipment touched by ATC personnel (mouse, keyboards, and VCCS panels).
4. Increase the frequently of facility cleaning, including periods of routine planned "deep cleaning" (OPS rooms, break rooms, wash rooms).
5. Due to the number of CWPs/Position available in excess of operational and back up requirements at OTBD, OTHH Towers and Doha Approach room, social distancing between different working position in the ATC rooms was implemented.
6. A procedure for operational rooms deep cleaning and sterilization was established. Contingency COVID-19 operations rooms to deliver air traffic service from alternatives/backup site in case of confirmed case reported in the main operation room were established to enable sterilization and deep cleaning of any affected areas.
7. Additional break rooms/space were provided to staff.
8. Essential staff vaccination was prioritized by the Air Navigation Department in coordination with the Qatar Ministry of Public Health.
9. Employees were encouraged to follow the Qatar Ministry of Public Health recommendations and measures (social distancing, health and safety measures: washing hands, staying at home if not feeling well and self-testing, not sharing their headsets, encourage employees to clean their own position) . These were promoted by e-mails, circulars and posters located within the building.
10. Implement temperature taking stations at the building entrance and Etheraz checks.
11. COVID rapid antigen tests were provided to employees requesting these.
12. Providing sterilization materials on the facility (units, break rooms, elevators).

Factors that played a major role in facilitating the implementation of these measures and the measures which were either recommended or required to be taken as advised or mandated by the local Public Health Authority:

- The size of the operational rooms
- The numbers of back up working positions available
- The aircraft movement decrease
- The number of essential staff
- The establishment of COVID contingency rooms
- The awareness and communication with the employees

Draft

INTERNATIONAL CIVIL AVIATION ORGANIZATION



MID REGION HIGH LEVEL AIRSPACE CONCEPT

Version 2.0 May 2023

This concept was developed by the ICAO MID ATM SG.

Approved by MIDANPIRG/20 and published by the ICAO MID Office, Cairo

RECORD OF AMENDMENTS

The MID Region High Level Airspace Concept should be reviewed and updated by the ATM Sub-Group and presented to MIDANPIRG for endorsement.

The table below provides a means to record all amendments.

An up-to-date electronic version of the Plan will be available on the ICAO MID Regional Office website.

Edition Date	Description	Pages Affected
October 2022	Second edition	All pages

TABLE OF CONTENTS

GLOSSARY	4
Chapter 1: INTRODUCTION	7
Chapter 2: AIRSPACE CONFIGURATIONS, DESIGNATORS AND CHANGES	10
Chapter 3: MINIMUM STANDARD SEPARATION APPLICATION	11
Chapter 4: AIRSPACE MANAGEMENT	15
Chapter 5: ASBU AND CNS REQUIREMENTS	22
<i>Appendix A: COMMON RULES FOR REPLACEMENT OF DUPLICATED 5LNCS</i>	24
<i>Appendix B: TEMPORARY RVSM APPROVAL PROCEDURE</i>	25
<i>Appendix C: MIDRMA PROCEDURE - RVSM APPROVED AIRCRAFT</i>	26

1. GLOSSARY

1.1 Abbreviations and Acronyms

ACC	Area Control Centre
ADS-B	Automatic Dependent Surveillance-Broadcast
AFTN	Aeronautical Fixed Telecommunications Network
AIDC	ATS Inter-facility Data Communications
AIM	Aeronautical Information Management
ASBU	Aviation System Block Upgrade
ATC	Air Traffic Control
ATFCM	Air Traffic Flow and Capacity Management
ATFM	Air Traffic Flow Management
AU	Airspace User
AUP	Airspace Use Plan
CCO	Continuous Climb Operations
CDM	Cooperative Decision Making
CDO	Continuous Descent Operations
CDR	Conditional Route
CNS	Communication, Navigation and Surveillance
FIR	Flight Information Region
FUA	Flexible Use Airspace
GANP	Global Air Navigation Plan
GAT	General Air Traffic
GNSS	Global Navigation Satellite System
LOA	Letter of Agreement
MIDANPIRG	MID Air Navigation Planning and Implementation Regional Group
OAT	Operational Air Traffic
OLDI	On-Line Data Interchange
PBN	Performance-based Navigation
RNAV	Area Navigation
RVSM	Reduced Vertical Separation Minimum
UUP	Updated Airspace Use Plan

1.2 Terminology and Definition

Airspace management (ASM). The process by which airspace options are selected and applied to meet the needs of the air traffic management community in the following levels:

- a) *Level 1 - Strategic ASM.* Is the act of defining and reviewing, as required, the national airspace policy taking into account national and international airspace requirements.
- b) *Level 2 - Pre-Tactical ASM.* Is the act of conducting operational management within the framework of pre-determined existing ATM structure and procedures defined in ASM Level 1 and of reaching specific agreement between civil and military authorities involved.
- c) *Level 3 - Tactical ASM.* Is the act, on the day of operation, of activating, deactivating or real time reallocating of airspace allocated in ASM Level 2, and of solving specific airspace problems and/or of individual OAT/GAT traffic situations in real time between civil and military ATS units and/or controlling military units and/or controllers, as appropriate. This coordination can take place either in active or passive mode with or without action by the controller.

Air traffic flow management (ATFM). A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

Air traffic management (ATM). The dynamic, integrated management of air traffic and airspace (including air traffic services, airspace management and air traffic flow management) — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

Air traffic management system. A system that provides ATM through the collaborative integration of humans, information, technology, facilities, and services, supported by air and ground- and/or space-based communications, navigation and surveillance.

Civil/Military Coordination. is the communication between civil and military elements (human and/or technical) necessary to ensure safe, efficient and harmonious use of the airspace.

Conditional route (CDR). A non-permanent ATS route or portion thereof which can be planned and used under specified conditions.

A Conditional Route may have more than one category, and those categories may change at specified times:

- a) *Category One - Permanently Plannable CDR:* CDR1 routes are in general available for flight planning during times published in the relevant national Aeronautical Information Publication (AIP). Updated information on the availability in accordance with conditions published daily AUP notification.
- b) *Category Two - Non-Permanently Plannable CDR:* CDR2 routes may be available for flight planning. Flights may only be planned on a CDR2 in accordance with conditions published daily AUP and UUP notification, and

Flexible use of airspace (FUA). An airspace management concept based on the principle that airspace should not be designated purely as civil or military, but rather as a continuum in which all user requirements are accommodated to the greatest possible extent.

Global navigation satellite system (GNSS). A worldwide position and time determination system that includes one or more satellite constellations, aircraft receivers and system integrity monitoring, augmented as necessary to support the required navigation performance for the intended operation.

Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Regional ATS route. An ATS route shall be considered as the MID regional ATS route network provided that:

- a) Cross-bordered (at least initiate/terminate from FIR boundary);
- b) Route designator shall be assigned in accordance with Annex 11, Appendix 1 and the ICAO Codes and Routes Database (ICARD) requirement; and
- c) Published in ICAO Air Navigation Plan (ANP)- Middle East Region (Doc 9708), Volume II, Table ATM II-MID-1 MID Region ATS Route Network.

Segregated airspace. Airspace of specified dimensions allocated for exclusive use to a specific user(s), with operations that are not able to be safely integrated with other airspace users.

CHAPTER 1

INTRODUCTION

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

1.2 The airspace concept constitutes a master plan of the intended airspace design and its operations. It should satisfy the following:

- provides a detailed description of the planned airspace organization and its operations.
- addresses all the strategic objectives identified for the airspace project.
- addresses all CNS/ATM enablers.
- identifies operational and technical assumptions.

1.3 The objective of the High level Airspace Concept is to consolidate the requirements on airspace operations, navigation applications and CNS/ATM enablers agreed on by MIDANPIRG, in order to provide a generic set of characteristics to be applied by States, which would support the harmonization of the airspace operations in the MID Region.

1.4 MID airspace Principles

Principle 1 - Safety

Safety shall be maintained and enhanced. Thus, airspace structures accompany related agreements and procedures shall be subject to a safety assessment.

Principle 2 - Operational Performance

Capacity requirements and environmental impact are to be mitigated through design and use of airspace without prejudice to Safety. In developing and applying Airspace Configurations, trade-offs may be required between capacity, flight efficiency and environmental mitigation without compromising safety. In order to improve the environmental performance of the climb and descent phases, airspace design should enable optimised CCO and CDO, to top of climb and from top of descent respectively, to the extent possible.

Principle 3 - Airspace Continuum

This means that there is no intended division within en-route airspace or between en-route and terminal airspace. However, the different attributes are required.

Principle 4 – Increase airspace capacity

MID ATS airspace should offer a level of adaptability matching the demands of airspace users to the extent possible whilst maintaining cost effectiveness and optimising overall efficiency. This allows for the most effective balance between capacity, mission effectiveness and flight efficiency, whilst reducing environmental impact, where possible.

Principle 5 – Collaborative Decision-Making process

Any airspace re-structuring project and/or ATS Route Network changes consolidation is achieved through the cooperative decision-making process of the States at regional level.

Principle 6 - Ensure close relationship between airspace structure, ASM and ATFCM

In ATS route structure, main traffic flows are to be given priority over minor flows and efficient connectivity must be assured between ATS routes and other airspaces.

Principle 7 – Continuous Development of MID Airspace

Airspace are to be developed in consultation with all operational stakeholders. Appropriate co-ordination with ASM, ATFCM, ATS, AUs and Airports is required.

1.5 Fundamentals of the MID Region High Level Airspace Concept:

- a) Minimum Standard Separation application
- b) Implementation of PBN concept
- c) Implementation of Global Air Navigation Plan (GANP) in accordance with the ICAO MID Air Navigation Strategy (ICAO MID Doc 002).
- d) Implementation of Airspace Management.
- e) Implementation of Continuous Climb Operations (CCO) and Continuous Descent Operations CDO.
- f) Implementation of Regional Air Traffic Flow Management (ATFM)
- g) Communication, Navigation and Surveillance requirements

CHAPTER 2

AIRSPACE CONFIGURATIONS, DESIGNATORS AND CHANGES

Configuration of MID ATS route network

2.1 The strategic planning and design of “packages” of ATS routes of the MID region, Terminal Routes, airspace reservations and ATC sectors responding to requirements stemming from different strategic objectives represents one of the solutions for meeting the safety, capacity, flight efficiency, cost effectiveness and environmental requirements of the MID airspace network. These packages are called Airspace Configurations.

2.2 To meet the diversity of user requirements, there is a need for an effective and dynamic management of airspace configurations through a highly flexible and integrated Cooperative Decision-Making (CDM) process at network, regional, national and local level.

2.3 The main feature of MID region ATS routes network is the ability to offer more routing options even during contingency situation to accommodate airspace users demand in the safe and efficient manner. These ATS routes will be based on the principles of regional and intra-regional ATS route network design, independent from national boundaries, adapted to main traffic flows and endorsed by MIDANPIRG in ICAO Air Navigation Plan (ANP)- Middle East Region (Doc 9708), Volume II, Table ATM II-MID-1 MID Region ATS Route Network.

MID ATS route designators and 5LNCs

2.4 Basic regional ATS route designators shall be assigned in accordance with the following principles.

- a) The same basic designator shall be assigned to a main trunk route throughout its entire length, irrespective of terminal control areas, States or regions traversed.
- b) Where two or more trunk routes have a common segment, the segment in question shall be assigned each of the designators of the routes concerned, except where this would present difficulties in the provision of air traffic service, in which case, by common agreement, one designator only shall be assigned.
- c) A basic designator assigned to one route shall not be assigned to any other route.
- d) States' requirements for designators shall be notified to the ICAO MID Offices for coordination through ICARD platform.

2.5 MID regional ATS Route Designators including “A, B, G and R (Regional, Conventional)” and “L, M, N and P (Regional, RNAV)” have been distributed by the Air Navigation Bureau according to the following table:

MID	A	B	G	R	L	M	N	P
Number Blocks	400-424	400-424	650-674	650-674	300-324	300-324	300-324	300-324
	775-799	525-549	775-799	775-799	550-574	550-574	550-574	550-574
					700-724	700-724	700-724	700-724

2.6 The 5LNC shall be easily recognizable in voice communications and shall be free of ambiguity with those used for other significant points in the same general area.

2.7 The unique 5LNC pronounceable name-code designator assigned to a significant point shall not be assigned to any other significant point. When there is a need to relocate a significant point, a new name-code designator shall be chosen. In cases when a State wishes to keep the allocation of specific name-codes for reuse at a different location, such name-codes shall not be used until after a period of at least six months.

2.8 States' requirements for unique five-letter pronounceable name-code (5LNC) designators shall be notified to the ICAO MID Regional Office for coordination through ICARD system.

2.9 ICAO HQ compiled a full list of global 5LNC duplication in 2018. There were 3905 duplicated 5LNCs worldwide, in which 113 were in MID region. ICAO and States/Administrations need to work together to resolve this issue on a case-by-case basis and take into consideration of common rules for replacement of duplicated 5LNCS available at **Appendix A**.

Change in MID ATS route network

2.10 Any changes to ANP- Middle East Region (Doc 9708), Volume II, Table ATM II-MID-1 MID Region ATS Route Network need to consider the following procedure:

- a) Update: This modification includes minor changes in the content of the table e.g., add/deletion/rename of reporting points and coordination. This update should be requested by the relevant state(s), reviewed by ATM SG and endorsed by MIDANPIRG.
- b) Significant changes: This modification is mainly related to removal of the existing ATS route from the table, add new regional ATS route to the table or change in condition (as defined by notes). These sorts of changes also should be requested by the relevant state(s) and followed standard PfA processes.

CHAPTER 3

MINIMUM STANDARD SEPARATION APPLICATION

Reduced Vertical Separation Minima (RVSM)

3.1 The Use of Reduced Vertical Separation Minima (RVSM) between FL290 and FL410, inclusive. The implementation of RVSM in the MID Region started on 27 November 2003. Currently RVSM is successfully implemented in all the MID Region Flight Information Regions (FIRs).

3.2 The provisions for RVSM approval and the monitoring of the height keeping performance are contained in Annex 6. The general requirements for RVSM implementation are contained in the ICAO, Doc 9754 (Manual on a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive). The Operating Procedures and Practices for Regional Monitoring Agencies in relation to RVSM are provided in ICAO Doc 9937.

3.3 Monitoring of aircraft height-keeping performance was one of the underlying assumptions of the safety studies on which RVSM was based. In all regions where RVSM has been implemented, Regional Monitoring Agencies (RMAs) have been established by the appropriate Planning and Implementation Regional Groups (PIRGs) to carry out this function. The RVSM safety objectives for the implementation of RVSM in the MID Region are set out by MIDANPIRG through MIDANPIRG/12 Conclusion, as follows:

MIDANPIRG CONCLUSION 12/16: MID RVSM SAFETY OBJECTIVES

That, the safety assessment of RVSM operations in the MID Region be based on the following safety objectives:

- a) **Safety Objective 1:** The risk of collision in the MID RVSM airspace due solely to technical height-keeping performance meets the ICAO Target Level of Safety (TLS) of 2.5×10^{-9} fatal accidents per flight hour;*
- b) **Safety Objective 2:** The overall risk of collision due to all causes which includes the technical risk and all risk due to operational errors and in-flight contingencies in MID RVSM airspace meets the ICAO overall TLS of 5×10^{-9} fatal accidents per flight hour; and*
- c) **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.*

3.4 The MIDRMA and the ICAO Secretariat developed the MIDRMA Manual to provide, for easy reference of interested parties, a consolidation of material related to the administrative management, membership, funding mechanism of the MIDRMA, as well as its activities related to the sustained RVSM safety assessment and associated requirements for the provision of data. It contains the Terms of Reference (TOR) of the MIDRMA Board and a number of other provisions approved by the MIDRMA Board and MIDANPIRG.

3.5 The MIDRMA Manual, in addition to the reports and information related to RVSM implementation in the MID Region are available on the MIDRMA website (<http://midrma.com>).

3.6 In order to standardize and improve the reporting of required data to the MIDRMA, the MIDANPIRG/14 meeting agreed to the following Conclusion which replaces and supersedes the MIDANPIRG/13 Conclusion 13/65:

MIDANPIRG CONCLUSION 14/35: PROVISION OF REQUIRED DATA TO THE MIDRMA

That, considering the on-going requirement for RVSM safety monitoring in the MID Region:

- a) States provide the required data to the MIDRMA on a regular basis and in a timely manner. The data is to include, but is not necessarily limited to:*
 - i) approval of operators and aircraft for RVSM operations (on monthly basis or whenever there's a change);*
 - ii) Large Height Deviations (LHD) (on monthly basis);*
 - iii) traffic data (as requested by the MIDRMA Board);*
 - iv) radar data as, when and where required; and*
 - v) airway structure (above FL 290) and waypoints.*
- b) States not providing the required data to the MIDRMA on a regular basis and in a timely manner:*
 - i) be included in the MIDANPIRG list of air navigation deficiencies; and*
 - ii) might not be covered by the MID RVSM Safety Monitoring Report (SMR).*

3.7 The MIDRMA developed the LHD Online Reporting Tool to be used by the States, as the only mean, for the submission of their LHD reports to the MIDRMA.

3.8 With a view to address the LHDs in an effective manner with the ATS Units concerned and to analyze the LHDs prior to presentation to the MIDRMA Board or ATM SG meetings for validation, the meeting agreed that the MIDRMA should conduct bilateral teleconferences with the adjacent ATS Units to analyze the relevant LHDs and present a consolidated report to the MIDRMA Board or the ATM SG meetings for validation in order to finalize the SMR for endorsement by MIDANPIRG. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 17/2: ANALYSIS OF LHDS

That, as part of the MIDRMA Scrutiny Group activities, the MIDRMA conduct bilateral teleconferences with the MIDRMA ATC focal points to analyze the relevant LHDS and present a consolidated report to the MIDRMA Board or the ATM SG meetings for validation in order to finalize the SMR for endorsement by MIDANPIRG.

3.9 The MIDANPRIG meeting noted with concern that an important number of non-RVSM approved aircraft are still operating within the RVSM airspace (filing “W” in the FPL), and agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 18/6: 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:

a) the MIDRMA:

- 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*
- 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*

b) the MID States/ATCUs:

- i. ensure that the non-RVSM approved aircraft listed in the MIDRMA Bulletin are not allowed to operate within the RVSM airspace; and*
- ii. report to MIDRMA any case of violation, including the cases of aircraft transferred from adjacent Regions/FIRs.*

3.10 The MIDANPIRG meeting reviewed and agreed to the procedure at **Appendix C** for the follow-up with States and the issuance of warning related to RVSM approved aircraft without valid height-keeping performance monitoring results. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 17/3: PROCEDURE FOR THE FOLLOW-UP WITH STATES AND THE ISSUANCE OF WARNING RELATED TO RVSM APPROVED AIRCRAFT WITHOUT VALID HEIGHT-KEEPING PERFORMANCE MONITORING RESULTS

That, the Procedure at Appendix C for the follow-up with States and the issuance of warning related to RVSM approved aircraft without valid height-keeping performance monitoring results, is endorsed.

3.11 The MIDANPIRG meeting noted that the ICAO provisions do not address the initial process of granting RVSM approval for new aircraft type not previously part of the operator fleet and there is no procedure to guide the responsible Authority. Accordingly, and due to the increased enquiries received recently from several airworthiness inspectors, the meeting reviewed the procedure, developed by the MIDRMA, on granting Temporary RVSM Approvals, and agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 18/2: PROCEDURE FOR TEMPORARY RVSM APPROVAL

That, the procedure for granting Temporary RVSM Approvals at Appendix B, is endorsed.

3.12 States are encouraged to consult to provide the required data and to liaise with MIDRMA

when carrying safety assessment for the implementation of ATS Routes in the MID RVSM Airspace.

Reduced Surveillance Longitudinal Separation

3.14 MIDANPIRG/13 meeting, through Conclusion 13/5, encouraged MID States to implement 20NM surveillance longitudinal separation and develop plans for further reduction of longitudinal separation from 20NM to 10NM:

*MIDANPIRG CONCLUSION 13/5: IMPLEMENTATION OF REDUCED Radar
LONGITUDINAL SEPARATION IN THE MID
REGION*

That,

a) States, that have not yet done so;

- i) be urged to implement the 20 NM radar longitudinal separation;*
- ii) be encouraged to further reduce the radar longitudinal separation within the MID Region to 10 NM, where appropriate; and*
- iii) be invited to agree with their neighbouring FIRs/States on the date of implementation and updating of the LoAs;*

3.15 ASBU SNET-B0/1 (Short-Term conflict alert), ASUR-B0/1 (ADS-B), ASUR-B0/2 (MLAT) and ASUR-B0/3 (SSR-DAPS) are considered as priority one (1) for implementation in the MID Region and are included in the MID AIR Navigation Strategy Doc 002.

CHAPTER 4

AIRSPACE MANAGEMENT

Performance Based Navigation (PBN) Implementation

4.1 Implementation of PBN concept in enroute phase based on RNAV 1 & RNAV 5 will enhance establishment of trunk routes and extend parallel ATS route network to connect RNAV/conventional SIDs and STARs to/from the TMA/CTR boundaries across the MID Region and at interfaces with adjacent regions.

4.2 As part of the implementation of an airspace concept, States in consultation with the Airspace users should establish an efficient ATS route structure/network connected in an efficient manner to the terminal airspace structure, preferably, starting at the Terminal Control Area (TMA) boundary.

4.3 Based on operational requirements, States may choose to establish RNAV1 and RNAV-5 routes to utilize capacity and efficiency of airspace by reducing route spacing, providing that appropriate communication and surveillance coverages are available. Details of these requirements are provided in the PBN manual (Doc 9613) and PANS-ATM (Doc 4444).

4.4 The MIDANPIRG meeting noted that some States have not yet updated their AIPs to change RNP 5 to RNAV 5 and the RNAV 5 applicable area is implemented in MID FIR's/States with a different base Flight Level (FL150, FL195, FL245, FL280). Accordingly, the meeting agreed to the following Conclusion:

CONCLUSION 12/9: RNAV 5 IMPLEMENTATION IN THE MID REGION

That, States that have not yet done so, be urged to:

- a) update their AIP to change RNP 5 to RNAV 5; and*
- b) take necessary measures to implement RNAV 5 area in the level band FL160 - FL460 (inclusive).*

4.5 Establishment of parallel ATS routes in the MID region should consider the below minimum route spacing and availability of the required CNS infrastructure details in Doc 9613:

- a) for RNAV 5 ATS Routes should be spaced at least by a lateral distance of 16.5NM for unidirectional and 18NM for bi-directional tracks.
- b) for RNAV 1 ATS routes based on a standard a 7 NM in a high density en-route system.

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

4.6 Route spacing of 7 NM for straight and turning tracks (with turns not exceeding 90 degrees) in a high density en-route system, using ATS surveillance, has been derived by independent collision risk analyses undertaken by EUROCONTROL. (Ref: ICAO PBN manual Volume II. Implementing RNAV and RNP Operations – Attachment B).

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

4.8 The MID Region PBN Implementation Plan (ICAO MID Doc 007) offers appropriate guidance for air navigation service providers, airspace operators and users, and international/regional organizations, on the evolution of navigation applications, as one of the key enablers supporting air traffic management, and which describes the RNAV and RNP types that should be implemented in the short, medium and long term in the MID Region. The Plan is endorsed by MIDANPIRG and available on the ICAO MID Regional Office Website (<http://icao.int/mid>) under eDocuments.

4.9 ASBU APTA-B0/1 (PBN Approaches (with basic capabilities)) and APTA-B0/2 (PBN SID and STAR procedures (with basic capabilities)) are considered as priority one (1) for implementation in the MID Region and are included in the MID AIR Navigation Strategy Doc 002.

Continuous Climb Operation (CCO) and Continuous Descent Operation (CDO)

4.10 Continuous climb operation (CCO) is an operation, enabled by airspace design, procedure design and ATC operational procedures, in which a departing aircraft climbs continuously, to the greatest possible extent, by employing optimum climb engine thrust and climb speeds until reaching the cruise flight level.

4.11 Continuous descent operation (CDO) is an operation, enabled by airspace design, procedure design and ATC operational procedures, in which an arriving aircraft descends continuously, to the greatest possible extent, by employing minimum engine thrust, ideally in a low drag configuration, prior to the final approach fix/final approach point.

4.12 Implementation of Continuous Climb Operations (CCO) and Continuous Descent Operations CDO, as basis for the operations within TMAs. States are encouraged to implement CCO and CDO, where applicable.

4.13 ASBU APTA-B0/4 (CDO basic) and APTA-B0/5 (CCO basic) are considered as priority one (1) for implementation in the MID Region and are included in the MID AIR Navigation Strategy Doc 002.

Civil-Military cooperation and implementation of Flexible Use of Airspace

4.14 The airspace is a common resource to both civil and military aviation activities. The growing civil air traffic and mission-oriented military air traffic would benefit greatly from a more flexible use of airspace used for military purposes and that satisfactory solutions to the problem of cooperative access to airspace have not evolved in all areas.

4.15 The ICAO Global ATM Operational Concept emphasized that all airspace should be a usable resource, any restriction on the use of any particular volume of airspace should be considered transitory, and all airspace should be managed flexibly.

4.16 The flexible use of airspace by both civil and military air traffic may be regarded as the ultimate goal, improvement in civil/military coordination and cooperation offers an immediate approach towards more effective airspace management.

4.17 An ATS route network allows operators to choose from several strategically designed ATS routes. Improvements in the strategic design, planning and management of ATS routes increase the predictability of the route options and reduce the need for tactical re-routing by ATCOs. This flexibility is based on the Flexible Use of Airspace Concept principles.

4.18 GAT and OAT requirements have to be accommodated by integrating them in the strategic developments process. Consequently, deviations from developments shall be kept to a minimum.

4.19 As regards temporary reserved and segregated airspace, it is envisaged, under certain Airspace Configurations, to have them activated and de-activated closer to real time. Such airspace may vary in size, geographic location and time (to accommodate airspace user requirements). This includes requirements for standardised rules for separation.

4.20 To increase efficiency, the shared use of both cross-border areas and temporary reserved segregated airspaces is expected to become more frequent. To improve vertical flight efficiency and environmental performance in the climb and descent phases, it is recommended that due consideration is given to enabling optimised CCO and CDO in the airspace design process, to the extent possible.

4.21 MIDANPIRG/14 through Conclusions 14/12 and 14/13 urged States to take necessary measures to foster the implementation of Civil/Military Cooperation and to implement the Flexible Use of Airspace (FUA) concept through strategic Civil/Military Coordination, collaboration and dynamic interaction, in order to open up segregated airspace when it is not being used for its originally-intended purpose and allow for better airspace management and access for all users.

4.22 The MIDANPIRG meeting noted the identified challenges related to CMC/FUA implementation in the Region, and the need to raise awareness on different subjects, including:

- a) State aircraft operations under Due Regard in particular over the high seas;
- b) CMC/FUA implementation;
- c) Drones-Airspace management applications;
- d) GNSS/GPS interference; and
- e) NMAC reports between Civil and Military aircraft.

4.23 Accordingly, the meeting based on ICAO Doc 10088, agreed to the following MIDANPIRG Decision, to replace and supersede the MIDANPIRG Decision 18/31:

MIDANPIRG DECISION 19/19: MID CMC/FUA ACTION GROUP

That,

- a) the MID CMC/FUA Action Group develop region specific complementary procedures for ICAO Doc. 10088, in order to ensure that the regional requirements related to Civil Military Cooperation and implementation of FUA Concept are addressed, including State aircraft operations under Due Regard in particular over the high seas, are covered; and*
- b) the outcome of the MID CMC/FUA AG, be presented to ATM SG/8 meeting, for review.*

4.24 ASBU FRTO-B0/2 (Airspace planning and Flexible Use of Airspace (FUA), Level 1 Strategic and Airspace planning and Flexible Use of Airspace (FUA)) and FRTO-B0/4 (Basic conflict detection and conformance monitoring) are considered as priority one (1) for implementation in the MID Region and are included in the MID Air Navigation Strategy Doc 002.

Remotely Piloted Aircraft System (RPAS) and Unmanned Aircraft Systems (UAS)

4.25 developments related to RPAS and take necessary measures for the establishment of the required legislative and regulatory framework to ensure safe integration of the RPA into the non-segregated airspace. The MIDANPIRG & RASG-MID meeting urged States to report any safety occurrence related to RPA operations to the ICAO MID Regional Office on regular basis; and encouraged States to use the guidance material related to RPAS provided in the ICAO Doc 10019 and the information available on the RPAS webpage: <https://www4.icao.int/rpas>.

4.26 The MIDANPIRG & RASG-MID meeting noted that due to the use of advanced technologies, these vehicles make use of new types of flight profiles and capabilities and generally operate at much lower altitudes, which current airspace and air traffic management systems were not designed to accommodate. It is therefore required to address these shortfalls in design and system performance as well as to enhance structures and systems to support and manage the new demands for airspace monitoring and management by means of an Unmanned Traffic Management (UTM) System.

4.27 The meeting agreed that overall, the available guidance material for UTM implementation offers a basic starting point, while the rapid growth of RPAS creates an urgency for the States to plan and start the implementation of their UTM systems.

4.28 Based on the above, the meeting agreed to the establishment of an Action Group composed of the Chairpersons of the ATM SG, ASRG and SEIG, Bahrain, Egypt, Iran, Saudi Arabia, UAE, FAA, Boeing, IATA, CANSO and ICAO MID to strengthen the collaboration between States and stakeholders for an orderly growth of unmanned air traffic; and to provide necessary guidance to States related to Unmanned Traffic Management (UTM). Draft Terms of Reference (TOR) for the Action Group is at Appendix 3.2B, for further review and consideration by the Action Group. Accordingly, the meeting agreed to the following Decision:

PIRG/RASG MID DECISION 1: RPAS/UTM ACTION GROUP

That, the RPAS/UTM Action Group be:

- a) established to support the development of UTM Capabilities in the MID Region, harmonize the integration of RPAS/UAS operation and provide feedback to the ATM SG, ASRG and SEIG; and*
- b) composed of the Chairpersons of the ATM SG, ASRG and SEIG; and representative of the aforementioned states and organization.*

MID ATS route network, catalogue and RDWG

4.29 The MIDANPIRG meeting noted that the following ATS route network challenges have been identified and addressed in the AIM and ATM SGs:

- a) Interruption of Regional ATS routes;
- b) Use of non-regional designators for regional routes, and vice versa;
- c) Consideration of non-regional routes as regional, and vice versa;
- d) Lack of consideration of some regional routes in the MID ANP Vol II ATS table;
- e) Duplication of Route designators; and

- f) Missing bi-lateral coordination between adjacent States.

4.30 The MIDANPIRG meeting recognized that the main objective of the MID RDWG is to enhance the cooperative approach between States and stakeholders to avoid duplication of efforts related to the improvement of the ATS Route Network at National and cross-border levels. Accordingly, the meeting urged States and airspace users to use the MID RDWG as the main platform to facilitate bilateral and multilateral coordination related to the improvement of the ATS Route Network and airspace management in the MID Region.

4.31 The MIDANPIRG meeting noted that the MID Region ATS Route Catalogue (available on the ICAO MID Website <https://icao.int/mid>) includes the Airlines' ATS route proposals presented, in a prioritized manner with their associated benefits, for consideration by States to enhance the ATS Route Network.

4.32 Based on the above, the MIDANPIRG meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 17/18: MID RDWG AND MID REGION ATS ROUTE CATALOGUE

That, States be urged to:

- a) use the MID Route Development Working Group (MID RDWG) as the main platform to facilitate bilateral and multilateral coordination related to the improvement of the ATS Route Network and airspace management in the MID Region; and*
- b) review the MID Region ATS Route Catalogue and take actions related to the implementation of the ATS proposals relevant to their FIRs.*

4.33 MIDANPIRG 19 urged States with the support of ICAO MID Office to take action to overcome/eliminate the remaining challenges including 5LNCs duplication.

4.34 MIDANPIRG 19 meeting reviewed and endorsed the proposal for amendment to the MID eANP VOL II, Table ATM II-MID-I, to remove prefix "U" and include MID contingency route network under "Note 5" (implementation possible only during specific periods (e.g., weekends, nights, etc., as published)).

Note: details of MID region Air Traffic Management (ATM) Contingency plan and its requirements are contained in ICAO MID Doc 003.

Implementation of MID Air Traffic Flow Management (ATFM)

4.35 Air Traffic Flow Management (ATFM) is used to manage the flow of traffic in a way that minimizes delays and maximizes the use of the entire airspace. ATFM can regulate traffic flows involving departure slots, smooth flows and manage rates of entry into airspace along traffic axes, manage arrival time at waypoints or Flight Information Region (FIR)/sector boundaries and re-route traffic to avoid saturated areas. ATFM may also be used to address system disruptions including constrained airspace, severe meteorological conditions or any other phenomena or event affecting the normal flights operation.

4.36 ATFM and its applications should not be restricted to one State or FIR because of their far-reaching effects on the flow of traffic elsewhere. Doc 4444 - Procedures for Air Navigation Services

— Air Traffic Management (PANS-ATM) recognizes this important fact, stating that ATFM should be implemented on the basis of a Regional Air Navigation Agreement or, when appropriate, a Multilateral Agreement.

4.37 A MID Region ATFM service/system should be implemented to manage efficiently the traffic flows within and across the Region. Nevertheless, all initiatives to improve traffic flows and capacity should be exhausted before implementation of any ATFM measures in the MID Region. This approach should be captured as part of the airspace concept to be developed by ICAO MID States at their national level.

4.38 The MIDANPIRG/17 meeting agreed that the Multi-Nodal Concept should be applied for the MID Region as a first phase, which would be evolved to a centralized ATFM system in the future. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 17/22: MULTI-NODAL ATFM SOLUTION FOR THE MID REGION

That,

- a) the Multi-Nodal Concept be implemented in the MID Region, as a first phase, which would be evolved to a centralized ATFM system in the future; and*
- b) the ATFM Task Force develop the ATFM Concept of Operations for MID Region, accordingly, including the minimum flight data that should be exchanged by ATFM Units.*

4.39 MIDANPIRG 19 meeting reviewed the MID Doc 014 V.2.0 which incorporated the MID ATFM CONOPS, ATFM MID Region Framework and implementation guidance. The meeting agreed to rename the MID Doc 014 as MID Region ATFM Plan (V2.0) and to be published on the ICAO MID Website:

<https://www.icao.int/MID/MIDANPIRG/Documents/eDocuments/MID%20DOC%20014%20-%20MID%20ATFM%20Plan%20V2.0.pdf>

4.40 Accordingly, MIDANPIRG/19 meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 19/14: MID ATFM PLAN (V2.0)

That, the MID Doc 014 renamed as MID Region Air Traffic Flow Management Plan (V2.0), is endorsed and be published on the ICAO MID website.

4.41 MID ATM/CDM data exchange process will also foster the exchange of operational data with the basic available tools, in order to support States and ANSPs to improved Airspace capacity/demand management.

4.42 To implement the MID region ATFM Plan Doc 014, Phase I, the following threads and elements are considered as priority one (1) in line with MID Air Navigation Strategy Doc 002:

- a) NOPS-B0/1 (Initial integration of collaborative airspace management with air traffic flow management);
- b) FICE-B0/1 (Automated basic inter facility data exchange (AIDC/OLDI));
- c) FRTO-B0/2 (Airspace planning and Flexible Use of Airspace (FUA)) & FRTO-

- B0/4 (Basic conflict detection and conformance monitoring); and
- d) ASUR-B0/1 (Automatic Dependent Surveillance – Broadcast (ADS-B)), ASUR-B0/2 (Multilateration cooperative surveillance systems (MLAT)) & ASUR-B0/3 (Cooperative Surveillance Radar Downlink of Aircraft Parameters (SSR-DAPS)).

CHAPTER 5

ASBU AND CNS REQUIREMENTS

Implementation of Aviation System Block Upgrade (ASBU)

5.1 The MID Region air navigation objectives are set in line with the Global Air Navigation objectives as described in the Global Air Navigation Plan (GANP) and address specific air navigation operational improvements identified within the framework of the MIDANPIRG.

5.2 The MID Air Navigation Strategy MID Doc 002, endorsed by MIDANPIRG, includes the ASBU Threads with their associated Elements, Area of Applicability, Performance Indicators and Targets, considered as priority for implementation in the MID Region. The ASBU threads and elements are considered enablers for the implementation of airspace concept.

5.3 States are urged to take into consideration the guidelines/requirements of the GANP, the MID Region Air Navigation Strategy and the MID ANP while planning for the improvement of their CNS/ATM systems, and provide on periodical basis their National Air Navigation Plan to the MID Office.

5.4 The monitoring of the implementation of the agreed ASBU threads and elements will be performed through the MID ANP, Volume III, and reflected on the Annual MID Air Navigation Report.

5.5 The MIDANPIRG 18 meeting noted that the revised version of the Strategy included an initial list of Key Performance Indicators (KPIs) to be used for the monitoring of the air navigation system performance. The meeting agreed the month of June for KPIs 01 & 02 and the month of July for KPIs 13 & 14 will be used for the collection of required data for measuring the selected KPIs. Based on that, the meeting agreed to the following MIDANPIRG Conclusions:

MIDANPIRG CONCLUSION 18/11: ANS PERFORMANCE MONITORING

That, in order to optimize allocation and use of resources in the modernization of the air navigation system, States:

a) be urged to:

- i. embrace a performance-based approach in line with the 6th Edition of the Global Air Navigation Plan and the six-step performance management process, as described in the Manual on Global Performance of the Air Navigation System (Doc 9883);*
- ii. follow-up a phased approach in the performance monitoring of their air navigation system using as an initial phase the list of KPIs at Appendix 5.2C; and*
- iii. provide ICAO with the results of the KPIs monitoring for the agreed period, as part of the data necessary for the development of the Annual Air Navigation Report, starting with the Report for 2021.*

b) be encouraged to start as soon as possible, on an experimental basis, to establish the necessary processes, procedures and systems for the collection of necessary data to measure the selected KPIs.

Implementation of AIDC/OLDI connectivity between concern ACCs

5.6 The use of ATS Interfacility Data Communication (AIDC), as defined in the ICAO, Doc 9694, Manual of Air Traffic Services Data Link Applications improves the coordination between air traffic service units (ATSUs). The transfer of communication in a data link environment improves the efficiency of this process and the overall air traffic coordination management.

5.7 In accordance with the MID Air Navigation Strategy AIDC/OLDI should be implemented between all adjacent ACCs. This considers as one of the main enablers for airspace concept according to the applicability table in MID Air Navigation Strategy Doc 002 Attachment A.

Performance Based Communication and Surveillance (PBCS).

5.8 The MIDANPIRG meeting recalled that the airspace users shall comply with RCP and RSP specifications prescribed for the communications and surveillance capabilities within specific airspace to meet the requirements for air traffic service provision. The RMAs were requested to monitor compliance with the set-out specifications and share information among each other. The meeting was informed that there are no RCP/RSP specifications prescribed by MID States for the provision of ATS. However, a process should be put in place to ensure that information related to the aircraft registered in MID States and operating in airspace where RCP/RSP specifications are prescribed, is provided and shared with the MIDRMA. The meeting agreed that the subject should be addressed also by the RASG-MID, ATM SG and CNS SG. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 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 actions.*

APPENDIX A

COMMON RULES FOR REPLACEMENT OF DUPLICATED 5LNCs

Whenever possible Member States with 5LNCs of the same name but allocated to more than one physical location (duplicates, triplicates, quadruplicates, etc.) shall discuss the voluntary release of duplicated 5LNCs to allow one State to retain that 5LNC. If no resolution is agreed, the following 5LNC duplicate resolution rules will apply:

RULE 1. Priority is given to (a) 5LNC(s) which is (are) already allocated in ICARD. Duplicated 5LNCs that are not allocated in ICARD shall be replaced by new 5LNCs. If two or more 5LNCs of the same name are in ICARD, Rule 2 applies.

RULE 2. If two or more 5LNCs of the same name are allocated in ICARD:

a) Creation date (date when the 5LNC was allocated in ICARD for that State)

If there are two or more 5LNCs with a creation date, the earliest date will have priority. After verification that the State with the priority date is still using that 5LNC, (a) new 5LNC(s) shall be proposed by the Regional Office(s) to the other State(s) with the same duplicated 5LNC;

b) Creation date versus no creation date

A new 5LNC(s) shall be proposed to the State(s) with no ICARD creation date;

c) No creation date

If there are two or more 5LNCs of the same name without creation dates, Rule 3 applies.

RULE 3. If Rules 1 and 2 do not resolve the 5LNC duplication, the following characteristics will have priority:

a) 5LNCs used in both terminal airspace (SIDs/STARs) and En-route airspace;

Note: The amount of changes foreseen and publication required in AIP sections AD and ENR could be very large

b) 5LNCs used in high-density/high-complexity terminal airspace (e.g. SIDs/STARs, holdings, instrument approach procedures);

c) 5LNCs used in en-route airspace (e.g. crossovers between two or more ATS routes, transfer of control points, upper/lower airspace routes, etc). Priority shall be given to highest number of ATS routes crossings through the 5LNCs concerned;

d) 5LNCs used in low-density/low-complexity terminal airspace;

e) 5LNCs used in other routes (domestic, temporary, helicopter, etc.)

RULE 4. Resolving conflicts:

a) if any of the previous rules do not resolve 5LNC duplicates and if the 5LNC duplicates are within the area of accreditation of one Regional Office, that Regional Office will make the decision;

b) if the 5LNC duplicates are in different regions, the Regional Offices involved shall agree on a resolution;

c) if any of the previous rules do not resolve the 5LNC duplicates, ICAO Headquarters, in coordination with the relevant Regional Office(s), will make the final decision.

APPENDIX B

Temporary RVSM Approval Procedure

The Procedure below is for the issuance of Temporary RVSM approval by MIDRMA Member States Civil Aviation Airworthiness Authorities:

1. The responsible Airworthiness Authority must issue Airworthiness Approval first before granting the Temporary RVSM approval for the concerned operator aircraft type.
2. The responsible Airworthiness Authority must make sure the Temporary RVSM approval is granted for new aircraft type not previously operated by the airline operator, or for the remaining number of the same aircraft type if already approved one aircraft from the same type, and in case the operator is fully compliant for height monitoring and add aircraft type already in service then the authority might grant full RVSM approval valid for two years.

Note 1: Aircraft Category 1, operator required to height monitor two aircraft every two years.

Note 2: Aircraft Category 2, operator required to height monitor 60% of their fleet.

Note 3: Aircraft Category 3, Operators of aircraft types contained in this category shall have 100% of airframes monitored every 2 years.

3. The validity of the Temporary RVSM approval must not exceed 90 days; during this period the responsible airworthiness authority shall instruct the operator to contact the MIDRMA to conduct height monitoring.

Note 1: this period is not subject to extension unless the operator provide evidence to the responsible authority to justify their failure to comply.

Note 2: in case there is a need to extend the validity of the Temporary RVSM Approval, the extended validity must not exceed another 30 days, further failure will result in cancelling the RVSM Approval and withdrawal of the aircraft from the State official RVSM approval list.

4. The MIDRMA shall keep the responsible authority aware of the progress of height monitoring of aircraft granted Temporary RVSM approval and update the height monitoring compliance status once the monitoring is successfully completed with valid result.

APPENDIX C

MIDRMA PROCEDURE TO ENSURE THE COMPLIANCE OF RVSM APPROVED AIRCRAFT REGISTERED IN THE ICAO MIDDLE EAST REGION FOR HEIGHT MONITORING

- a) The MIDRMA will notify the States concerned every 3 months about their aircraft non-compliance with ICAO RVSM Height Monitoring requirements;
 - b) States should take remedial actions to rectify the situation and ensure that their relevant aircraft are complying with ICAO RVSM Height Monitoring requirements in a timely manner, and notify the MIDRMA about their corrective action plans;
 - c) States should develop corrective action plans in coordination with the airlines concerned and MIDRMA, which includes a time frame to allow the concerned airline operator rectify this violation as early as possible, this period should not exceed 90 days to perform the height monitoring;
 - d) If no height monitoring would be conducted during the 90 days, the concerned States must withdraw the RVSM approval of the aircraft concerned and inform the MIDRMA;
 - e) The MIDRMA should issue a warning to all MID States and RMAs related to non-compliance aircraft registered in the MID Region;
 - f) The MIDRMA in coordination with the ICAO MID Office will continue working closely with the States concerned to resolve the issue; and
 - g) Once the issue would be resolved, a notification should be issued by MIDRMA to all MID States and RMAs.
-

MID REGION SAR AGREEMENT STATUS BETWEEN ANSPS/ACCS

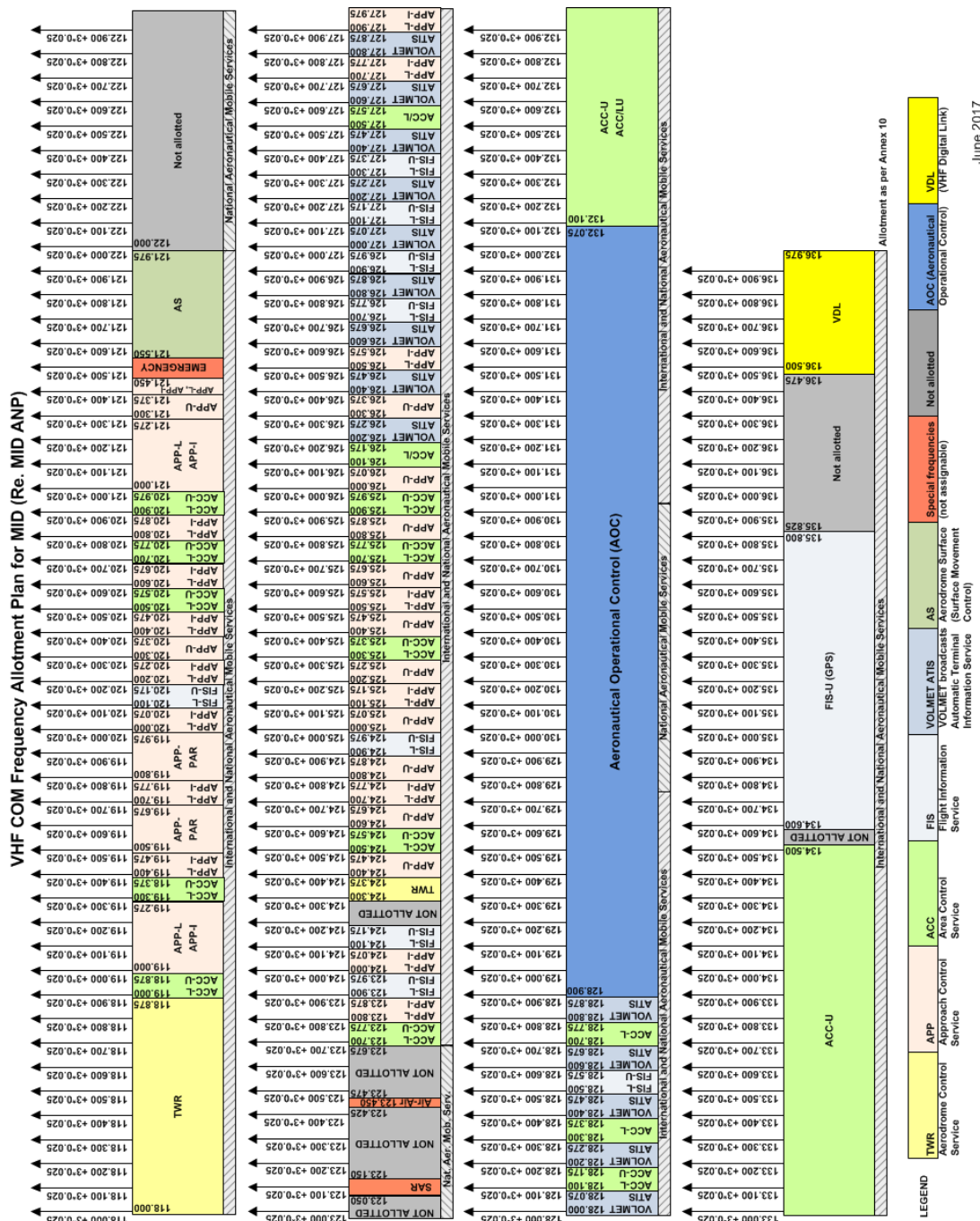
June 2023

STATE	CORRESPONDING STATES			REMARKS*
BAHRAIN	☒ IRAN ☒ SAUDI ARABIA	☒ KUWAIT ☒ UAE	☐ QATAR	4/5
EGYPT	☒ CYPRUS ☐ JORDAN ☐ SUDAN	☐ GREECE ☒ LYBIA	☐ Israel ☐ SAUDI ARABIA	2/7
IRAN	☒ ARMENIA ☒ BAHRAIN ☒ OMAN ☐ TURKMENISTAN	☒ AZERBAIJAN ☐ IRAQ ☐ PAKISTAN ☒ UAE	☐ AFGHANISTAN ☒ KUWAIT ☐ TURKEY	6/11
IRAQ	☐ IRAN ☒ JORDAN	☐ KUWAIT ☐ SAUDI ARABIA	☐ SYRIA ☐ TURKEY	1/6
JORDAN	☐ EGYPT ☒ IRAQ	☐ ISRAEL ☒ SAUDI ARABIA	☐ SYRIA	2/5
KUWAIT	☒ BAHRAIN ☒ IRAN	☐ IRAQ	☒ SAUDI ARABIA	3/4
LEBANON	☒ CYPRUS	☐ SYRIA		1/2
LIBYA	☐ ALGERIA ☐ CHAD ☐ EGYPT	☐ MALTA ☐ NIGER	☐ SUDAN ☐ TUNIS	0/7
OMAN	☐ INDIA ☒ IRAN	☒ SAUDI ARABIA ☐ PAKISTAN	☒ UAE ☐ YEMEN	3/6
QATAR	☐ BAHRAIN	☐ SAUDI ARABIA	☒ UAE	1/3
SAUDI ARABIA	☒ BAHRAIN ☐ IRAQ ☒ OMAN ☐ UAE	☐ EGYPT ☒ JORDAN ☐ Qatar ☐ YEMEN	☐ ERITREA ☒ KUWAIT ☐ SUDAN	4/11
SUDAN	☐ CENTRAL AFRICAN ☐ CHAD ☐ EGYPT	☒ ERITREA ☒ ETHIOPIA ☐ LIBYA	☐ SAUDI ARABIA ☐ SOUTH SUDAN	2/8
SYRIA	☐ IRAQ ☐ JORDAN	☐ LEBANON ☒ CYPRUS	☒ TURKEY	2/5
UAE	☒ BAHRAIN ☒ IRAN	☒ OMAN ☐ SAUDI ARABIA	☒ QATAR	4/5
YEMEN	☐ DJIBOUTI ☐ ERITREA ☐ ETHIOPIA	☐ INDIA ☐ OMAN ☐ SAUDI ARABIA	☐ SOMALIA	0/7

☒ Agreement Signed ☐ Agreement NOT Signed *Signed Agreements / Total No. of required Agreements

Appendix B. Regional frequency allotment plans

App B-5



APPENDIX 6.6B

SUBMISSION OF FREQUENCY REQUIREMENTS FOR THE PERIOD 2023 – 2030

1.1 The primary purpose of this simulation is to determine if a congestion in the use of frequencies can be foreseen that would require the implementation of 8.33 kHz channel spacing in any parts of the MID Region.

1.2 With the view to determine the medium-term spectrum requirements for VHF communication services, States are invited to submit these requirements to the MID Regional Office (RO) by 1 August 2023. On the basis of these requirement, the RO will undertake an analysis that is aimed at determining whether these requirements can be assigned a frequency within the available 25 kHz channels.

1.3 In this case, States can introduce the requirements in the local version of Frequency Finder and generate with the button “Export Submissions” an Excel file that can be submitted to the RO.

1.4 States are able to download the Frequency Finder tool from Frequency Spectrum Management Panel (FSMP) webpage at: <https://www.icao.int/safety/FSMP/Pages/Documents.aspx>, and the RO will provide assistance for any difficulties in installation and use of this ICAO tool.

1.5 Precise details not available.

1.5.1 When precise details are not available for future frequency requirements, States can submit such requirements in any format.

1.5.2 Example 1: For a new airport, States can submit the (approximate) coordinates and specify the need for:

- x TWR frequencies
- x Aerodrome surface frequencies
- x APP-U frequencies
- x APP-L frequencies
- x ACC-U frequencies
- ATTM.- 2
- x ACC-L frequencies
- x VOLMET frequencies
- x ATIS frequencies
- x VDL frequencies

APPENDIX 6.6C

ICAO position for the International Telecommunication Union (ITU)

World Radiocommunication Conference 2023 (WRC-23)

SUMMARY

This paper reviews the agenda for the International Telecommunication Union (ITU) World Radiocommunication Conference 2023 (WRC-23), discusses points of aeronautical interest and provides the ICAO Position for these agenda items.

The goal of the ICAO Position is to ensure aeronautical access to appropriately protected spectrum for radiocommunication and radionavigation systems that support current and future safety-of-flight applications. In particular, it describes the safety considerations necessary to ensure adequate protection against harmful interference.

Support of the ICAO Position by ITU Member States is required to ensure that the position is supported at the WRC-23 and that aviation requirements are met.

- 1) Introduction
- 2) ICAO and the international regulatory framework
- 3) Spectrum requirements for international civil aviation
- 4) Aeronautical aspects on the agenda for WRC-23.

1 Introduction

1.1 The ICAO Position on issues of interest to international civil aviation to be addressed at the 2023 ITU World Radiocommunication Conference (WRC-23) is presented below. The agenda of this Conference is contained in the attachment. The ICAO Position is to be considered in conjunction with sections 7-II and 8 of the Handbook on Radio Frequency Spectrum Requirements for Civil Aviation, Volume I — ICAO spectrum strategy, policy statements and related information (Document 9718, Second Edition, 2018). Document 9718 is available on <http://www.icao.int/safety/fsmp> (see webpage: Documents). It should be noted that the Handbook contains a long-term policy based on a snapshot in time and, as such, it may lag behind the ICAO WRC Position. As a result, when there is conflict between the Handbook and a current ICAO WRC Position, the Position should be seen as being the guiding document.

1.2 ICAO supports the working principle within the ITU, as established during studies for WRC-07, that ICAO will ensure the compatibility of ICAO standard systems with existing or planned aeronautical systems operating in accordance with international aeronautical Standards. Compatibility of ICAO standard

systems with non-ICAO standard aeronautical systems (or non-aeronautical systems) will be addressed in the ITU.

2 ICAO and the International Regulatory Framework

2.1 ICAO is the specialized agency of the United Nations providing for the international regulatory framework for civil aviation. The *Convention on International Civil Aviation* is an international treaty providing required provisions for the safety of flights over the territories of the 193 ICAO Member States and over the high seas. It includes measures to facilitate air navigation, including international Standards and Recommended Practices commonly referred to as SARPs.

2.2 The ICAO Standards constitute the rule of law through the ICAO Convention and form a regulatory framework for aviation, covering personnel licensing, technical requirements for aircraft operations, airworthiness requirements, aerodromes and systems used for the provision of communications, navigation and surveillance, as well as other technical and operational requirements.

3 Spectrum requirements for International Civil Aviation

3.1 Air transport plays a major role in driving sustainable economic and social development worldwide. Since the mid-1970s and until the end of 2019, air traffic growth has consistently defied economic recessionary cycles, expanding two-fold once every 15 years. It is estimated that in 2019 air transport directly and indirectly supported the employment of 87.7 million people, contributing USD 3.5 trillion to the global gross domestic product (GDP), and carried over 4.5 billion passengers and over 52 million tonnes of cargo.

3.2 While the COVID-19 outbreak did significantly impact the global air transport industry, the industry continues to play a critical role in supporting humanity's fight against the global pandemic. The industry contributions have included delivering medical equipment and medicines, supporting traveller repatriations and medical evacuations, and maintaining crucial global supply chains through increased air cargo operations.

3.3 The safety of air operations is dependent on the availability of reliable communication and navigation services. Current and future communication, navigation, and surveillance/air traffic management (CNS/ATM) systems are highly dependent upon the availability of sufficient, suitably protected radio spectrum that can support the high integrity and availability requirements associated with aeronautical safety systems. Spectrum requirements for current and future aeronautical CNS systems are specified in the ICAO Spectrum Strategy¹, as addressed by the Twelfth Air Navigation Conference, and as approved by the ICAO Council.

3.4 In support of the safety aspects related to the use of radio frequency spectrum by aviation:

- Article 40 of the ITU Constitution states, “*international telecommunication services must give absolute priority to all telecommunications concerning safety of life at sea, on land, in the air or in outer space, as well as to epidemiological telecommunications of exceptional urgency of the World Health Organization*”.
- No. 4.10 of the Radio Regulations states, “Member States recognize that the safety aspects of radionavigation and other safety services require special measures to ensure their freedom

¹ The ICAO spectrum strategy is included in the ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation, Volume I — ICAO spectrum strategy, policy statements and related information (Document 9718).

6.6C-3

from harmful interference; it is necessary therefore to take this factor into account in the assignment and use of frequencies.”

In particular, compatibility of aeronautical safety services with co-band or adjacent band aeronautical non-safety services or non-aeronautical services must be considered with extreme care in order to preserve the integrity of the aeronautical safety services.

3.5 The continuous increase in air traffic movements as well as the additional requirement for accommodating new and emerging applications such as unmanned aircraft systems (UAS²) and commercial sub-orbital vehicle flights are placing an increased demand on both the aviation regulatory and air traffic management mechanisms. As a result, the airspace is becoming more complex and the demand for frequency assignments (and consequential spectrum allocations) is increasing. While some of this demand can be met through improved spectral efficiency of existing radio systems in frequency bands currently allocated to aeronautical services, it is inevitable that these frequency bands may need to be increased or additional aviation spectrum allocations may need to be agreed upon to meet this demand.

3.6 In addition, it is noted that there is a general trend toward the development of new terrestrial mobile communications networks with higher radiated power base stations, in particular IMT base stations using active antennas. A review of unwanted emission levels of these stations should be considered to ensure continued compatibility with other systems and services, particularly aviation safety systems.

3.7 The ICAO Position for the ITU WRC-23 was initially developed in 2020 with the assistance of the Frequency Spectrum Management Panel (FSMP) and was reviewed by the Air Navigation Commission at the seventh meeting of its 215th Session on 27 October 2020. Following the review by the Commission, it was submitted to ICAO Contracting States and relevant international organizations for comment. After a further review of the ICAO Position in light of the comments received by the Commission on 29 April 2021, the ICAO Position was reviewed and approved by the ICAO Council on 14 June 2021. [Editorial Note: Update the following when/as appropriate.] Taking into account the results of studies within the ITU and ICAO, the ICAO Position was updated and approved by the ICAO Council on XX June 2023. This document contains that updated ICAO WRC-23 Position

3.8 States and international organizations are requested to make use of the ICAO Position, to the maximum extent possible, in their preparatory activities for the WRC-23 at the national level, in the activities of the regional telecommunication organizations³ and in the relevant meetings of the ITU.

4 Aeronautical aspects on the agenda for WRC-23

Note 1 – The statement of the ICAO Position on an agenda item is given in a text box at the end of the section addressing the agenda item, after the introductory background material.

Note 2 – WRC-23 agenda items 1.6, 1.7, 1.8, 1.9, 1.10 and 9.2 address issues where aviation is seeking action by the WRC.

² For the purposes of this document, UAS is referred to in ICAO as remotely piloted aircraft systems (RPAS).

³ African Telecommunication Union (ATU), Asia-Pacific Telecommunity (APT), European Conference of Postal and Telecommunications Administrations (CEPT), Inter-American Telecommunication Commission (CITEL), Arab Spectrum Management Group (ASMG) and the Regional Commonwealth in the Field of Communications (RCC).

*Note 3 – WRC-23 agenda items **1.1, 1.2, 1.3, 1.4, 1.11, 1.13, 1.15, 1.16, 1.17, 4, 8, and 9.1 topics a) and b), and 10** could potentially affect aviation use of spectrum and hence aviation should participate in studies to ensure there is no undue impact. As a result, they are included in this position.*

*Note 4 – No impact on aeronautical services has been identified from WRC-23 agenda items **1.5, 1.12, 1.14, 1.18, 1.19, 2, 3, 5, 6, 7, 9.1 topic c), 9.1 topic d)** and **9.3** which are therefore not addressed in this position.*

Note 5 – When in this document reference is made to “No. X.YYY”, it means “No. X.YYY of the ITU Radio Regulations”.

WRC-23 agenda item 1.1

Agenda item title

1.1 *to consider, based on the results of ITU-R studies, possible measures to address, in the frequency band 4 800-4 990 MHz, protection of stations of the aeronautical and maritime mobile services located in international airspace and waters from other stations located within national territories, and to review the power flux-density criteria in No. 5.441B in accordance with Resolution 223 (Rev.WRC-19);*

Discussion

This agenda item seeks to study the technical and regulatory provisions necessary to ensure the protection of aeronautical and maritime mobile services, located either in or above international waters, from other stations located within national territories and operating in the frequency band 4 800-4 990 MHz. Additionally, the agenda item calls for the review of the pfd criteria contained in RR No. **5.441B**.

The frequency bands 4 800-4 825 MHz and 4 835-4 950 MHz are allocated to the aeronautical mobile service worldwide in accordance with the Table of Frequency Allocations and RR No. **5.442**. In addition, in parts of Region 2 and Australia as well as adjacent international airspace the frequency bands 4 400-4 940 and 4 825-4 835 MHz are used for aeronautical mobile telemetry for flight testing in accordance with the provisions of RR Nos. **5.440A**, **5.442** and Resolution **416 (WRC-07)**. According to Resolution **416 (WRC-07)** the aeronautical mobile telemetry emissions are limited to transmission from aircraft stations only.

Flight testing is key to maintaining and enhancing the safety of aircraft operation. Analysis of data gathered during flight testing is used to evaluate the aerodynamic flight characteristics of the vehicle and the performance of the systems onboard that vehicle in order to validate the design and its safety. The flight test phase allows any identified design issues to be addressed and resolved, as well as verifying and documenting the vehicle's performance for government certification and customer acceptance. It is key to ensure the integrity of the flight test data. Any interference to the transmission or reception of flight test data, if spotted, may invalidate the test data gathered during that flight and hence require a repetition of that flight test or if not spotted cause nugatory work to be carried out to address an issue that does not exist.

However, assignments to certain types of aeronautical systems, for example radio links between aircraft, are not registered in the MIFR. The absence of such recording together with RR No. **8.1**, which states that *rights and obligations of administrations in respect of frequency assignments shall be derived from the recording of those assignments in the MIFR*, could lead to questions being raised as to why the protection of the aeronautical mobile service is required. Unfortunately, although the Radio Regulations require assignments to be registered in order to be internationally recognized (RR Nos. **11.2** & **11.8**), provision RR No. **11.14** precludes the notification and registration of frequency assignments to aeronautical mobile stations that do not have associated aeronautical land stations. This apparent discrepancy should be resolved in a manner that ensures recognition and protection of aviation systems when they are operated in international airspace.

Though this agenda item is limited to the frequency band 4 800-4 990 MHz, its considerations might have influence on a general regulatory mechanism of protection of the aeronautical mobile service in international airspace. It is essential to ensure that the proposed methods to satisfy this agenda item would not have a negative impact on the use of aviation systems in other frequency bands.

ICAO Position

To support any measures based on the results of studies taken to ensure the protection of flight testing in international airspace, especially those stations operated in accordance with RR No. **5.440A**.

To oppose any proposed measure that is not in line with the results of studies and reduces the level of protection of flight test operations in international airspace and above international waters, especially those operated in accordance with RR No. **5.440A**.

To ensure that the proposed methods to satisfy this agenda item do not have a negative impact on the use of aviation systems in other frequency bands.

WRC-23 agenda item 1.2

Agenda item title

1.2 *to consider identification of the frequency bands 3 300-3 400 MHz, 3 600-3 800 MHz, 6 425-7 025 MHz, 7 025-7 125 MHz and 10.0-10.5 GHz for International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution 245 (WRC-19);*

Discussion

The agenda item, based on the called for studies, seeks additional IMT identification, and possible new allocations to the mobile service identified for IMT on a primary basis in the frequency bands:

- 3 300-3 400 MHz (Region 1 & 2);
- 3 600-3 800 MHz (Region 2);
- 6 425-7 025 MHz (Region 1);
- 7 025-7 125 MHz (globally);
- 10.0-10.5 GHz (Region 2).

In parts of Region 2, as well as adjacent international airspace, the frequency band 5 925-6 700 MHz is used for aeronautical mobile telemetry for flight testing in accordance with the provisions of Resolution **416 (WRC-07)**.

Flight testing is key to maintaining and enhancing the safety of aircraft. Analysis of data gathered during flight testing is used to evaluate the aerodynamic flight characteristics of the vehicle and the performance of the systems onboard that vehicle in order to validate the design and its safety. The flight test phase allows any identified design issues to be addressed, as well as verifying and documenting the vehicles performance for government certification and customer acceptance.

It is key to ensure the integrity of the flight data. Any interference to the transmission or reception of flight test data, if spotted, may invalidate the test data gathered during that flight and hence require a repetition of that flight, or if not spotted, cause unnecessary work to be carried out to address an issue that does not exist.

Parts of the frequency bands 3 600-3 800 MHz and 6 425-7 025 MHz are allocated to the fixed satellite service (FSS) are used by FSS feeder links (downlinks and uplinks) of GSO mobile satellite service (MSS) networks to support the transmission of AMS(R)S communications in the 1.6/1.5 GHz bands, which is used to support ATC and aircraft operations by many ANSPs and airlines. GSO satellites have visibility over a very wide area (about one third of the Earth surface), so any interference to MSS feeder uplinks operated in the band 6 425-6 575 MHz could endanger aircraft operations over a similar-sized area.

Some GSO very small aperture terminals (VSAT) may operate in the FSS in some countries of Region 1 and Region 2 in the frequency bands 3 600-3 700 MHz and 6 425-6 525 MHz for the provision of aeronautical services.

ITU-R studies identified under Resolution **245 (WRC-19)** will need to be completed to determine the potential for sharing of IMT with the FSS. In advance of results of these studies, ITU-R Report S.2368

contains sharing studies between IMT-Advanced systems and GSO FSS in the 3 400-4 200 MHz and 4 500-4 800 MHz frequency bands in the WRC study cycle leading to WRC-15⁴.

The report summarises the required separation distances presented in the individual technical studies to protect GSO FSS earth stations. The separation distances vary depending on the study and range from approximately ten to well over a hundred km for protection of the FSS interference criteria.

Studies have been conducted by the ITU-R to assess the aggregate interference from IMT systems to FSS satellites in the band 6 425-7 075 MHz. The studies show a range of results, in some cases showing interference below the FSS protection criterion, and in other cases showing interference above the criterion. The differences are mainly related to the scenarios used and to different assumptions on the number of IMT base station operating and their characteristics.

Recently ICAO has received several studies regarding the interference potential to radio altimeters from new mobile service systems planned to operate in frequency bands adjacent/nearby to that used by those altimeters. The radio altimeter is a mandated critical aircraft safety system operating in the 4 200-4 400 MHz frequency band and used to determine the aircraft's height above terrain, enabling several safety related flight operations and navigation functions on all commercial aircraft and a wide range of other civil aircraft types. Such functions and systems include terrain awareness, aircraft collision avoidance, wind shear detection, flight controls, and functions to automatically land an aircraft. Harmful interference to the function of the radio altimeter during any phase of flight would pose a serious safety risk. It is important to note, however, that the issues raised by the radio altimeter studies are not with the regulatory allocation and identification to the mobile service (i.e., it is not pertinent to WRC-23 agenda item 1.2 discussions), rather to how new systems are being authorized for deployment within that service. Work continues to assess any possible measures that might be needed, both near-term and in the future, to ensure compatible operation of radio altimeters and these new mobile service systems.

ICAO Position

To ensure that any IMT identification in the Region 2 in the frequency bands 3 600-3 800 MHz would include technical conditions to protect FSS in order to continue the use of these bands by the FSS for the provision of aeronautical services.

In case of any IMT identification in the frequency band 6 425-6 575 MHz in Region 1, regulatory provisions would be required for protecting FSS uplinks in order to continue the use of these bands by GSO FSS networks used for the provision of aeronautical services.

In case of any IMT identification in the frequency band 6 425-6 700 MHz in Region 1, to ensure that the flight test operations in accordance with Resolution **416 (WRC-07)** would not be affected in Region 2.

WRC-23 agenda item 1.3

⁴ Report ITU-R S.2368-0: Sharing studies between International Mobile Telecommunication-Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3 400-4 200 MHz and 4 500-4 800 MHz frequency bands in the WRC study cycle leading to WRC-15 (<https://www.itu.int/pub/R-REP-S.2368>)

Agenda item title

1.3 *to consider primary allocation of the band 3 600-3 800 MHz to the mobile service in Region 1 and take appropriate regulatory actions, in accordance with Resolution 246 (WRC-19);*

Discussion

The agenda item, based on the called for studies, seeks to upgrade the secondary allocation to the mobile service identified for IMT in the frequency band 3 600-3 800 MHz in Region 1.

Systems operating under the allocation to the fixed satellite service (FSS) in the frequency range 3 400-4 200 MHz provide ground infrastructure for the transmission of critical aeronautical and meteorological information. These systems are also used for feeder links to support systems providing an aeronautical mobile satellite (route) service. Reports ITU-R M.2109 & ITU-R S.2199 contain sharing studies between systems operating under an allocation to the FSS and international mobile telecommunication (IMT) systems and broadband wireless access systems respectively in the frequency range 3 400-4 200 MHz. Studies show a potential for interference from IMT and broadband wireless access stations into Earth station in the FSS at distances of up to several hundred kilometres. Such large separation distances would impose substantial constraints on both mobile and satellite deployments. The studies also show that interference can occur when IMT systems are operated in frequency bands adjacent to those used by the FSS.

In addition, WRC-12 adopted Resolution **154** (revised at WRC-15) to support existing and future operation of Earth stations in the FSS within the frequency band 3 400-4 200 MHz, as an aid to safe operation of aircraft and reliable distribution of meteorological information in some countries, mainly in Africa, of Region 1

Recently ICAO has received several studies regarding the interference potential to radio altimeters from new mobile service systems planned to operate in frequency bands adjacent/nearby to that used by those altimeters. The radio altimeter is a mandated critical aircraft safety system operating in the 4 200-4 400 MHz frequency band and used to determine the aircraft's height above terrain, enabling several safety related flight operations and navigation functions on all commercial aircraft and a wide range of other civil aircraft types. Such functions and systems include terrain awareness, aircraft collision avoidance, wind shear detection, flight controls, and functions to automatically land an aircraft. Harmful interference to the function of the radio altimeter during any phase of flight would pose a serious safety risk.

It is important to note, however, that the issues raised by the radio altimeter studies are not with the regulatory allocation and identification to the mobile service (i.e., it is not pertinent to WRC-23 agenda item 1.3 discussions), rather to how new systems are being authorized for deployment within that service. Work continues to assess any possible measures that might be needed, both near-term and in the future, to ensure compatible operation of radio altimeters and these new mobile service systems.

ICAO Position

To ensure that any mobile allocation in Region 1 in the frequency bands 3 600-3 800 MHz would include technical conditions to protect FSS in order to continue the use of these bands by the FSS for the provision of aeronautical services, including GSO MSS feeder links for the purpose of supporting aeronautical services.

WRC-23 agenda item 1.4

Agenda item title

1.4 *to consider, in accordance with Resolution 247 (WRC-19), the use of high-altitude platform stations as IMT base stations (HIBS) in the mobile service in certain frequency bands below 2.7 GHz already identified for IMT, on a global or regional level;*

Discussion

At WRC-2000, the frequency bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3, and the frequency bands 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2 were identified in RR No. **5.388A** for possible use by high-altitude platform stations as international mobile telecommunications (IMT) base stations (HIBS) within the mobile service allocation. Resolution **221 (Rev.WRC-07)** referred to in RR No. **5.388A** stipulates technical conditions for HIBS necessary for the protection of ground-based IMT stations in neighbouring countries and other services based on the sharing and compatibility studies with IMT-2000.

In view of increasing demand to provide mobile broadband services to underserved areas and noting the increase in the number of frequency bands within which ground based IMT is deployed, there is a need to review the existing regulations for HIBS with a view to providing flexibility for the operators to deploy HIBS in all frequency bands below 2.7 GHz that are identified for IMT. This review should include the fact that HIBS are expected to be used as a part of terrestrial IMT networks and may use the same frequency bands as ground-based IMT base stations. As a result, this agenda item considers appropriate technical conditions and regulatory actions for HIBS in certain frequency bands below 2.7 GHz that are already identified for IMT, i.e.:

- 694-960 MHz;
- 1 710-1 885 MHz (1 710-1 815 MHz to be used for uplink only in Region 3);
- 2 500-2 690 MHz (2 500-2 535 MHz to be used for uplink only in Region 3, except 2 655-2 690 MHz in Region 3).

In accordance with *resolves* 2 of Resolution **247 (WRC-19)**, the sharing and compatibility studies under this agenda item should ensure the protection of services having allocations in the same and adjacent frequency bands.

One of the frequency bands considered for HIBS is 694-960 MHz, which is adjacent to the band 960-1 164 MHz allocated to AM(R)S and ARNS and heavily used by aeronautical systems, e.g., ADS-B, DME, LDACS, SSR etc.

Another frequency band being considered is 2 500-2 690 MHz which is close to the frequency band 2 700-2 900 MHz used for the provision of primary approach radars. Regarding that latter band, in order to enable the deployment of ground based IMT below 2 690 MHz the existing radars had to be modified to increase the receiver front end filter rejection in order to cope with the power in the IMT fundamental signal. The design of those modifications was based on a specific set of assumptions about the deployment of IMT base stations, the antenna characteristics including height and directivity, and the use of a specific terrestrial propagation model (Recommendation ITU-R P.452). Placing the IMT base station on a high-altitude platform changes the assumptions used in determining the modifications required to the radar receiver front ends to accommodate ground based IMT. It is essential to ensure that by placing the base station on a high-altitude platform the maximum level of signal received by the radar both in-band and out of band from IMT

does not exceed those predicted during the studies on ground based IMT and on which the radar modifications were designed.

ICAO Position

To ensure that any identification of frequency bands for high-altitude platform stations as IMT-base stations (HIBs) should include provisions for the protection of aeronautical systems operating in the frequency bands 960-1 164 MHz and 2 700-2 900 MHz.

To oppose the use of HIBS within the frequency band 2 500-2 690 MHz or parts thereof if agreed studies have not demonstrated the protection of aeronautical systems.

WRC-23 agenda item 1.6

Agenda item title

1.6 *to consider, in accordance with Resolution 772 (WRC-19), regulatory provisions to facilitate radiocommunications for sub-orbital vehicles;*

Discussion

Sub-orbital vehicles have been developed to reach altitudes and velocities that are much higher than conventional aircraft. Re-usable sub-orbital vehicles that launch like traditional rockets have become routine. Furthermore, with the advances in technology, re-useable sub-orbital vehicles that take off and land on a traditional runway are close to becoming a reality with companies testing such vehicles. These vehicles are intended to perform various missions, such as deploying satellites, conducting scientific research, or carrying passengers and cargo, and then returning to the Earth's surface. As one example, such vehicles could lead to hypersonic travel from Europe to Australia in 90 minutes, down from the current 24 hours.

The integration of sub-orbital vehicles into airspace managed by **Member States** will create various challenges for spectrum usage and frequency management. A sub-orbital vehicle could share airspace with conventional aircraft during certain portions of its flight, or be separated procedurally to maintain aviation safety. Therefore, there is a need, in some cases, for that vehicle to communicate with other airspace users and air traffic control, as decided by the **Member States**. These sub-orbital vehicles may use a number of different terrestrial and space services, some standardized by ICAO, in various ranges of frequency bands.

With respect to spectrum for systems and applications related to aviation safety, ICAO standardized systems are necessary for harmonization and interoperability with the air traffic management system. However, sub-orbital vehicles are intended to achieve altitudes and velocities that are much higher than conventional aircraft and hence do not always perform as an aircraft. Also, the way that on-board ICAO-standard terrestrial or satellite systems operate may not necessarily be consistent with the definitions in the RR. Therefore, in the current Radio Regulations, there is not a clear regulatory understanding as to how stations on board sub-orbital vehicles should be addressed and hence no clear understanding as to the radio service(s) under which they should operate.

Studies have shown that in principle from a technical perspective, some of the current ICAO standardized systems should have the capability, although potentially not the capacity, to provide suitable radio links for sub-orbital vehicles to operate safely. RR modifications (e.g., a WRC Resolution) may be required at WRC-23 to address the outcome of the studies under Resolution 772 (WRC-19). Any such changes to the Radio Regulations shall not create constraints on aeronautical operations.

ICAO Position

To support the regulatory provision for terrestrial stations and earth stations required onboard a suborbital vehicle to safely integrate it into air traffic service airspace, as decided by the **responsible Member State(s)**, to maintain the services under which these stations are **classified**.

Any such changes to the Radio Regulations shall not create constraints on aeronautical operations.

WRC-23 agenda item 1.7

Agenda item title

1.7 to consider a new aeronautical mobile-satellite (R) service (AMS(R)S) allocation in accordance with Resolution 428 (WRC-19) for both the Earth-to-space and space-to-Earth directions of aeronautical VHF communications in all or part of the frequency band 117.975-137 MHz, while preventing any undue constraints on existing VHF systems operating in the AM(R)S, the ARNS, and in adjacent frequency bands;

Discussion

The use of low-Earth orbiting satellites for VHF aeronautical safety and regularity of flight messages between the pilot and controller have a potential to augment, but not replace, coverage of existing terrestrial VHF communications facilities. Several proposals currently being studied would provide complementary service to oceanic and remote regions that already exist for global navigation satellite systems and satellite-based surveillance systems. These implementations would all use existing on-board aircraft VHF radios without any needed modification.

Such an AMS(R)S system will provide significant operational benefits to many different regions globally, but may not be viable in all areas given the extensive usage of existing AM(R)S systems in some Administrations. Therefore, in addition to any applied ITU coordination procedures, complementary coordination procedures in the ICAO will need to be established to ensure that all relevant entities are consulted before any frequency is used and not constrain the current or future AM(R)S systems in the same band.

ICAO Position

To support a global primary allocation to the aeronautical mobile-satellite (route) service for both the Earth-to-space and space-to-Earth directions in all or part of the frequency band 117.975-137 MHz subject to the following conditions:

- The use of any new AMS(R)S allocation be limited to aeronautical VHF communications for safety and regularity of flight.
- Ensure the protection of existing primary terrestrial aeronautical systems in the 117.975-137 MHz band, and not constrain the planned usage of those systems.

The systems shall be implemented, operated, and planned, in accordance with international Standards and Recommended Practices and procedures established in accordance with the Convention on International Civil Aviation.

WRC-23 agenda item 1.8

Agenda item title

1.8 *to consider, on the basis of ITU R studies in accordance with Resolution 171 (WRC-19), appropriate regulatory actions, with a view to reviewing and, if necessary, revising Resolution 155 (Rev.WRC-19) and No. 5.484B to accommodate the use of fixed-satellite service (FSS) networks by control and non-payload communications of unmanned aircraft systems;*

Discussion

Resolution **155 (Rev.WRC-19)** was initially developed at WRC-15 and modified by WRC-19, with the aim of enabling the use of geostationary-satellite networks operating in the fixed-satellite service (FSS) to be used for the provision of unmanned aircraft control and non-payload communication (CNPC) in the following frequency bands:

- For downlink (space-to-Earth):
 - 10.95-11.2 GHz,
 - 11.45-11.7 GHz,
 - 11.7-12.2 GHz in Region 2,
 - 12.2-12.5 GHz in Region 3,
 - 12.5-12.75 GHz in Regions 1 and 3,
 - 19.7-20.2 GHz,
- For uplink (Earth-to-space):
 - 14-14.47 GHz,
 - 29.5-30.0 GHz.

Resolution **155 (Rev.WRC-19)**, in its *resolves*, contains the conditions under which an unmanned aircraft can use a satellite network operating in the FSS for CNPC. However, it was recognized when the Resolution was originally developed that:

- ICAO had yet to complete the development of the relevant international aeronautical Standards and Recommended Practices (SARPs);
- additional work would be required to assess the feasibility of using the satellite networks under the conditions contained in Resolution **155 (Rev.WRC-19)**;
- there may be inconsistencies between some of the *resolves*;
- Resolution **155 (Rev.WRC-19)** was originally developed during WRC-15, and modifications may be required once the further study work and relevant ICAO SARPs material had been completed to ensure that the provisions of the Resolution meet the ICAO requirements.

Therefore, the Resolution as developed by WRC-15, contained a clause requiring WRC-23 “to consider the results of the above studies referred to in this Resolution with a view to reviewing and, if necessary, revising this Resolution, and take necessary actions, as appropriate”. It also precluded operational use of the FSS by UAS CNPC before the review by WRC-23.

At WRC-19 Resolution **155** was revised and WRC-23 agenda item 1.8 adopted that through Resolution **171 (WRC-19)** resolved to invite the ITU Radiocommunication Sector to:

6.6C-17

- continue and complete in time for WRC-23 relevant studies of the technical, operational and regulatory aspects, based on the frequency bands mentioned in *resolves* 1 of Resolution **155 (Rev.WRC-19)**, in relation to the implementation of Resolution **155 (Rev.WRC-19)**, taking into account the progress obtained by ICAO in the completion of SARPs on use of the FSS for the UAS CNPC links;
- review RR No. **5.484B** and Resolution **155 (Rev.WRC-19)** taking into account the results of the above studies.

Additionally, Resolution **171 (WRC-19)** *invites the 2023 World Radiocommunication Conference* to revise, if necessary, RR No. **5.484B** and Resolution **155 (Rev.WRC-19)** and take other necessary actions, as appropriate, on the basis of the studies conducted under Resolutions **155 (Rev.WRC-19)** and **171 (WRC-19)**. Work on the ITU-R studies is continuing, and the final outcome of the work has not yet been reached in order to allow WRC-23 to make decisions.

In this context, ICAO is invited to develop aeronautical Standards and Recommended Practices (SARPs) identifying how UAS CNPC operates under the existing FSS primary allocation, based on Resolution **155 (Rev.WRC-19)**. As a basis for developing these SARPs, since CNPC is a safety-of-life aeronautical system, ICAO is expecting that the decision of WRC-23 results in a Resolution that;

- clearly provides primary status;
- removes the apparent inconsistencies;
- acknowledges that in accordance with the Annexes of the Convention of the International Civil Aviation Organization (ICAO), ensuring the safety-of-life aspects of the use of UAS CNPC is the role of the responsible States;
- provides sufficient information to support and/or validate safety cases;
- ensures that the UAS CNPC operator is notified prior to any change in the service provision performance being implemented as a result of the satellite coordination process;
- ensures that any change as a result of a satellite coordination process does not adversely affect the initial service level agreement.

Within the ITU during the last study period work has made substantive progress on Document ITU-R M.[UA_PFD] - Review of power flux-density limits in accordance with *resolves* 16 of Resolution **155 (WRC-15)**, which addresses the various *resolves* within Resolution **155**, however this work has not been formally completed. It has to be noted that this document will contain critical information that will be used for assessing the feasibility of UAS CNPC for different operational conditions, by ICAO, under Resolution **155**.

Within ICAO work has progressed on the development of Standards and Recommended Practices (SARPs) material. The first package of SARPs, dealing with the identification of frequency bands (including those listed in *resolves* 1 of Resolution **155 (Rev.WRC-19)** and C2 Link procedures, has been adopted and became effective on 12 July 2021, following a review of comments received from States. The second package of SARPs, endorsed by the RPAS Panel in November 2022 and now proceeding to State letter review, addresses the technical solutions for the FSS systems and the other relevant *resolves* of Resolution **155**. ICAO will be responsible for the safety-of-life aspects of UAS CNPC under the existing RF environment given by Resolution **155**.

The Director of the Radiocommunication Bureau will decide if the conditions included in the *instructs the Director of the Radiocommunication Bureau* 4 of Resolution **155 (Rev.WRC-19)** have been met. If they have, satellite network filings submitted by administrations with a new class of station can then be considered for processing.

It should be noted that work under WRC-23 agenda item 1.16 (Resolution **173 (WRC-19)**) and WRC-23 agenda item 1.17 (Resolution **773 (WRC-19)**) may have impacts on the use of the FSS by UAS CNPC during the WRC-23 cycle. The implications of any proposed amendment under these agenda items to the Radio Regulations need to be assessed and action taken, if necessary, to ensure that the radio regulatory provisions established during WRC-23 do not adversely impact the use of the frequency bands 19.7-20.2 GHz and 29.5-30.0 GHz by unmanned aircraft for CNPC.

ICAO Position

To support the modification of RR No. **5.484B** and Resolution **155 (Rev.WRC-19)**.

ICAO is expecting that the decision of WRC-23 will result in a Resolution that:

- clearly provides primary status;
- removes any apparent inconsistencies;
- acknowledges that in accordance with the Annexes of the Convention of the International Civil Aviation Organization (ICAO), **ensuring the safety-of-life aspects of the use of UAS CNPC is the role of the responsible States;**
- provides sufficient information to support and/or validate safety cases; and
- ensures that the UAS CNPC operator is notified prior to any change in the service provision performance being implemented as a result of the satellite coordination process;
- ensures that any change as a result of a satellite coordination process does not adversely affect the initial service level agreement.

WRC-23 agenda item 1.9

Agenda item title

1.9 *to review Appendix 27 of the Radio Regulations and consider appropriate regulatory actions and updates based on ITU-R studies, in order to accommodate digital technologies for commercial aviation safety-of-life applications in existing HF bands allocated to the aeronautical mobile (route) service and ensure coexistence of current HF systems alongside modernized HF systems, in accordance with Resolution 429 (WRC-19);*

Discussion

HF is the only terrestrial service with means of providing ubiquitous global communication coverage for aircraft, and is still the long-range system required by many aviation regulators for the provision of safety and regularity of flight communications in oceanic, polar and remote areas. Access to the various frequency bands in the range 2 850-22 000 kHz assigned to the aeronautical mobile (route) service (AM(R)S) is therefore essential. Since the last substantive review of Appendix 27 at the 1979 World Administrative Radio Conference, use of HF by aviation has continued to evolve and grow, especially with the introduction of HF datalink in the 1990s; now used by many airlines.

To date, operational capacity has been limited by the number of 3 kHz channels available in the HF band. However, the development of advanced digital techniques, including new waveforms, allows the aggregation of independent 3 kHz channels (either contiguous or non-contiguous) into wideband links. This opens the possibility for simultaneous transmission of voice and data, thus improving capacity, connectivity, and quality of HF communication systems. Aviation would like to take advantage of these developments to provide aircraft with additional capabilities and to improve the reliability, availability and continuity of communications especially when used in conjunction with existing L-band aviation SATCOM systems.

In order to take advantage of the various benefits that a modern wideband HF communication system could offer, Appendix 27 of the Radio Regulations needs to be modified to allow the introduction of new digital wideband systems in accordance with Resolution 429 (WRC-19). For the purpose of this agenda item, the term “wideband” in HF communications may refer to a combination of multiple 3 kHz channels to provide improved data rates. With the availability of advanced digital technologies and the demonstrated capabilities of aeronautical wideband HF, including contiguous or non-contiguous channel aggregation, faster data rates and digital voice communications are possible.

Studies have identified minor changes to Appendix 27 that would both protect current users of aeronautical HF, and allow for the aggregation of narrowband channels into wideband links to support growing aviation need.

ICAO Position

To support modification of Appendix 27 to the Radio Regulations for explicitly recognizing digital HF wideband aeronautical communication systems in a manner fully compatible with existing aeronautical HF assignments, and without modifying the Appendix 27 allotment plan. Those systems shall be operated in accordance with international Standards and Recommended Practices and procedures established in accordance with the Convention on International Civil Aviation.

WRC-23 agenda item 1.10

Agenda item title

1.10 *to conduct studies on spectrum needs, coexistence with radiocommunication services and regulatory measures for possible new allocations for the aeronautical mobile service for the use of non-safety aeronautical mobile applications, in accordance with Resolution 430 (WRC-19);*

Discussion

As technology has developed and miniaturization has advanced, it has become possible to use aircraft as platforms for payload applications such as fire and border surveillance, air quality and environment monitoring, video surveillance, terrain mapping, and imagery such as film-making. As a result, the number of aircraft equipped with sensors and the demand for associated communication links to offload large amounts of data has also grown and is expected to continue to grow. Those communication links, whilst not associated with aeronautical safety, can be mission critical in providing data or sensor control for the application that they are supporting.

At the same time, there is no clear identification of the frequency bands in which non-safety aeronautical mobile applications can operate, due in-part to the limitations often placed on existing mobile allocations that either preclude or place technical/operational restrictions that are not compatible with aeronautical use. This has stifled further development due to a lack of confidence within the industry of long-term spectrum access and stability.

In consequence, there is a need for adaptation of the current regulatory framework in order to clearly identify spectrum that could only be used for aeronautical payload communication, giving the industry the stability it needs to allow it to develop innovative applications that can deliver tangible benefits. However, it is important that there is a clear distinction between such systems and those used to provide safety and regularity of flight communications, including UAS command and control functions.

The objective of this agenda item is to assess spectrum requirements for new non-safety aeronautical mobile service applications and seek:

- possible new primary allocations to the aeronautical mobile service in frequency band 15.4-15.7 GHz for such non-safety aeronautical applications; and
- possible revision of the “except aeronautical mobile” in the frequency band 22-22.21 GHz, already allocated on a primary basis to the mobile, except aeronautical mobile, service.

ICAO Position

Based upon the agreed results of studies, not to oppose new allocations to the aeronautical mobile service for use by non-safety aeronautical mobile applications on a primary basis in the frequency bands 15.4-15.7 GHz and 22-22.21 GHz.

To ensure that any such modification does not adversely affect the status or provision of aeronautical safety services.

WRC-23 agenda item 1.11

Agenda item title

1.11 *to consider possible regulatory actions to support the modernization of the Global Maritime Distress and Safety System and the implementation of e-navigation, in accordance with Resolution 361 (Rev.WRC-19);*

Discussion

Aircraft, of which helicopters are a subset, are an integral part of the global maritime distress and safety system, providing a rapid search capability that can affect a rescue or direct surface vessels to the scene of the incident. As such, they are fitted with appropriate Global Maritime Distress and Safety System (GMDSS) radio equipment to facilitate such activities. It is therefore essential to ensure that any change to the regulatory provisions and spectrum allocations resulting from this agenda item do not adversely impact on the capability of search and rescue aircraft to effectively communicate with vessels during disaster relief operations.

In addition, ICAO requires, inter alia, that satellite systems supporting aeronautical satellite safety communications (aeronautical mobile-satellite (route) service), must comply with priority requirements contained in ICAO Standards and Recommended Practices (SARPs). Therefore, if a system which already carries such communications were to be approved by the International Maritime Organization and identified to carry GMDSS, any resultant changes to the Radio Regulations should not adversely impact that, or other, system's SARPs compliance.

ICAO Position

To ensure that any change to the regulatory provisions and spectrum allocations resulting from this agenda item do not adversely impact on the capability of search and rescue aircraft, including helicopters, to effectively communicate with vessels during disaster-relief operations.

With respect to Resolution **361 (Rev.WRC-19)**, resolves 3, to ensure that any regulatory provisions in response to this agenda item do not adversely affect the compliance of aeronautical mobile-satellite (route) service systems in the frequency band 1 610-1 626.5 MHz with international standards and recommended practices and procedures established in accordance with the Convention on International Civil Aviation.

WRC-23 agenda item 1.13

Agenda item title

1.13 *to consider a possible upgrade of the allocation of the frequency band 14.8-15.35 GHz to the space research service, in accordance with Resolution 661 (WRC-19);*

Discussion

Under this agenda item, the following studies are to be conducted:

- a) to investigate and identify all relevant scenarios between data relay satellites, non-geostationary satellites and manned flights in the space research service operating in the frequency band 14.8-15.35 GHz, to investigate and identify all relevant scenarios that need to be considered in compatibility and sharing studies, taking into account the latest relevant ITU Radiocommunication Sector (ITU-R) Recommendations;
- b) to conduct and complete in time for WRC-23 sharing and compatibility studies in order to determine the feasibility of upgrading the SRS allocation to primary status in the frequency band 14.8-15.35 GHz, with a view to ensuring protection of the primary services;
- c) to determine the technical and regulatory conditions according to the results of the studies necessary to ensure b) above.

Currently, the frequency band 14.8-15.35 GHz is allocated to the generic mobile and fixed services on a primary basis. According to Recommendations ITU-R M.2089 mentioned in *noting a)* of Resolution **661 (WRC-19)**, systems operating in the aeronautical mobile service in the frequency range 14.5-15.35 GHz are used by airborne data links to support remote sensing applications on board either manned or unmanned aircraft. In addition, in some States systems operating under the fixed service allocation are used to support air traffic operations. Neither of these applications use ICAO standardized systems.

ICAO Position

To ensure that any radio regulatory action taken as a result of agreed studies does not adversely affect the provision of aeronautical services.

WRC-23 agenda item 1.15

Agenda item title

1.15 *to harmonize the use of the frequency band 12.75-13.25 GHz (Earth-to-space) by earth stations on aircraft and vessels communicating with geostationary space stations in the fixed-satellite service globally, in accordance with Resolution 172 (WRC-19);*

Discussion

This agenda item seeks to harmonize the use of the frequency band 12.75-13.25 GHz (Earth-to-space) by earth stations on board an aircraft or vessel communicating with geostationary space stations in the fixed satellite service operating in accordance with the provisions of RR Appendix **30B** (No. **5.441**). It resolves that such earth stations shall not be used or relied upon for safety-of-life applications nor result in changes or restrictions to existing Plan allotments and List assignments made under RR Appendix **30B**.

Resolution **172 (WRC-19)** calls for studies to:

- Identify the technical and operational characteristics and user requirements of earth stations on aircraft and vessels that communicate or plan to communicate with geostationary (GSO) space stations in the FSS in the frequency band 12.75-13.25 GHz (Earth-to-space) under the envelope of RR Appendix **30B** Article 6 recorded in the List or the Master International Frequency Register (MIFR) with favourable finding only;
- address the sharing and compatibility issues between earth stations on aircraft and vessels communicating with GSO space stations in the fixed satellite service with current and planned stations of existing services as well as services in adjacent frequency bands;
- to study the responsibility of the entities involved in the operation of the earth stations on aircraft and vessels;
- to develop the criteria to ensure that earth stations on aircraft and vessels, as a new FSS application in this frequency band, shall not claim more protection nor cause more interference than filed earth stations in RR Appendix **30B**.

Once consensus has been reached on those studies the Resolution calls on the ITU-R to develop technical conditions and regulatory provisions for the harmonised operation of earth stations on aircraft and vessels communicating with GSO space stations in the FSS operating in the frequency band 12.75-13.25 GHz (Earth-to-space). Those technical conditions and regulatory provisions shall ensure the protection of and not impose undue constraints on, the existing services in that frequency band. Additionally, they shall not adversely affect the criteria contained in Annex 4 to RR Appendix **30B** including the cumulative effect of multiple earth stations on aircraft and vessels nor limit access of other administrations to their national resources in RR Appendix **30B**.

WRC-23 should then consider the relevant regulatory action necessary based on the work, as detailed above, undertaken during this study period whilst ensuring that any action taken does not result in any additional status than that of the GSO satellite networks with which these stations are communicating.

The introduction of earth station in motion operations into a frequency band that is subject to RR Appendix **30B** restrictions could provide a welcome additional capacity for non-safety passenger/payload communication. Additionally, given the restriction that such use shall not be or relied upon for safety-of-life communication this agenda item should not adversely affect the provision of aeronautical safety service.

However, how this agenda item develops needs to be monitored to ensure that modifications are not introduced that change that expectation.

See also WRC-23 agenda item 1.16.

ICAO Position

To ensure that any radio regulatory action, taken as a result of this agenda item, does not adversely affect the provision of aeronautical safety-of-life services.

WRC-23 agenda item 1.16

Agenda item title

1.16 *to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by non-geostationary fixed-satellite service earth stations in motion, while ensuring due protection of existing services in those frequency bands, in accordance with Resolution 173 (WRC-19);*

Discussion

This agenda item seeks to extend the concept of earth stations in motion (ESIMs) communicating with geostationary space stations, to operation of ESIMs with non-geostationary space stations in the fixed-satellite service (FSS) to the 17.7-18.6 GHz, 18.8-19.3 GHz, 19.7-20.2 GHz (space-to-Earth), 27.5-29.1 GHz and 29.5-30 GHz frequency bands.

Resolution **173 (WRC-19)** calls for studies to:

- identify the technical and operational characteristics and user requirements of the different types of ESIMs that plan to operate within non-geostationary (non-GSO) satellite systems operating in the FSS in the frequency bands or parts thereof identified;
- address the sharing and compatibility between ESIMs communicating with non-GSO FSS systems and current & planned stations of primary services allocated in the frequency bands identified as well as in the adjacent frequency bands.

The Resolution also calls on the ITU-R to develop technical conditions and regulatory provisions for the operation of aeronautical and maritime ESIMs communicating with non-GSO space stations operating in the FSS in the frequency bands identified. Those technical conditions and regulatory provisions shall ensure the protection of and not impose additional constraints on the existing services in the frequency bands identified.

ITU-R should also consider the relevant regulatory action necessary based on the work, as detailed above, undertaken during this study period.

It should be noted that the frequency bands 19.7-20.2 GHz and 29.5-30.0 GHz are identified within Resolution **155 (Rev.WRC-19)** for the provision of unmanned aircraft systems (UAS) control and non-payload communication (CNPC). However, both Resolution **156 (WRC-15)** that regulates the use of these frequency bands for ESIMs communicating to GSO satellites and Resolution **173 (WRC-19)** that seeks to facilitate the use of ESIMs communicating to non-GSO satellites in these frequency bands preclude the use of the relevant ESIMs from being used or relied upon for safety-of-life applications. The implications of any proposed amendment under WRC-23 agenda item 1.16 to the Radio Regulations need to be assessed and action taken if they:

- could adversely affect the provision of UAS CNPC under Resolution **155 (Rev.WRC-19)**;
- do not make a clear regulatory distinction between satellite networks or satellite network resources providing UAS CNPC and those providing non-safety ESIMs applications such that it does not set a precedent that could adversely affect the provision of aeronautical safety-of-life services.

See also WRC-23 agenda items 1.8, 1.15 and 1.17.

ICAO Position

To ensure that any radio regulatory action taken as a result of this agenda item:

- do not adversely affect the provision of UAS CNPC under Resolution **155 (Rev.WRC-19)**;
- make a clear regulatory distinction between satellite networks or satellite network resources providing UAS CNPC and those providing non-safety ESIMs applications such that it does not set a precedent that could adversely affect the provision of aeronautical safety-of-life services.

WRC-23 agenda item 1.17

Agenda item title

1.17 *to determine and carry out, on the basis of ITU-R studies in accordance with Resolution 773 (WRC-19), the appropriate regulatory actions for the provision of inter-satellite links in specific frequency bands, or portions thereof, by adding an inter-satellite service allocation where appropriate;*

Discussion

Inter-satellite links have traditionally been used to relay communication between space stations, normally situated on non-geostationary satellites, and an earth station where direct communication is impeded for some reason such as being beyond visual line of sight. With the planned expansion in the use of low earth orbit satellites the demand for inter-satellite links and associated spectrum is also increasing. This agenda item seeks to develop the technical conditions and regulatory provisions, including potential new allocations to the inter-satellite service, by which the different types of space station can operate inter-satellite links in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz.

Resolution **773 (WRC-19)** calls for studies to:

- identify the technical and operational characteristics, including spectrum requirements, for transmissions between space stations in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz;
- address the sharing and compatibility between satellite-to-satellite links intending to operate between space stations in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz and current and planned stations of the FSS and other existing services allocated in same frequency bands and adjacent frequency bands,

Based on those studies the Resolution calls on the ITU-R to develop, for different types of space stations, the technical conditions and regulatory provisions for satellite-to-satellite operations, including potential new inter-satellite service allocations, in the frequency bands identified.

WRC-23 should then consider the relevant regulatory action necessary based on the work, as detailed above, undertaken during this study period whilst ensuring the protection of the fixed and mobile services allocated on a primary basis within the identified frequency bands.

It should be noted that the frequency bands 19.7-20.2 GHz and 29.5-30.0 GHz are identified within Resolution **155 (Rev.WRC-19)** for the provision of unmanned aircraft systems (UAS) control and non-payload communication (CNPC). It is therefore important that the implications of any proposed amendment under WRC-23 agenda item 1.17 to the Radio Regulations are assessed and action taken if they could adversely affect the provision of UAS CNPC under Resolution **155 (Rev.WRC-19)**,

See also WRC-23 agenda items 1.8 and 1.16.

ICAO Position

To ensure that, given the overlap in frequency bands, any radio regulatory action taken as a result of this agenda item does not adversely affect the protection of the GSO stations in the frequency bands listed in Resolution **155 (Rev.WRC-19)**.

WRC-23 agenda item 4

Agenda item title

4 *in accordance with Resolution 95 (Rev.WRC-19), to review the Resolutions and Recommendations of previous conferences with a view to their possible revision, replacement or abrogation;*

ICAO Position

Resolutions:

Resolution No.	Title	Action recommended
18 (Rev.WRC-15)	Relating to the procedure for identifying and announcing the position of ships and aircraft of States not parties to an armed conflict.	No change
20 (Rev.WRC-03)	Technical cooperation with developing countries in the field of aeronautical telecommunications.	No change
26 (Rev.WRC-19)	Footnotes to the Table of Frequency Allocations in Article 5 of the Radio Regulations.	No change
27 (Rev.WRC-19)	Use of incorporation by reference in the Radio Regulations.	No change
63 (Rev.WRC-12)	Protection of radiocommunication services against interference caused by radiation from industrial, scientific and medical (ISM) equipment.	No change
76 (Rev.WRC-15)	Protection of geostationary fixed-satellite service and geostationary broadcasting-satellite service networks from the maximum aggregate equivalent power flux-density produced by multiple non-geostationary fixed-satellite service systems in frequency bands where equivalent power flux-density limits have been adopted.	No change
95 (Rev.WRC-19)	General review of the resolutions and recommendations of world administrative radio conferences and world radiocommunication conferences.	No change
114 (Rev.WRC-15)	Studies on compatibility between new systems of the aeronautical radionavigation service and the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite systems in the mobile-satellite service) in the frequency band 5 091-5 150 MHz.	No change

Resolution No.	Title	Action recommended
140 (<i>Rev.WRC-15</i>)	Measures and studies associated with the equivalent power flux-density (epfd) limits in the band 19.7-20.2 GHz.	No change
154 (<i>WRC-15</i>)	Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400-4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1.	No change
155 (<i>Rev.WRC-19</i>)	Regulatory provisions related to earth stations on board unmanned aircraft which operate with geostationary-satellite networks in the fixed-satellite service in certain frequency bands not subject to a plan of Appendices 30 , 30A and 30B for the control and non-payload communications of unmanned aircraft systems in non-segregated airspaces.	Subject to WRC-23 agenda item 1.8.
156 (<i>WRC-15</i>)	Use of the frequency bands 19.7-20.2 GHz and 29.5-30.0 GHz by earth stations in motion communicating with geostationary space stations in the fixed-satellite service	Modify if necessary to ensure clear distinction between ESIMs providing non-safety applications and unmanned aircraft control and non-payload communication covered in Resolution
160 (<i>WRC-15</i>)	Facilitating access to broadband applications delivered by high-altitude platform stations.	Suppress based on the results of studies carried out under WRC-19 agenda item 1.14.
165 (<i>WRC-19</i>)	Use of the frequency band 21.4-22 GHz by high-altitude platform stations in the fixed service in Region 2	No change
166 (<i>WRC-19</i>)	Use of the frequency band 24.25-27.5 GHz by high-altitude platform stations in the fixed service in Region 2	No change

6.6C-33

Resolution No.	Title	Action recommended
167 (WRC-19)	Use of the frequency band 31-31.3 GHz by high-altitude platform stations in the fixed service	No change
168(WRC-19)	Use of the frequency band 38-39.5 GHz by high-altitude platform stations in the fixed service	No change
171 (WRC-19)	Review and possible revision of Resolution 155 (Rev.WRC-19) and No. 5.484B in the frequency bands to which they apply	Subject to WRC-23 agenda item 1.8.
172 (WRC-19)	Operation of earth stations on aircraft and vessels communicating with geostationary space stations in the fixed-satellite service in the frequency band 12.75-13.25 GHz (Earth-to-space)	Subject to WRC-23 agenda item 1.15.
173 (WRC-19)	Use of the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by earth stations in motion communicating with non-geostationary space stations in the fixed-satellite service	Subject to WRC-23 agenda item 1.16.
176 (WRC-19)	Use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by aeronautical and maritime earth stations in motion communicating with geostationary space stations in the fixed-satellite service	Modify or suppress as necessary based on the results of studies carried out (preliminary WRC-27 agenda item 2.2).
205 (Rev.WRC-19)	Protection of the systems operating in the mobile satellite service in the band 406-406.1 MHz.	No change
207 (Rev.WRC-15)	Measures to address unauthorized use of and interference to frequencies in the bands allocated to the maritime mobile service and to the aeronautical mobile (R) service.	No change
217 (WRC-97)	Implementation of wind profiler radars.	No change
222 (Rev.WRC-12)	Use of the frequency bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite service, and procedures to ensure long-term spectrum access for the aeronautical mobile-satellite (R) service.	No change

Resolution No.	Title	Action recommended
223 (Rev WRC-19)	Additional frequency bands identified for International Mobile Telecommunications	Modify, retain, or suppress, <i>invites the ITU Radiocommunications Sector 1</i> to Resolution 223 , as appropriate, reflecting the need for continued studies, based on the results of the studies called for by that provision.
225 (Rev.WRC-12)	Use of additional frequency bands for the satellite component of IMT.	No change
229 (Rev.WRC-19)	Use of the frequency bands 5 150-5 250 MHz, 5 250-5 350 MHz and 5 470-5 725 MHz by the mobile service for the implementation of wireless access systems including radio local area networks	No change
240 (WRC-19)	Spectrum harmonization for railway radiocommunication systems between train and trackside within the existing mobile-service allocations.	Monitor studies and ensure protection of aeronautical systems.
245 (WRC-19)	Studies on frequency-related matters for the terrestrial component of International Mobile Telecommunications identification in the frequency bands 3 300-3 400 MHz, 3 600-3 800 MHz, 6 425-7 025 MHz, 7 025-7 125 MHz and 10.0-10.5 GHz	Subject to WRC-23 agenda item 1.2.
246 (WRC-19)	Studies to consider possible allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis within Region 1	Subject to WRC-23 agenda item 1.3.
247 (WRC-19)	Facilitating mobile connectivity in certain frequency bands below 2.7 GHz using high-altitude platform stations as International Mobile Telecommunications base stations	Subject to WRC-23 agenda item 1.4.

6.6C-35

Resolution No.	Title	Action recommended
249 (WRC-19)	Study of technical and operational issues and regulatory provisions for space-to-space transmissions in the Earth-to-space direction in the frequency bands [1 610-1 645.5 and 1 646.5-1 660.5 MHz] and the space-to-Earth direction in the frequency bands [1 525-1 544 MHz], [1 545-1 559 MHz], [1 613.8-1 626.5 MHz] and [2 483.5-2 500 MHz] among non-geostationary and geostationary satellites operating in the mobile-satellite service	Modify or suppress as necessary based on the results of studies carried out for WRC-27 (preliminary WRC-27 agenda item 2.8)
250 (WRC-19)	Studies on possible allocations to the land mobile service (excluding International Mobile Telecommunications) in the frequency band 1 300-1 350 MHz for use by administrations for the future development of terrestrial mobile-service applications	Modify or suppress as necessary based on the results of studies carried out for WRC-27 (preliminary WRC-27 agenda item 2.9)
251 (WRC-19)	Removal of the limitation regarding aeronautical mobile in the frequency range 694-960 MHz for the use of International Mobile Telecommunications user equipment by non-safety applications	Modify or suppress as necessary based on the results of studies carried out for WRC-27 (preliminary WRC-27 agenda item 2.12)
339 (Rev.WRC-07)	Coordination of NAVTEX services.	No change
354 (WRC-07)	Distress and safety radiotelephony procedures for 2 182 kHz.	No change
356 (WRC-07)	ITU maritime service information registration.	No change
361 (Rev.WRC-19)	Consideration of regulatory provisions for modernization of the global maritime distress and safety system and related to the implementation of e-navigation.	Subject to WRC-23 agenda item 1.11.
405 (Geneva 1979)	Relating to the use of frequencies of the aeronautical mobile (R) service.	Subject to WRC-23 agenda item 1.9.
413 (Rev.WRC-12)	Use of the band 108-117.975 MHz by aeronautical service.	No change
417 (Rev.WRC-12)	Use of the frequency band 960-1 164 MHz by the aeronautical mobile (R) service.	No change

Resolution No.	Title	Action recommended
418 (Rev.WRC-15)	Use of the band 5 091-5 250 MHz by the aeronautical mobile service for telemetry applications.	No change
422 (WRC-12)	Development of methodology to calculate aeronautical mobile-satellite (R) service spectrum requirements within the frequency bands 1 545-1 555 MHz (space-to-Earth) and 1 646.5-1 656.5 MHz (Earth-to-space).	Suppress as a result of the approval of Recommendation ITU-R M.2091.
424 (WRC-15)	Use of wireless avionics intra-communications in the frequency band 4 200-4 400 MHz.	No change
425 (Rev.WRC-19)	Use of the frequency band 1 087.7-1 092.3 MHz by the aeronautical mobile-satellite (R) service (Earth-to-space) to facilitate global flight tracking for civil aviation.	No change
428 (WRC-19)	Studies on a possible new allocation to the aeronautical mobile-satellite (R) service within the frequency band 117.975-137 MHz in order to support aeronautical VHF communications in the Earth-to-space and space-to-Earth directions	Subject to WRC-23 agenda item 1.7.
429 (WRC-19)	Consideration of regulatory provisions for updating Appendix 27 of the Radio Regulations in support of aeronautical HF modernization	Subject to WRC-23 agenda item 1.9.
430 (WRC-19)	Studies on frequency-related matters, including possible additional allocations, for the possible introduction of new non-safety aeronautical mobile applications	Subject to WRC-23 agenda item 1.10.
608 (Rev.WRC-19)	Use of the frequency band 1 215-1 300 MHz by systems of the radionavigation satellite service.	No change
609 (Rev.WRC-07)	Protection of aeronautical radionavigation systems from the equivalent power flux-density produced by radionavigation satellite service networks and systems in the 1 164-1 215 MHz band.	No change
610 (Rev.WRC-19)	Coordination and bilateral resolution of technical compatibility issues for radionavigation satellite networks and systems in the band 1 164-1 300 MHz, 1 559-1 610 MHz and 5 010-5 030 MHz.	No change

6.6C-37

Resolution No.	Title	Action recommended
612 (Rev.WRC-12)	Use of the radiolocation service between 3 and 50 MHz to support oceanographic radar operations.	No change
660 (WRC-19)	Use of the frequency band 137-138 MHz by non-geostationary satellites with short-duration missions in the space operation service.	No change
661 (WRC-19)	Examination of a possible upgrade to primary status of the secondary allocation to the space research service in the frequency band 14.8-15.35 GHz	Subject to WRC-23 agenda item 1.13.
705 (Rev.WRC-15)	Mutual protection of radio services operating in the band 70-130 kHz.	No change
729 (Rev.WRC-07)	Use of frequency adaptive systems in the MF and HF bands.	No change
748 (Rev.WRC-19)	Compatibility between the aeronautical mobile (R) service and the fixed satellite service (Earth-to-space) in the band 5 091-5 150 MHz.	No change
762 (WRC-15)	Application of power flux density criteria to assess the potential for harmful interference under No. 11.32A for fixed-satellite and broadcasting-satellite service networks in the 6 GHz and 10/11/12/14 GHz bands not subject to a plan.	No change
772 (WRC-19)	Consideration of regulatory provisions to facilitate the introduction of sub-orbital vehicles.	Subject to WRC-23 agenda item 1.6.
773 (WRC-19)	Study of technical and operational issues and regulatory provisions for satellite-to-satellite links in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8 20.2 GHz and 27.5-30 GHz	Subject to WRC-23 agenda item 1.17.
774 (WRC-19)	Studies on technical and operational measures to be applied in the frequency band 1 240-1 300 MHz to ensure the protection of the radionavigation-satellite service (space-to-Earth)	Subject to WRC-23 agenda item 9.1 topic b).

Recommendations:

Recommendation No.	Title	Action recommended
7 (<i>Rev.WRC-97</i>)	Adoption of standard forms for ship station and ship earth station licences and aircraft station and aircraft earth station licences.	No change
9	Relating to the measures to be taken to prevent the operation of broadcasting stations on board ships or aircraft outside national territories.	No change
71	Relating to the standardization of the technical and operational characteristics of radio equipment.	No change
75 (<i>Rev.WRC-15</i>)	Study of the boundary between the out-of-band and spurious domains of primary radars using magnetrons.	No change
401	Relating to the efficient use of aeronautical mobile (R) worldwide frequencies.	No change
608 (<i>Rev.WRC-07</i>)	Guidelines for consultation meetings established in Resolution 609 (WRC-07) .	No change

WRC-23 agenda item 8

Agenda item title

8 to consider and take appropriate action on requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, taking into account Resolution 26 (Rev.WRC-19);

Discussion

Allocations to the aeronautical services are generally made for all ITU regions and normally on an exclusive basis. These principles reflect the global process of standardization within ICAO for the promotion of safety and to support the global interoperability of radiocommunication and radionavigation equipment used in civil aircraft. In some instances, however, footnotes to the ITU Table of Frequency Allocations allocate spectrum in one or more countries to other radio services in addition or alternatively to the aeronautical service to which the same spectrum is allocated in the body of the table.

The use of country footnote allocations to non-aeronautical services in aeronautical bands is generally not recommended by ICAO, on safety grounds, as such use may result in harmful interference to safety services. Furthermore, this practice generally leads to an inefficient use of available spectrum to aeronautical services, particularly when the radio systems sharing the band have differing technical characteristics. It also may result in undesirable (sub-) regional variations with respect to the technical conditions under which the aeronautical allocations can be used. This can have a serious impact on the safety of aviation.

The following footnotes in aeronautical bands should be carefully reviewed by administrations in order to preserve the safety and efficiency of aeronautical services for the reasons as discussed below:

- a) In the frequency bands used for the ICAO instrument landing system (ILS), (marker beacons 74.8-75.2 MHz; localizer 108-112 MHz and glide path 328.6-335.4 MHz) and the VHF omnidirectional radio range system (VOR); 108-117.975 MHz, RR Nos. **5.181**, **5.197** and **5.259** allow for the introduction of the mobile service on a secondary basis and subject to agreement obtained under No. **9.21** of the Radio Regulations when these bands are no longer required for the aeronautical radionavigation service. The use of both ILS and VOR is expected to continue. In addition, WRC-03, as amended by WRC-07, has introduced RR No. **5.197A** stipulating that the band 108-117.975 MHz is also allocated on a primary basis to the aeronautical mobile (R) service (AM(R)S), limited to systems operating in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **413 (Rev.WRC-12)**. The use of the band 108-112 MHz by the AM(R)S shall be limited to systems composed of ground-based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards. ICAO encourages administrations listed in RR Nos. **5.181**, **5.197** and **5.259** to review their use and if no longer required, to remove their country's name from these footnotes.
- b) RR Nos. **5.201** and **5.202** allocate the frequency bands 132-136 MHz and 136-137 MHz in some States to the aeronautical mobile (off-route) service (AM(OR)S). Since these frequency bands are heavily utilized for ICAO-standard VHF voice and data communications, ICAO encourages those concerned administrations to review their use and if no longer required, to remove their country's name from these footnotes.

- c) In the frequency band 1 215-1 300 MHz, which is used by civil aviation for the provision of radionavigation services through RR No. **5.331**. RR footnote No. **5.330** allocates the band in a number of countries to the fixed and mobile service. Given the receiver sensitivity of aeronautical uses of the frequency band, ICAO does not support the continued inclusion of an additional service through country footnotes. ICAO would therefore encourage administrations to review their use and if no longer required, to remove their country's name from RR No. **5.330**.
- d) In the frequency band 1 525-1 530 MHz, which is used by civil aviation for the provision of satellite services RR No. **5.352A** specifies that stations in the mobile-satellite service, except stations in the maritime mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed service in a number of countries that were notified prior to 1 April 1998. As of August 2020, the ITU Master International Frequency Register shows out of 20 administrations listed in this footnote, only 4 Administrations have fixed stations notified prior to 1 April 1998. ICAO would therefore encourage Administrations listed in the footnote to review their use of fixed service assignments in 1 525-1 530 MHz, and if no longer required, to remove their country's name from RR No. **5.352A**.
- e) In the frequency bands 1 540-1 559 MHz, 1 610.6-1 613.8 MHz and 1 613.8-1 626.5 MHz, within which some portions are assigned to or used by the aeronautical mobile-satellite (R) service, RR No. **5.355** also allocates the band on a secondary basis to the fixed service in a number of countries. Given that portions of these bands are utilized by a safety-of-life service, ICAO does not support the continued use of RR No. **5.355** country footnote. ICAO encourages those concerned administrations to review their use and if no longer required, to remove their country's name from RR No. **5.355**.
- f) In the frequency bands 1 550-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz which are assigned to mobile-satellite services, including in some portions assignment to or use by the aeronautical mobile-satellite (R) service, RR No. **5.359** also allocates the bands to the fixed service on a primary basis in a number of countries. Given that portions of these bands are utilized by a safety-of-life service, ICAO does not support the continued use of RR No. **5.359** country footnote. ICAO would therefore encourage those concerned administrations to review their use and if no longer required, to remove their country's name from No. **5.359**.
- g) In the frequency band 4 200-4 400 MHz, which is reserved for use by airborne radio altimeters and wireless avionics intra-communications (WAIC), RR No. **5.439** allows the operation of the fixed service on a secondary basis in some countries. Radio altimeters are a critical element in aircraft automatic landing systems and serve as a sensor in ground proximity warning systems. WAIC provides aircraft safety communications between points on an airframe. Interference from the fixed service has the potential to affect the safety of both of these systems. ICAO would therefore encourage those concerned administrations to review their use and if no longer required, to remove their country's name from RR No. **5.439**.

ICAO Position

To encourage administrations listed in the footnotes to review RR Nos. **5.181**, **5.197** and **5.259**, as access to the frequency bands 74.8-75.2, 108-112 and 328.6-335.4 MHz by the mobile service is difficult and could create the potential for harmful interference to important radionavigation systems used by aircraft at final approach and landing as well as systems operating in the aeronautical mobile service in the frequency band 108-112 MHz.

To encourage administrations listed in the footnotes to review RR Nos. **5.201** and **5.202**, as use by the AM(OR)S of the frequency bands 132-136 MHz and 136-137 MHz in some States may cause harmful interference to current and future aeronautical safety communications.

To encourage administrations listed in the footnote to review RR No. **5.330** as access to the frequency band 1 215-1 300 MHz by the fixed and mobile services could potentially cause harmful interference to services used to support aircraft operations.

To encourage administrations listed the footnote to review RR No. **5.352A** as access to the frequency bands 1 525-1 530 MHz by the fixed services could potentially constrain aeronautical use of this frequency band.

To encourage administrations listed in the footnote to review RR No. **5.355** as access to the frequency bands 1 540-1 559, 1 610.6-1 613.8 and 1 613.8-1 626.5 MHz by the fixed services could potentially constrain aeronautical use of these frequency bands.

To encourage administrations listed in the footnote to review RR No. **5.359** as access to the frequency bands 1 550-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz by the fixed services could potentially jeopardize aeronautical use of those frequency bands.

To encourage administrations listed in the footnote to review RR No. **5.439** to ensure the protection of the safety critical operation of radio altimeters and WAIC systems in the frequency band 4 200-4 400 MHz.

ICAO would encourage administrations to take appropriate actions under this agenda item to remove their country's name from these footnotes if no longer required.

Note 1.— Administrations indicated in the footnotes mentioned in the ICAO Position above which are urged to remove their country names from these footnotes are as follows:

No. 5.181 *Egypt, Israel and Syrian Arab Republic No.*

No. 5.197 *Syrian Arab Republic*

No. 5.201 *Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq (Republic of), Japan, Kazakhstan, Mali, Mongolia, Mozambique, Uzbekistan, Papua New Guinea, Poland, Kyrgyzstan, Romania, Senegal, Tajikistan, Turkmenistan and Ukraine*

No. 5.202 *Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bulgaria, the United Arab Emirates, the Russian Federation, Georgia, Iran (Islamic Republic of), Jordan, Mali, Oman, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Romania, Senegal, Tajikistan, Turkmenistan and Ukraine*

No. 5.259 *Egypt and Syrian Arab Republic*

No. 5.330 *Angola, Bahrain, Bangladesh, Cameroon, Chad, China, Djibouti, Egypt, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Nepal, Oman, Pakistan, the Philippines, Qatar, Saudi Arabia, Somalia, Sudan, South Sudan, the Syrian Arab Republic, Togo, the United Arab Emirates and Yemen*

No. 5.355 *Bahrain, Bangladesh, Congo (Rep of the), Djibouti, Egypt, Eritrea, Iraq, Israel, Kuwait, Qatar, Syrian Arab Republic, Somalia, Sudan, South Sudan, Chad, Togo and Yemen*

No. 5.352A *Algeria, Saudi Arabia, Egypt, Guinea, India, Israel, Italy, Jordan, Kuwait, Mali, Morocco, Mauritania, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Viet Nam and Yemen*

No. 5.359 *Germany, Saudi Arabia, Armenia, Azerbaijan, Belarus, Cameroon, the Russian Federation, Georgia, Guinea, Guinea-Bissau, Jordan, Kazakhstan, Kuwait, Lithuania, Mauritania, Uganda, Uzbekistan, Pakistan, Poland, the Syrian Arab Republic, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Tajikistan, Tunisia, Turkmenistan and Ukraine*

No. 5.439 *Iran (Islamic Republic of)*

WRC-23 agenda item 9.1

Agenda item title

9 **to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention;**

9.1 **on the activities of the Radiocommunication Sector since WRC-19:**

Note — The subdivision of WRC-23 agenda item 9.1 into topics, such as a), b), etc. was made at the first session of the Conference Preparatory Meeting for WRC-23 (CPM23-1) and is summarized in the BR Administrative Circular CA/251, 19th December 2019. In addition, a topic d) was added which was not part of Resolution 811 (WRC-19) (the WRC-23 agenda), however was agreed by WRC-19 (see WRC-19 Document 573 §§ 35.2 to 35.4).

Topic 9.1-a

In accordance with Resolution 657 (Rev.WRC-19), review the results of studies relating to the technical and operational characteristics, spectrum requirements and appropriate radio service designations for space weather sensors with a view to describing appropriate recognition and protection in the Radio Regulations without placing additional constraints on incumbent services;

Space weather observations from ground-based networks of space weather sensor systems are becoming more and more important for the detection of solar activity that can harmfully affect the operation of international civil aviation. Solar events, such as large solar flares and coronal mass ejections (CMEs), produce magnetic storms that can present serious aviation safety risks. These events can cause major disruptions to the communications, navigation, and surveillance (CNS) systems critical to the operation of aircraft electronic systems and the aeronautical systems necessary to the safe operation of the airspace.

Data from Space Weather Sensors are provided to space weather forecast and warning centers around the world for many applications. Space weather advisories for international air navigation are provided to aircraft operators for planning mitigations to any potential risks. These forecasts and warnings also allow operators of aeronautical systems the opportunity to put in place mitigations to protect their systems and services. The Sun is the primary source of space weather of interest for spectrum management of civil aviation CNS systems. In addition, there are experimental research activities and other users of space weather sensor data that are not used by aviation.

Currently, space weather sensor systems are deployed in some countries and operate over a very large frequency range of approximately 10 kHz – 10 GHz based on existing ITU-R Reports. While space weather sensors systems may operate in a variety of frequency bands, these may not be the same between different countries as there is not a harmonized approach to the use of space weather sensors worldwide.

Within the ITU, some space weather sensors have been reported to operate in frequency bands that are critical to aircraft aeronautical communications, navigation, and surveillance. There are also active systems that operate in frequency bands used by aviation safety services on a non-interference basis. Some systems may not be used by ICAO to serve the purpose of space weather observation for flight planning and forecasting purposes.

ICAO Position

To support continuation of ITU-R studies and support appropriate recognition in the Radio Regulations of space weather sensors, provided that space weather systems do not impact current or planned aeronautical systems or applications.

Topic 9.1-b

Review the amateur service and the amateur-satellite service allocations in the frequency band 1 240-1 300 MHz to determine if additional measures are required to ensure protection of the radionavigation-satellite service (space-to-Earth) operating in the same band in accordance with Resolution 774 (WRC-19);

The amateur service has a secondary allocation in the frequency band 1 240-1 300 MHz (known as the “23 cm band” by the amateur community) and is currently used for amateur voice, data and image transmission. The frequency band is also allocated on a primary basis to the following services:

- Table Allocation
 - Earth exploration-satellite (active)
 - Radiolocation
 - Radionavigation Satellite (space-to-Earth) (space-to-space)
 - Space research(active).
- Footnote Allocation within various countries
 - 5.330 Fixed
 - 5.330 Mobile
 - 5.331 Radionavigation.

In the frequency band 1 240-1 300 MHz radionavigation satellite service (RNSS) systems such as GLONASS, Galileo, Beidou & QZSS are either operational, or becoming operational in various parts of the world with the expectation of enhancing the accuracy, reliability and positional accuracy of the current systems as well as offering additional features. However, there have been confirmed reports of harmful interference to the RNSS being caused by amateur service systems. This agenda item seeks to identify additional technical and operational measures that could be implemented to improve the protection of those RNSS from amateur and amateur-satellite systems operating under the secondary allocations to the amateur and amateur-satellite service without removing those amateur allocations.

Within the frequency band 1 240-1 300 MHz aviation currently operates primary surveillance radars used in the provision of air traffic control services. Past research has indicated that RNSS systems such as those indicated above can cause harmful interference to radars. The concern is that action taken under this agenda item could adversely affect the provision of those primary radar services with a consequential impact on air traffic control.

ICAO Position

To ensure that any mitigation measures taken under this agenda item will not impact the protection of aeronautical radar systems operating under the existing aeronautical radionavigation or radiolocation service allocations.

WRC-23 agenda item 9.2

Agenda item title

9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the ITU Convention;

9.2 on any difficulties or inconsistencies encountered in the application of the Radio Regulations;¹

The relevant ITU-R working parties are invited to carry out the requested studies, indicated below, and to report the results of the studies to the Director of the Radiocommunication Bureau to be considered as the Director deems appropriate.

From Resolution **427 (WRC-19)** “Updating provisions related to aeronautical services in the Radio Regulations – *resolves to invite ITU-R states* “to study the Articles, limited to Chapters IV, V, VI and VIII of Volume I of the Radio Regulations and their associated Appendices, as appropriate, in order to identify outdated aeronautical provisions with respect to ICAO Standards and Recommended Practices and to develop examples of regulatory texts for updating these provisions, while ensuring that potential changes to such provisions will not impact any other systems or services operating in accordance with the Radio Regulations”. (Responsible Group: WP 5B).

ICAO Position

Any potential regulatory actions taken under this agenda item, should not affect current or planned aeronautical systems or applications.

¹ This agenda sub-item is strictly limited to the Report of the Director on any difficulties or inconsistencies encountered in the application of the Radio Regulations and the comments from administrations. Administrations are invited to inform the Director of the Radiocommunication Bureau of any difficulties or inconsistencies encountered in the Radio Regulations.

WRC-23 agenda item 10

Agenda item title

10 *to recommend to the Council items for inclusion in the agenda for the next WRC, and items for the preliminary agenda of future conferences, in accordance with Article 7 of the Convention and Resolution 804 (Rev.WRC-19)*

Discussion

Resolution **812 (WRC-19)** contains the preliminary agenda for the 2027 World Radiocommunication Conference (WRC-27). Section 2.9 resolves: “*to consider possible additional spectrum allocations to the mobile service in the frequency band 1 300-1 350 MHz to facilitate the future development of mobile-service applications, in accordance with Resolution 250 (WRC-19)*”.

The frequency band 1 300-1 350 MHz is used by multiple ICAO Member States for various types of long-range radar systems that measure range, bearing, and velocity of aircraft, and perform missions critical to safe and reliable air traffic control (ATC) as considered in Resolution **250 (WRC-19)**. These radar systems ensure the safe transportation of people and goods, encourage the flow of commerce, and provide for State air surveillance requirements. Long-range radars are operated in this frequency band due to the minimal atmospheric effects such as loss from rain and fog, and the low external background noise levels.

While Resolution **250 (WRC-19)** resolves to conduct sharing and compatibility studies to ensure protection of existing services to which the frequency band is allocated on a primary basis, the studies performed to date have not shown any potential for compatibility with the systems operated in this band. Furthermore, studies under WRC-15 agenda item 1.1 with IMT and the same incumbent radar systems demonstrated that co-frequency sharing was not possible. Therefore, there is significant concern for a new WRC-27 agenda item to add a Mobile Service allocation to the 1 300-1 350 MHz band that causes harmful interference to these incumbent radar systems and the potential for harm to public safety.

ICAO Position

To oppose a new agenda item for WRC-27 for an additional spectrum allocation to the mobile service in the frequency band 1 300-1 350 MHz.

APPENDIX 6.6D

AMC USER ACCREDITATION PROCEDURE FOR MID COM CENTERS

- All MID COM centers are considered as **External COM Operators** on AMC.
- The accreditation procedures found in Para (2.5.2) in ATS Messaging Management Manual (EUR Doc 021) are no longer applicable to MID COM centers.
- The MID AMC Team has developed new accreditation procedures for MID External COM Operators after MID AMC web application was withdrawn in April 2021 .
- Each MID COM Centre shall be allowed to designate one External COM Operator + two backup associated to its COM Centre.
- The External COM Centre should firstly register an account in the OneSky Online Extranet using the following link
:https://ext.eurocontrol.int/elsh/registerNewUserForApplication.do?eurocontrolresourceid=amc_users
- The External COM Centre request an account activation of the registered users by sending an email to MID AMC Team with a CC to the CNS Officer of the ICAO Middle East Regional Office including the full name, position, Organization and contact details
- The request is endorsed by the CNS Officer of the ICAO Regional Office & MID AMC Team.
- The MID AMC Team will add the new External COM operators in the Network inventory, Person & Contacts on Day 1 of the next AIRAC cycle (when the AMC entry phase is open).
- The MID AMC Team submit a request of account activation to EUROCONTROL who accepts the request;
- The External COM Centre is notified by the MID AMC team when the request is approved and the account is active.

MID Doc 006



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)**

**MID REGION GUIDANCE FOR THE IMPLEMENTATION OF
AIDC/OLDI**

**EDITION 2
MAY, 2023**

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontier or boundaries.

TABLE OF CONTENTS

1. Introduction:.....	5
2. Background and ASBU B0-FICE	6
3. ICAO General Assembly 38 WP-266:.....	Error! Bookmark not defined. 1
4. Details of the ATM systems to support implementation	13
5. Message Types – Phase 1.....	16
6. D – Message Types – Phase 2.....	24
7. Test objectives	296
8. Sample Test Scripts and Flight plans	27
9. Bilateral Agreement Template	418
10. Implementation Phases	47

RECORD OF AMENDMENTS

The following table records the history of the successive editions of the present document:

Edition Number	Edition Date	Description	Pages Affected
0.1	03 February 2014	Initial version	All
0.2	09 September 2014	CNS SG/6 update	All
1.0	26 November 2014	MSG/4 endorsement	All
1.1	June 2015	Deletion of the planning parts and change of title of the Document. MIDANPIRG/15 endorsement.	All
1.2	April 2019	Update the table - Details of the ATM systems to support Implementation Table	13-15
2.0	May 2023	Added Performance requirements and benefits, Training requirements, main Systems affected by OLDI implementation and mapping AIDC/OLDI messages sets Deleted Details of the ATM systems to support implementation table and Assembly WP	

1. INTRODUCTION

1.1 Seeking to ensure continuous Safety improvement and Air Navigation modernization, the International Civil Aviation Organization (ICAO) has developed the strategic systems approach termed Aviation System Block Upgrade (ASBU). The latter, defines programmatic and flexible global systems, allows all States to advance their Air Navigation capacities based on their specific operational requirements.

1.2 The ASBU approach has four Blocks, namely Block 0, Block 1, Block 2 and Block 3. Each block is further divided into Elements

1.3 Element AIDC is in FICE Thread Block 0 (FICE-B0/1). AIDC is introduced to improve coordination between air traffic service units (ATSUs) by using ATS inter-facility data communication (AIDC). The transfer of communication in a data link environment improves the efficiency of this process. The data link environment enhances capacity, efficiency, interoperability, safety and reduces cost.

1.4 The AIDC and the OLDI are tools to coordinate flight data between Air Traffic Service Units (ATSU) and both satisfies the requirements of basic coordination of flight notification, coordination and transfer of control.

1.5 Various items concerning MID Region Implementation of AIDC/OLDI have been detailed in this document.

2. BACKGROUND on ASBU FICE B0/1 (AIDC)

Module B0-FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration:

Summary	To improve coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by the ICAO <i>Manual of Air Traffic Services Data Link Applications</i> (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process particularly for oceanic ATSUs.	
Operating environment/ Phases of flight	All flight phases and all type of ATS units.	
Applicability considerations	Applicable to at least two area control centres (ACCs) dealing with en-route and/or terminal control area (TMA) airspace. A greater number of consecutive participating ACCs will increase the benefits.	

2.1 General

2.1.1 Flights which are being provided with air traffic services are transferred from one air traffic services (ATS) unit to the next in a manner designed to ensure safety. In order to accomplish this objective, it is a standard procedure that the passage of each flight across the boundary of the areas of responsibility of the two units is co-ordinated between them beforehand and that the control of the flight is transferred when it is at, or adjacent to, the said boundary.

2.1.2 Where it is carried out by telephone, the passing of data on individual flights as part of the coordination process is a major support task at ATS units, particularly at area control centres (ACCs). The operational use of connections between flight data processing systems (FDPSs) at ACCs replacing phone coordination (on-line data interchange (OLDI)) is already proven in several MID States.

2.1.3 This is now fully integrated into the ATS interfacility data communications (AIDC) messages in the *Procedures for Air Navigation Services — Air Traffic Management*, (PANS-ATM, Doc 4444) which describes the types of messages and their contents to be used for operational communications between ATS unit computer systems. This type of data transfer (AIDC) will be the basis for migration of data communications to the aeronautical telecommunication network (ATN).

2.1.4 The AIDC module is aimed at improving the flow of traffic by allowing neighboring air traffic services units to exchange flight data automatically in the form of coordination and transfer messages.

2.1.5 With the greater accuracy of messages based on the updated trajectory information contained in the system and where possible updated by surveillance data, controllers have more reliable information on the conditions at which aircraft will enter in their airspace of jurisdiction with a reduction of the workload associated to flight coordination and transfer. The increased accuracy and data integrity permits the safe application of reduced separations.

2.1.6 Combined with air-ground data link applications, AIDC also allows the transfer of aircraft logon information and the timely initiation of establishing controller-pilot data link communications (CPDLC) by the next air traffic control (ATC) unit with the aircraft.

2.1.7 These improvements outlined above translate directly into a combination of performance improvements.

2.1.8 Information exchanges between flight data processing systems are established between air traffic services units for the purpose of notification, coordination and transfer of flights and for the purpose of civil/military coordination. These information exchanges rely upon appropriate and harmonized communication protocols to secure their interoperability.

2.1.9 Information exchanges apply to:

- a) communication systems supporting the coordination procedures between air traffic services units using a peer-to-peer communication mechanism and providing services to general air traffic; and
- b) communication systems supporting the coordination procedures between air traffic services units and controlling military units, using a peer-to-peer communication mechanism.

Baseline

2.1.10 The baseline for this module is the traditional coordination by phone, and procedural and/or radar distance/time separations.

2.2 Intended Performance Operational Improvement

2.2.1 Metrics to determine the success of the Element are proposed in the *Manual on Global Performance of the Air Navigation System* (Doc 9883).

<i>Capacity</i>	Reduced controller workload and increased data integrity supporting reduced separations translating directly to cross sector or boundary capacity flow increases.
<i>Efficiency</i>	The reduced separation can also be used to more frequently offer aircraft flight levels closer to the flight optimum; in certain cases, this also translates into reduced en-route holding.
<i>Global interoperability</i>	Seamlessness: the use of standardized interfaces reduces the cost of development, allows air traffic controllers to apply the same procedures at the boundaries of all participating centres and border crossing becomes more transparent to flights.

<i>Safety</i>	Better knowledge of more accurate flight plan information.
<i>Cost Benefit Analysis</i>	Increase of throughput at ATS unit boundary and reduced ATCO workload will outweigh the cost of FDPS software changes. The business case is dependent on the environment.

2.3 Necessary Procedures (Air and Ground)

2.3.1 Required procedures exist. They need local analysis of the specific flows and should be spelled out in a Letter of Agreement between ATS units; the experience from other Regions can be a useful reference.

2.4 Necessary System Capability

Avionics

2.4.1 No specific airborne requirements.

Ground systems

2.4.2 Upgrade the ground system to support the composition, exchange and processing of messages set either AIDC or/and OLDI. Connectivity between ATSU systems through IP, AMHS, etc

2.4.3 The technology also includes for oceanic ATSUs a function supporting transfer of communication via data link.

2.5 Human Performance

Human Factors Considerations

2.5.1 Ground interoperability reduces voice exchange between ATCOs and decreases workload. A system supporting appropriate human-machine interface (HMI) for ATCOs is required.

2.5.2 Human factors have been taken into consideration during the development of the processes and procedures associated with this module. Where automation is to be used, the HMI has been considered from both a functional and ergonomic perspective (see Section 6 for examples). The possibility of latent failures, however, continues to exist and vigilance is required during all implementation activity. In addition it is important that human factor issues, identified during implementation, be reported to the international community through ICAO as part of any safety reporting initiative.

Training and Qualification Requirements

2.5.3 To make the most of the automation support, training in the operational standards and procedures will be required and can be found in the links to the documents in Section 8 to this module. Likewise, the qualifications requirements are identified in the regulatory requirements in Section 6 which are integral to the implementation of this module.

2.6 Regulatory/Standardization Needs and Approval Plan (Air and Ground)

- Regulatory/standardization: use current published criteria that include:
 - a) ICAO Doc 4444, *Procedures for Air Navigation Services — Air Traffic Management*;
 - b) EU Regulation, EC No 552/2004.
- CAA may need to amend the national regulatory provisions on the use of AIDC. References: PANS-ATM (ICAO Doc 4444) and Regional Interface Control (ICD) documents.
 - Apply Safety Management System in accordance with the national requirements and guidance.

2.7 Implementation and Demonstration Activities (As known at time of writing)

2.7.1

2.7.2 Current use

- **MID Region:** MIDANPIRG classified the implementation of AIDC connections in the MID Region into two priorities based on traffic volume and operational needs. Priority-one connections are mandated to be implemented as per the ATM-Specific requirements in the MID Air Navigation Plan, Volume II.

- **Europe:** It is mandatory for exchange between ATS units.
http://europa.eu/legislation_summaries/transport/air_transport/124070en.htm

The European Commission has issued a mandate on the interoperability of the European air traffic management network, concerning the coordination and transfer (COTR) between ATS units through REG EC 1032/2006 and the exchange of flight data between ATS units in support of air-ground data link through REG EC 30/2009. This is based on the standard OLDI-Ed 4.2 and ADEXP-Ed 3.1.

- **EUROCONTROL:** Specification of interoperability and performance requirements for the flight message transfer protocol (FMTP). The available set of messages to describe and negotiate consistent transfer conditions via electronic means across centres' boundaries have been used for trials in Europe in 2010 within the scope of EUROCONTROL's FASTI initiative.
- **India:** AIDC implementation is in progress in Indian airspace for improved coordination between ATC centres. Major Indian airports and ATC centres have integrated ATS automation systems having AIDC capability. AIDC functionality is operational between Mumbai and Chennai ACCs. AIDC will be implemented within India by 2012. AIDC trials are underway between Mumbai and Karachi (Pakistan) and are planned between India and Muscat in coordination with Oman.
- **AIDC:** is in use in the Asia-Pacific Region, Australia, New-Zealand, Indonesia and others.

2.7.3

2.8 Reference Documents

2.8.1 Standards

- ICAO Doc 4444, *Procedures for Air Navigation Services - Air Traffic Management*, Appendix 6 - *ATS Interfacility Data Communications (AIDC) Messages*.
- ICAO Doc 9880, *Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols*, Part II — *Ground-Ground Applications — Air Traffic Services Message Handling Services (ATSMHS)*.

2.8.3 Guidance material

- ICAO Doc 9694, *Manual of Air Traffic Services Data Link Applications*; Part 6;
- GOLD Global Operational Data Link Document (APANPIRG, NAT SPG), June 2010;
- Pan Regional Interface Control Document for Oceanic ATS Interfacility Data.

Communications (PAN ICD) Coordination Draft Version 0.3. 31 August 2010;

□ Asia/Pacific Regional Interface Control Document (ICD) for ATS Interfacility Data Communications (AIDC) available at http://www.bangkok.icao.int/edocs/icd_aidc_ver3.pdf, ICAO Asia/Pacific Regional Office.

□ EUROCONTROL Standard for On-Line Data Interchange (OLDI); and EUROCONTROL Standard for ATS Data Exchange Presentation (ADEXP).

2.9 Performance benefits

- The OLDI exchanges mean the provision / reception of ATC coordination and transfer data in an automated way replacing the verbal coordination and transfer.
- The benefits of these automated exchanges can be several folds as:
 - Substantial increase in **Capacity**, because of ATCO workload reduction compared with the conventional process without an automated support. If the phone coordination is replaced by an automated one, the ATCO workload is reduced providing a means to increase the sector entry rates and accept more traffic within the sector, increasing the ATCO productivity.
 - The implementation of OLDI basic and advance features led in many cases to 7-10 % increase of sector capacity figures, therefore OLDI is considered as one of main booster for capacity increase.
 - The automation of coordination and transfer exchanges will slightly improve **Safety** due to the automation and reduction of human errors induced by verbal coordination and transfer.
 - The **Operational Efficiency** will increase by enabling more efficient planning and operational decision making.

- The traffic **Predictability** will be slight improved as adjacent ATS units will share the same information about the flight, therefore it is less needed to add buffers. Knowing in advance where aircraft will be and at what time will allow capacity to match demand, reducing penalties.
- The benefits of OLDI come from having a method to share the operational flight data information between adjacent ATS units each time there is an update. The impacted ANSPs can use this up-to-date information to calculate their trajectory predictions. As these predictions will be more accurate, i.e. with a narrower range of uncertainty, there might be some improvements in the performance of conflict detection tools (MTCD).
- OLDI provides more dialogue functionalities and more flexibility in the way flights are exchanged across centres (e.g., SKIP functionality).

2.10 OLDI Performance requirements

2.10.1 Availability

- In principle, the OLDI facility needs be available 24 hours every day, but especially during the hours of normal and peak traffic flows between the two units concerned. Any scheduled down-time periods (and thus the planned availability time) needs be bilaterally agreed between the two units concerned.

2.10.2 Reliability

- Reliability on every OLDI link shall be at least 99.86 % (equivalent to a down-time of not more than 12 hours per year based on 24-hour availability).
- Where operationally justified, a reliability of at least 99.99% (equivalent to a down-time of not more than 52 minutes per year, based on 24 Hour availability) should be provided.

2.10.3 Data security / integrity

- Data security methods (e.g., access rights, source verification) and, where applicable, network management should be applied to OLDI facilities. The failure rate at application level shall be less than or equal to one transmission error per 2000 messages.

2.10.4 Operational evaluation

- Each new OLDI facility, including a new facility on an existing link, shall be subject to an evaluation period to verify the data integrity, accuracy, performance, compatibility with ATC procedures and overall safety prior to its operational implementation.
- 2.10.5 The OLDI transaction times specified include transmission, initial processing at the receiving / accepting unit, creation of the acknowledgement message, its transmission and reception at the transferring unit. The maximum transaction times for the OLDI messages in 90% of cases need to be below 4 seconds, while for 99,8% of cases should not below 10 seconds.
- If no acknowledgement has been received within the specified time after transmission, a message shall be considered to have been unsuccessfully transmitted or processed and a

warning output. The OLDI message response time in the generation and reception phases shall not exceed 2 seconds.

- A time-out value addresses the case of no reception of LAM. If no acknowledgement has been received within the specified time after transmission:
 - a message needs to be considered to have been **unsuccessfully transmitted or processed** and
 - a **warning output** as specified in the specification for each process.
- Usual time-out values are between 15-30 seconds, depending on bilateral agreements for the exchanges of OLDI messages.

2.11 Main systems affected by OLDI deployment

- OLDI exchanges might be used to support the coordination and transfer process with adjacent ACC / APP / TWR units within the same FIR or with cross-border enroute, approach and TWR ATS unit.
- The main affected system is the Flight Data Processing System (FDPS). The FDPS needs to be capable of performing OLDI communication with up to predefined number of external / internal co-ordination partners. The FDPS shall be capable of sending and receiving defined set of OLDI messages in ICAO/ADEXP format, including RVSM and 8.33khz fields.
- As an integral part of each system flight plan (SFPL), the FDPS needs to maintain a copy of all OLDI messages which have been correlated to the SFPL.
- The FDPS needs to be sufficiently flexible in the selection of items to be used in the sending of OLDI messages with an external ATS unit, per COP and next ATS Unit. The FDPS shall permit the configuration of messages and parameters as defined in the EUROCONTROL OLDI specification for coordination with each external partner and optionally per COP.

The system also needs to check the syntax and semantics of received OLDI messages and return LAM if the are OK. The received OLDI messages will be used to update the trajectory or trajectory elements of the concerned flight.

The exchanged OLDI messages need to be presented on the Controller Working Position (CWP) with an adequate interface (HMI). The OLDI messages need to be presented in the track label or different flight lists to support the inter-sector co-ordination and full OLDI / OLDI dialogue co-ordination. The OLDI data needs to be presented in the track label, extended track label and corresponding FP lists and co-ordination windows.

The CWP functionalities need to support the co-ordination with adjacent ATS units with OLDI links as well as co-ordination between ARS unit without OLDI. The CWP needs to indicate that the transmission of the OLDI message is in progress or has been successfully transmitted as appropriate. The HMI at ATC positions using OLDI needs to provide a warning if the OLDI facility is not available.

The CWP needs remind the operator to use the telephone in order to perform the co-ordination data exchange with adjacent ATS units when the following events happen:

- the LAM message does not arrive within the parameter time (time out), indicating that the other sector might not have received the OLDI message

- there is a general fault in the OLDI communication / application;
- OLDI message (REV) is not supported;
- Exceeding time parameters for OLDI messages exchanges (REV/RRV).

The FDPS / CWP needs to provide a mechanism by which an estimate can be rapidly entered for a flight for which automatic notification is not available (e.g., no OLDI link with upstream ATSU);

The ATC supervisor needs to monitor the availability of OLDI links;

- The Flight Data Assistant (FDA) positions need to be equipped with capability for reception and handling of incorrect OLDI messages, as well as handling of incoming and outgoing verbal coordination with adjacent ATS units not equipped with OLDI facilities (or failed OLDI link) and inserting verbal co-ordination data in the system

The reminder (part of ATC toolkit) for manual co-ordination is derived from the relevant Letters of Agreement (LoA) or Standard Operating Procedures (SOP). This reminder is used in case the OLDI functionality is not available. Additional reminders as change of frequency and potential co-ordination failure are also needed.

The OLDI links and functionality need to be monitored and controlled by Technical Monitoring and Control System (TMCS). LOF / NAN OLDI messages are used for air-ground data link applications. OLDI also affects the Recording and Reply System (RRS) as all OLDI messages entering / leaving the system need to be recorded.

2.11 Training requirements

The automated exchanges of transfer and co-ordination data have substantial impact on ATC procedures and ATCO working methods. Therefore, an adequate familiarisation training for ATCO needs to be ensured. This training could be part with the overall training for the introduction of a new system or could be handled as special refreshment training on OLDI topics.

The ATC Coordination and Transfer is part of the ATCO Common Core Content (CCC). Therefore, OLDI as a means to achieve the automation of this process needs to be carefully addressed. The Flight Data Assistant needs to be trained as well on the OLDI topics and how to handle the correction of wrong OLDI messages.

ATSEPs also need to be trained on how to maintain the equipment: OLDI communication facilities, flight data processing, OLDI front-end and any other equipment involved in reception / provision and handling of OLDI messages. Usually all these training session are organised by the System Manufacturers who got a contract for the provision of a new or the upgrade of a existing ATC system.

3. AIDC & OLDI Messages Mapping

- The initial mapping is contained in ICAO Manual 9694. The mapping in below table is more focused on OLDI and their AIDC equivalents.

OLDI Message	AIDC equivalent
ABI	Notify
ACT	CoordinateInitial
PAC	CoordinateInitial
RAP	CoordinateNegotiate
ACP	CoordinateAccept
RJC	CoordinateReject
REV	CoordinateUpdate
RRV	CoordinateUpdate
CDN	CoordinateUpdate also reply to CoordinateNegotiate
MAC	CoordinateCancel
SBY	CoordinateStandby
LAM	AppAccept
TIM	TransferInitiate
HOP	TransferConditionsProposal
MAS	TransferCommAssume

ROF	TransferRequest and TransferConditionsAccept
COF	TransferComm
SDM	GeneralExecData
TIP	No
RTI	No
SKC	No
SKO	No
RRQ	No
RLS	No
CRQ	No
CRP	No
INF	No
PNT	GeneralPoint
COD	No
AMA	No
LOF	No
NAN	No

BFD	No
CFD	No
TFD	No
XIN	No
XRQ	No
XAP	No
XCM	No
Not specifically addressed, but it is a part of processes supported by ACT / RAP. The reception of ACT / RAP or REV/RRV cause the update of flight trajectory	CoordinateReady
Not specifically addressed, but it is a part of processes supported by ACT / RAP. The reception of ACT / RAP or REV/RRV cause the update of flight trajectory	CoordinateCommit
Not specifically addressed, but it is a part of processes supported by RAP, RRV and RJC. If the coordination is rejected the previous agreed coordination remains in place	CoordinateRollback
Not supported, all OLDI fields are structured	FreetextEmergency

Not supported, all OLDI fields are structured	FreetextGeneral
Not specifically addressed, but it is a part of processes supported by COF, as transfer of control coincide with change of frequency	TransferControl
Not specifically addressed, but it is a part of processes supported by MAS, the assumption coincide with MAS	TransferControlAssume
No, very specific for AIDC	AppStatus
No, very specific for AIDC	AppError

4. MESSAGE TYPES – PHASE 1

These are the messages that were agreed to be used in ICAO MID Region:

I. Basic Procedure Messages

1. Advance Boundary Information	ABI
2. Activate	ACT
3. Revision	REV
4. Preliminary Activation	PAC
5. Abrogation of Co-ordination	MAC
6. SSR Code Assignment	COD
7. Arrival Management	AMA
8. Logical Acknowledgement Message	LAM
9. Information Message	INF

II. Advance Boundary Information ABI

1. Purpose of the ABI Message

The ABI message satisfies the following operational requirements:

- Provide for acquisition of missing flight plan data;
- Provide advance boundary information and revisions thereto for the next ATC unit;
- Update the basic flight plan data;
- Facilitate early correlation of radar tracks;
- Facilitate accurate short-term sector load assessment;
- Request the assignment of an SSR code from the unit to which the above notification is sent, if required.

The ABI is a notification message.

2. Message Contents

The ABI message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- SSR Mode and Code (if available);
- Departure Aerodrome;
- Estimate Data;
- Destination Aerodrome;
- Number and Type of Aircraft;
- Type of Flight;
- Equipment Capability and Status.

If bilaterally agreed, the ABI message shall contain any of the following items of data:

- Route;
- Other Flight Plan Data.

3. Example

- (ABIOMAE/OMSJ578-ABY464/A5476-VIDP-MAXMO/0032F100-OMSJ-9/A320/M-15/N0457F360 OBDAG LUN G333 TIGER/N0454F380 G452 RK G214 PG G665 ASVIB M561 MOBET/N0409F260 A419 DARAX -80/S-81/W/EQ Y/EQ U/NO R/EQ/A1B1C1D1L1O1S1)

III. Activate ACT

1. Purpose of the ABI Message

The ACT message satisfies the following operational requirements:

- Replace the verbal boundary estimate by transmitting automatically details of a flight from one ATC unit to the next prior to the transfer of control;
- Update the basic flight plan data in the receiving ATC unit with the most recent information;
- Facilitate distribution and display of flight plan data within the receiving ATC unit to the working positions involved;
- Enable display of correlation in the receiving ATC unit;
- Provide transfer conditions to the receiving ATC unit.

2. Message Contents

The ACT message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- SSR Mode and Code;
- Departure Aerodrome;
- Estimate Data;
- Destination Aerodrome;
- Number and Type of Aircraft;
- Type of Flight;
- Equipment Capability and Status.

If bilaterally agreed, the ACT message shall contain any of the following items of data:

- Route;
- Other Flight Plan Data;
- Actual Take-Off Time.

Note: The Actual Take-Off Time is normally used in the cases where the ACT follows a PAC message that included the Estimated Take-Off Time.

3. Example

- (ACTOMAE/OMSJ727-ABY604/A7306-HEBA-ALRAR/0130F110-OMSJ-9/A320/M-15/N0428F250 DCT NOZ A727 CVO/N0461F350 UL677 MENLI UN697 NWB W733 METSA UB411 ASH G669 TOKLU UP559 ASPAK/N0438F290 UP559 NALPO P559 ITGIB/N0409F230 P559 -80/S-81/W/EQ Y/EQ U/NO R/EQ/A1B1C1D1L1O1S1)

IV. Revision Message REV

1. Purpose of the REV Message

The REV message is used to transmit revisions to co-ordination data previously sent in an ACT message provided that the accepting unit does not change as a result of the modification.

2. Message Contents

The REV message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- Departure Aerodrome;
- Estimate Data and/or Co-ordination point;
- Destination Aerodrome;

Note: The Estimate Data contained in the REV has to include complete data in the Estimate Data field in order to eliminate any ambiguity regarding the transfer elements. If the ACT message included the supplementary flight level, the following REV message will include the supplementary flight level if still applicable.

The REV message shall contain the following items of data if they have changed:

- SSR Mode and Code;
- Equipment Capability and Status.

If bilaterally agreed, the REV message shall contain any of the following items of data, if they have changed:

- Route.

If bilaterally agreed, the REV message shall contain any of the following items of data:

- Message Reference.

3. Example

- (REVBC/P873-UAE4486-OMDB-TUMAK/2201F360-LERT-81/Y/NO U/EQ)

V. Preliminary Activation PAC

1. Purpose of the PAC Message

The PAC message satisfies the following operational requirements:

- Notification and pre-departure co-ordination of a flight where the time of flight from departure to the COP is less than that which would be required to comply with the agreed time parameters for ACT message transmission;
- Notification and pre-departure co-ordination of a flight by a local (aerodrome /approach control) unit to the next unit that will take control of the flight;
- Provide for acquisition of missing flight plan data in case of discrepancies in the initial distribution of flight plan data;
- Request the assignment of an SSR code from the unit to which the above notification/coordination is sent.

2. Message Contents

The PAC message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- SSR Mode and Code;
- Departure Aerodrome;
- Estimated Take-Off Time or Estimate Data;
- Destination Aerodrome;
- Number and Type of Aircraft;

A PAC message sent from a TMA control unit or an ACC shall contain the following items of data:

- Type of Flight;
- Equipment Capability and Status.

If bilaterally agreed, the PAC message shall contain any of the following items of data:

- Route;
- Other Flight Plan Data;
- Message Reference.

3. Example

- (PACOMSJ/OMAE292-SQC7365/A9999-OMSJ0020-WSSS-9/B744/H-15/N0505F310 DCT RIKET B525 LALDO B505 NADSO A777 VAXIM P307 PARAR N571 VIRAM/N0505F330 N571 LAGOG/M084F330 N571 IGOGU/M084F350 N571 GUNIP/N0500F350 R467 -80/S-81/W/EQ Y/EQ U/NO R/EQ/)

VI. Message for the Abrogation of Co-ordination MAC

1. Purpose of the MAC Message

A MAC message is used to indicate to the receiving unit that the co-ordination or notification previously effected for a flight is being abrogated. The MAC is not a replacement for a Cancellation (CNL) message, as defined by ICAO, and therefore, shall not be used to erase the basic flight plan data.

2. Message Contents

The MAC message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- Departure Aerodrome;
- Co-ordination point;
- Destination Aerodrome;

If bilaterally agreed, the MAC message shall contain any of the following items of data:

- Message Reference;
- Co-ordination Status and Reason

3. Example

- (MACAM/BC112 AM/BC105-HOZ3188-EHAM-NIK-LFPG-18/STA/INITFL)

VII. SSR Code Assignment Message COD

1. Purpose of the COD Message

The Originating Region Code Allocation Method (ORCAM) is provided to permit a flight to respond on the same code to successive units within a participating area. Unless code allocation is performed centrally, e.g. by an ACC, airports may need to be individually allocated a set of discrete SSR codes. Such allocations are very wasteful of codes.

The COD message satisfies the operational requirement for the issue of a Mode A SSR code by one Air Traffic Service Unit to another for a specified flight when requested. The COD message also satisfies the operational requirement to inform the transferring Air Traffic Service Unit of the next Mode A SSR code when the code assigned cannot be retained by the accepting Air Traffic Service Unit.

2. Message Contents

The COD message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- SSR Mode and Code;
- Departure Aerodrome;
- Destination Aerodrome;

If bilaterally agreed, the COD message shall contain any of the following items of data:

- Message Reference.

3. Example

- (CODOMAE/OMSJ720-ABY567/A3450-OMSJ-OAKB)

VIII. Arrival Management Message AMA

1. Purpose of the AMA Message

Arrival management requires the capability for an accepting unit to pass to the transferring unit information on the time that a flight is required to delay (lose) or gain in order to optimise the approach sequence.

The AMA message satisfies the following operational requirements in order to alleviate ATC workload in co-ordinating arriving flights:

- Provide the transferring ATC unit with the time that the flight is to delay/gain at the arrival management metering fix;
- Where procedures have been bilaterally agreed between the units concerned, provide the transferring ATC unit with a target time for the flight to be at the COP;
- When bilaterally agreed, provide the transferring unit with a speed advisory. The speed advisory needs to be communicated to the flight, prior to transfer.

2. Message Contents

The AMA message shall contain the following items of data:

- Message Type;
 - Message Number;
 - Aircraft Identification;
 - Departure Aerodrome;
 - Destination Aerodrome;
- and based on bilateral agreement, contain one or more of the following items of data:
- Metering Fix and Time over Metering Fix;
 - Total Time to Lose or Gain;
 - Time at COP;
 - Assigned speed;
 - Application point;
 - Route;
 - Arrival sequence number

Note: The item Route contains the requested routing

3. Example

- (AMAM/BN112-AZA354-LIRF-CLS/0956-LEMD-18/MFX/PRADO TOM/1022 TTL/12)

IX. Logical Acknowledgement Message LAM

1. Purpose of the LAM Message

The LAM is the means by which the receipt and safeguarding of a transmitted message is indicated to the sending unit by the receiving unit.

The LAM processing provides the ATC staff at the transferring unit with the following:

- A warning when no acknowledgement has been received;
- An indication that the message being acknowledged has been received, processed successfully, found free of errors, stored and, where relevant, is available for presentation to the appropriate working position(s).

2. Message Contents

The LAM message shall contain the following items of data:

- Message Type;
- Message Number;
- Message Reference.

3. Example

- (LAMOMSJ/OMAE939OMAE/OMSJ718)

X. Logical Acknowledgement Message LAM

1. The INF message is used to provide information on specific flights to agencies not directly involved in the coordination process between two successive ATC units on the route of flight.

The INF message may be used to provide copies of messages and to communicate agreed co-ordination conditions to such agencies following a dialogue between controllers. For this purpose INF messages may be generated by the systems at the transferring or accepting unit. The message may also be used to provide information in relation to any point on the route of flight to an agency. The format allows the communication of initial data, revisions and cancellations.

2. The INF message shall contain the following items of data:

- Message type;
- Message number;
- All items of operational data as contained in the original message or resultant
- co-ordination being copied;
- Reference Message Type.

6.3. Example

(INFL/IT112-BAW011/A5437-EGLL-KOK/1905F290-OMDB-9/B747/H-15/N0490F410 DVR
KOK UG1 NTM UB6 KRH-18/MSG/ACT)

The Pan Regional (NAT and APAC) Interface Control Document for ATS Interfacility Data Communications (PAN AIDC ICD) Version1.0 has defined the specific AIDC messages to be used between ATSUs should be included in bilateral agreements as in the below table which is number as table 4-3

AIDC Messages

Core	Non-core	Message Class	Message
X		Notification	ABI (Advance Boundary Information)
X		Coordination	CPL (Current Flight Plan)
X		Coordination	EST (Coordination Estimate)
	X	Coordination	PAC (Preliminary Activate)
X		Coordination	MAC (Coordination Cancellation)
X		Coordination	CDN (Coordination Negotiation)
X		Coordination	ACP (Acceptance)
X		Coordination	REJ (Rejection)
	X	Coordination	PCM (Profile Confirmation Message)
	X	Coordination	PCA (Profile Confirmation Acceptance)
	X	Coordination	TRU (Track Update)
X		Transfer of Control	TOC (Transfer of Control)
X		Transfer of Control	AOC (Acceptance of Control)
X		General Information	EMG (Emergency)
X		General Information	MIS (Miscellaneous)
X		Application Management	LAM (Logical Acknowledgement Message)
X		Application Management	LRM (Logical Rejection Message)
	X	Application Management	ASM (Application Status Monitor)
	X	Application Management	FAN (FANS Application Message)
	X	Application Management	FCN (FANS Completion Notification)
	X	Surveillance Data Transfer	ADS (Surveillance ADS-C)

5. D – MESSAGE TYPES – PHASE 2

The messages during this phase will be the advance messages covering all phases of flight

Intentionally left blank

6. TEST OBJECTIVES

Test Objectives		
No	Test step	Test Description
01	Connectivity between FDPs	Check connectivity between FDPs.
02	FPL Processing	Check FPLs are correctly received and processed.
Preliminary Activation Message (PAC)		
03	PAC Message association	Check PAC messages are correctly sent, received, processed and associated with the correct FPL. If the system is unable to process a message that is syntactically and semantically correct, it should be referred for Manual intervention.
04	Coordination of Changes to previous PAC message	Check changes to previous PAC messages such as Change in SSR code, Aircraft type, Coordination point, Flight level and Destination aerodrome are correctly sent, received and associated with the correct FPL.
Advance Boundary Information (ABI)		
05	ABI Message association	Check ABI messages are correctly sent, received, processed and associated with the correct FPL. If the system is unable to process a message that is syntactically and semantically correct, it should be referred for Manual intervention.
06	Coordination of Changes to previous ABI message	Check changes to previous ABI messages such as Change in SSR code, Aircraft type, Coordination point, Flight level and Destination aerodrome are correctly sent, received and associated with the correct FPL.
Activate (ACT)		
07	ACT Message association	Check ACT messages are correctly sent, received, processed and associated with the correct FPL. If the system is unable to process a message that is syntactically and semantically correct, it should be referred for Manual intervention.
Logical Acknowledgement Messages (LAM)		
08	LAM Message generation	Check LAM messages are generated for messages that are syntactically and semantically correct.
SSR Code Request Messages (COD)		
09	COD Message association	Check COD messages are sent with correct SSR Code, received, processed and associated with the correct FPL. If the system is unable to process a message that is syntactically and semantically correct, it should be referred for Manual intervention.

7. SAMPLE TEST SCRIPTS

NOTE: All the samples are provided by UAE

1. Test 001 Connectivity:

Test 001 – Connectivity				
No	Test description	UAE ACC FDPS	Doha FDPS	Remarks
01	Ping Doha FDPS from RDS FDPS	OK / Not OK	OK / Not OK	
02	Ping RDS FDPS from Doha FDPS	OK / Not OK	OK / Not OK	
03	Check the link	Log in as root in rds fdps Type in netstat -tnap, should show the link “established” OK / Not OK	Check the link “established” OK / Not OK	

2. Test 002 Flight plan:

Test 002 – Flight Plan – sent from UAE ACC				
No	Test description	UAE ACC FDPS	Doha FDPS	Remarks
01	Send TST001 (OMAA-OTBD)	OK / Not OK	OK / Not OK	
02	Send TST002 (OMAM-OTBH)	OK / Not OK	OK / Not OK	

03	Send TST003 (OMAA-OEJN)	OK / Not OK	OK / Not OK	
04	Send TST004 (OOMS – OTBD)	OK / Not OK	OK / Not OK	
05	Send TST005 (OTBD – OMDB)	OK / Not OK	OK / Not OK	
06	Send TST006 (OTBH – OMDM)	OK / Not OK	OK / Not OK	
07	Send TST007 (OEJN-OMAD)	OK / Not OK	OK / Not OK	
08	Send TST008 (OTBD – OOMS)	OK / Not OK	OK / Not OK	

3. Test 003 Preliminary Activation Message (PAC):

Test 003 – Preliminary Activation Message (PAC) Doha FDPS to UAE ACC FDPS				
No	Test description	UAE ACC FDPS	Doha FDPS	Remarks
01	Activate start up TST005 (OTBD – OMDB) SSR code:0001 RFL : FPL level	SFPL moves from Pending to Workqueue with SSR code, check CFL field OK / Not OK	OK / Not OK	
02	Change SSR of TST005 New SSR Code:0002	SFPL colour changes to Green in Workqueue OK / Not OK	OK / Not OK	
03	Change ATYP of TST005 New ATYP: A332	SFPL colour changes to Green in Workqueue OK / Not OK	OK / Not OK	
04	Change ADES of TST005 New ADES: VOMM	New FPL is created by OLDI with new ADES	OK / Not OK	

		OK / Not OK		
05	Change RFL of TST005 New RFL: 370	Manual coordination requires OK / Not OK	OK / Not OK	
06	Change COP of TST005 New COP : NADAM	SFPL colour changes to Green in Workqueue OK / Not OK	OK / Not OK	
07	Check LAM messages	OK / Not OK	OK / Not OK	

4. Test 004 ABI & ACT messages:

Test 004 – Advance Boundary Information Message (ABI), Activate Message (ACT) Doha FDPS to UAE ACC FDPS				
No	Test description	UAE ACC FDPS	Doha FDPS	Remarks
01	Enter estimate for TST007 (OEJN – OMAD) SSR code:0003 Exit level : 190 ETX : Current time	SFPL moves from Pending to Work queue with SSR code, check ETN and CFL field OK / Not OK	OK / Not OK	
02	Change SSR of TST007 New SSR code: 0004	SFPL colour changes to Green if in Workqueue OK / Not OK	OK / Not OK	
03	Change ATYP of TST007 New ATYP: C130	SFPL colour changes to Green if in Workqueue OK / Not OK	OK / Not OK	

04	Change ADES of TST007 New ADES: OMAL	New FPL is created by OLDI with new ADES OK / Not OK	OK / Not OK	
05	Change XFL of TST007 New XFL: 170	SFPL colour changes to Green if in Workqueue OK / Not OK	OK / Not OK	
06	Change COP of TST007 New COP: NAMLA	SFPL colour changes to Green if in Workqueue OK / Not OK	OK / Not OK	
07	when ETX is Current time + 5 minutes the ACT should be automatically generated	No change, SFPL already in active. OK / Not OK	OK / Not OK	
08	Change ATYP of TST007 New ATYP:C30J	No change, SFPL already in active Expect manual coordination. OK / Not OK	Flag to notify ATCA that ATYP change is not communicated OK / Not OK	
09	Check LAM messages	OK / Not OK	OK / Not OK	

5. Test 005 ABI & ACT messages:

Test 005 – Advance Boundary Information Message (ABI), Activate Message (ACT) UAE ACC FDPS to Doha FDPS				
No	Test description	UAE ACC FDPS	Doha FDPS	Remarks
01	Enter estimate for TST004 (OOMS – OTBD) SSR code:0005 Exit level : 180 ETN : Current time COPX: MEKMA	SFPL moves from Pending to Active with SSR code A new ABI will be generated OK / Not OK	SSR, ETN and Entry level and entry point should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK	

02	Change SSR of TST004 New SSR code: 0006	A new ABI will be generated OK / Not OK	SSR should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK	
03	Change ATYP of TST004 New ATYP: AT45	A new ABI will be generated OK / Not OK	ATYP should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK	
04	Change ADES of TST004 New ADES: OTBH	A new ABI will be generated OK / Not OK	ADES should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK	
05	Change XFL of TST004 New XFL: 160	A new ABI will be generated OK / Not OK	Entry level should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK	
06	Change COP of TST004 New COP: BUNDU	A new ABI will be generated OK / Not OK	COP should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK	
07	when ETX is Current time + 5 minutes the ACT should be automatically generated	ACT will be generated OK / Not OK	OK / Not OK	
08	Change ATYP of TST004 New ATYP: B738	An indication to ATCO to show that this change needs to be manually coordinated	Expect manual coordination OK / Not OK	
09	Check LAM messages	OK / Not OK	OK / Not OK	

6. Test 006 PAC, ABI, ACT without FPL for UAE:

Test 006 – PAC, ABI, ACT – No FPL for UAE Doha FDPS to UAE ACC FDPS				
No	Test description	UAE ACC FDPS	Doha FDPS	Remarks
01	Activate start up TST009 (OTBD – OMAA) SSR code:0007 ATYP:A320 XFL: 210 COP: NAMLA	SFPL is created by PAC. OLDI window pops up. OK / Not OK	Automatically generates PAC message OK / Not OK	
02	Enter estimate for TST010, (OEJN – OOMS) SSR Code: 0010 ATYP: B738 XFL: 230 COP: BUNDU ETX: Current time	SFPL is created by ABI. OLDI window pops up. OK / Not OK	Automatically generates ABI message OK / Not OK	
03	Enter estimate for TST011, (OEJN – OOMS) SSR Code: 0011 ATYP: B738 XFL: 230 COP: BUNDU ETX: Current time + 3 mins	SFPL is created by ACT. OLDI window pops up. OK / Not OK	Automatically generates ACT message OK / Not OK	
04	Check LAM messages	OK / Not OK	OK / Not OK	

7. Test 007 ABI, ACT without FPL for Doha:

Test 007 – ABI, ACT – No FPL for Doha FDPS UAE ACC FDPS to Doha FDPS				
No	Test description	UAE ACC FDPS	Doha FDPS	Remarks
01	Enter estimate for TST012, (TACT – OTBH) SSR Code: 0012 ATYP: K35R XFL: 220 COP: TOSNA ETN: Current time	Automatically generates ABI message OK / Not OK	FPL created by ABI and flags for ATCA attention. OK / Not OK	
02	Enter estimate for TST013, (OOMS – OTBD) SSR Code: 0013 ATYP: A321 XFL: 180 COP: MEKMA ETN: Current time -20 mins	Automatically generates ACT message OK / Not OK	FPL created by ACT and flags for ATCA attention. OK / Not OK	
03	Check LAM messages	OK / Not OK	OK / Not OK	

8. Test 008 Duplicate SSR:

Test 008 – Duplicate SSR				
No	Test description	UAE ACC FDPS	Doha FDPS	Remarks
01	Create a FPL TST020 at Doha with SSR 0014 to block SSR code Enter estimate data for TST002 at UAE RDS (OMAM – OTBH) SSR Code : 0014 ETN: Current time XFL: 180	OLDI message window pops up with a question mark on TST002 OK / Not OK	Duplicate SSR should be duly flagged to operator OK / Not OK	
02	Create a FPL TST030 at UAE RDS with SSR 0015 to block SSR code Enter estimate data for TST008 at Doha (OTBD – OOMS) SSR Code : 0015 ETN: Current time XFL: 230	OLDI message window pops up with a question mark on TST008 OK / Not OK	Duplicate SSR should be duly flagged to operator OK / Not OK	

9. Test 009 Communication failure:

Test 009 – Communication failure				
No	Test description	UAE ACC FDPS	Doha FDPS	Remarks
01	Simulated link failure	OLDI messages that are not coordinated will move from Active to Workqueue OK / Not OK	Failures should be duly flagged to operator OK / Not OK	

10. Test Flight plans:

a. TST001 (OMAA – OTBD)

(FPL-TST001-IS
-A320/M-SDFHIJLOPRVWY/SD
-OMAA0655
-N0415F220 TOXIG Z994 VEBAT P899 MEKMA DCT NAJMA DCT DOH
-OTBD0030 OEDF
-PBN/A1B1C1D1L1O1S1 NAV/GPSRNAV DOF/13???? REG/A6TST
EET/OMAE0008 OBBB0020 SEL/ARKQ OPR/TST RMK/TEST FPL)

b. TST002 (OMAM – OTBH)

(FPL-TST002-IM
-C17/H-SGHJPRWXYZ/SD
-OMAM0820
-N0454F280 DCT MA270020 DCT MA285032 DCT DASLA Z994 BUNDU B415
DOH
DCT
-OTBH0032 OMAM
-PBN/A1B1C1D1L1O1S1 NAV/GPSRNAV DOF/13???? REG/A6TST
EET/OBBB0019 SEL/CFPR NAV/RNP10 RNAV1 RNAV5 RNVD1E2A1
RMK/TEST FPL)

c. TST003 (OMAA – OEJN)

(FPL-TST003-IS
-A320/M-SDGHIJLPRWXY/S
-OMAA0800
-N0467F220 TOXIG Z994 BUNDU B415 DOH A415 KIA G782 RGB/N0461F360
UM309 RABTO G782 ASLAT DCT
-OEJN0201 OEMA
-PBN/A1B1C1D1L1O1S1 NAV/GPSRNAV DAT/SV DOF/13???? REG/A6TST
EET/OMAE0009 OBBB0021 OEJD0044 SEL/BMAR RMK/TCAS
EQUIPPED RMK/TEST FPL)

d. TST004 (OOMS – OTBD)

(FPL-TST004-IS
-A320/M-SDFHIJLOPRVWY/SD
-OOMS0655
-N0458F320 MCT L764 PAXIM P899 ITRAX ALN P899 DASLA/N0440F260
Z994
VEBAT/N0424F220 P899 MEKMA DCT NAJMA DCT DOH
-OTBD0057 OMAA
-PBN/A1B1C1D1L1O1S1 DAT/V NAV/TCAS DOF/13???? REG/A6TST
EET/OMAE0023 OBBB0047 SEL/GLEH RMK/TEST FPL)

e. TST005 (OTBD – OMDB)

(FPL-TST005-IS

-B738/M-SHPRWXYIGZ/S
-OTBD1230
-N0390F210 DOH L305 ITITA L308 DESDI DESDI4T
-OMDB0049 OMRK OMAL
-PBN/A1B1C1D1L1O1S1 NAV/RNAV1 RNAV5 RNP4 RNP10 RNP5
RNVD1E2A1 DOF/13???? REG/A6TST
EET/OMAE0015 SEL/HQER RMK/TEST FPL)

f. TST006 (OTBH – OMDM)

(FPL-TST006-IM
-C130/M-SHITUY/S
-OTBH1000
-N0311F150 UL305 ALSEM L305 ITITA L308 SHJ DCT
-OMDM0059 OBBI
-PBN/A1B1C1D1L1O1S1 NAV/RNAV1 RNAV5 RNP4 RNP10 RNP5
RNVD1E2A1 DOF/13???? REG/A6TST
EET/OMAE0020 RMK/TEST FPL)

g. TST007 (OEJN – OMAD)

(FPL-TST007-IN
-GLF4/M-SDGHIRVWXY/S
-OEJN0600
-N0458F210 JDW T532 KIA B418 ASPAN N318 XAKUM Q666 BOXAK DCT
-OMAD0212 OMAL
-PBN/A1B1C1D1L1O1S1 NAV/RNAV1 RNAV5 RNP4 RNP10 RNP5
RNVD1E2A1 DOF/13???? REG/A6TST EET/OBBB0113 OMAE0151
RMK/TEST FPL)

h. TST008 (OTBD – OOMS)

(FPL-TST008-IS
-A320/M-SDFHIJLOPRVWY/SD
-OTBD0630
-N0466F310 B415 AFNAN B415 ADV N685 LAKLU G216 MCT DCT
-OOMS0103 OMAL
-PBN/A1B1C1D1L1O1S1 NAV/RNAV1 RNAV5 RNP4 RNP10 RNP5
RNVD1E2A1 DOF/13???? REG/A6TST EET/OBBB0007 OMAE0012
OOMM0038 SEL/GLEH RMK/TEST FPL)

8. BILATERAL AGREEMENT TEMPLATE

Bilateral Agreement Template to be appended to the main Letter of Agreement (LoA) Template
Please choose the appropriate OLDI or AIDC.

NOTE:

This part of the LOA only to be used as guidance it is related to the Automatic data exchange either OLDI or AIDC which are attachments 1 and 2 respectively to Appendix C of the complete letter of agreement.

Appendix C (1)

Exchange of Flight Data

(With automatic data exchange)

Unit 1

Unit 2

Revision: xxxx

Effective: xx xxxx xxxx

Revised: xxx

C.1 General

C.1.1 Basic Flight Plans

Basic flight plan data should normally be available at both ATS Units.

C.1.2 Current Flight Plan Data

Messages, including current flight plan data, shall be forwarded by the transferring ATS unit to the accepting ATS unit either by automatic data exchange or by telephone to the appropriate sector/position.

C.1.2.1 Automatic Data Exchange.

The messages (List agreed message for OLD e.g. ABI/ACT/LAM/PAC/REV/MAC messages are exchanged between the two ATS units in accordance with Attachment 1 or Attachment 2 to Appendix C.

C.1.2.2 Verbal Estimates.

For conditions that are not supported by the automatic data exchange, verbal estimates will be exchanged.

A verbal estimate shall be passed to the appropriate sector at the accepting ATS unit at least value minutes prior, but not earlier than 30 minutes before the aircraft is estimated to pass the transfer of control point.

A verbal estimate shall contain:

a) Callsign.

Note: To indicate that the flight plan is available, the accepting ATS unit should state aircraft type and destination after having received the callsign.

b) SSR code:

Note: Normally, the notification of a SSR code indicates that the selection of that code by the aircraft was verified.

c) ETO for the appropriate COP as laid down in Appendix D to this LoA.

d) Cleared level, specifying climb or descent conditions if applicable, at the transfer of control point.

Requested level if different from cleared level.

e) Other information, if applicable.

Normally, verbal estimates will not be passed in parallel with ACT messages.

In all cases, verbally passed data shall take precedence over data exchanged automatically.

C.1.2.3 Failure of Automatic Data Exchange.

In the event of a failure which prevents the automatic transfer of data, the Supervisors shall immediately decide to revert to the verbal exchange of estimates.

After recovery from a system failure, the Supervisors shall agree as to when they will revert to automatic data exchange.

C.1.3 **Non-availability of Basic Flight Plan Data**

If the accepting ATS unit does not have basic flight plan data available, additional information may be requested from the transferring ATS unit to supplement the ACT message or a verbal estimate.

Within the context of RVSM, such additional information should include:

a. the RVSM approval status of the aircraft; and

b. whether or not a non-RVSM approved aircraft is a State aircraft.

C.1.4 **Revisions**

Any significant revisions to the flight data are to be transmitted to the accepting ATS unit. Time differences of value minutes or more are to be exchanged.

Any levels which different than describe in Appendix D of this LOA are subject to an Approval Request.

C.1.5 **Expedite Clearance and Approval Requests**

Whenever the minimum time of value minutes for a verbal estimate, or those prescribed in Attachment 1 to Appendix C for ACT messages, cannot be met, either an expedite clearance request, an approval request (*or a PAC*), as appropriate, shall be initiated.

C.2 **Means of Communications and their Use**

C.2.1 **Equipment**

The following lines are available between Unit 1 and Unit 2:

Line Type	Amount	Additional Information
Data Line		
Telephone Lines		

“Additional Information” column should indicate if telephone lines meet the requirements for Direct Controller-Controller Voice Communication (DCCVC) or Instantaneous Direct Controller-Controller Voice Communication (ICCV)

C.2.2 Verbal Co-ordination

All verbal communications between non-physically adjacent controllers should be terminated with the initials of both parties concerned.

Exchange of flight plan data, estimates and control messages by voice shall be carried out in accordance with the following tables:

C.2.2.1 Messages from Unit 1 to Unit 2.

Receiving Sector/COPs	Message	Position
Sector Name COPs	Flight Plan Data and Estimates	
	Control Messages, Expedite Clearances, Approval Requests and Revisions	
	Surveillance Co-ordination	

C.2.2.2 Messages from Unit 2 to Unit 1.

Receiving Sector/COPs	Message	Position
Sector Name COPs	Flight Plan Data and Estimates	
	Control Messages, Expedite Clearances, Approval Requests and Revisions	
	Surveillance Co-ordination	

C.3 Failure of Ground/Ground Voice Communications

C.3.1 Fall-Back Procedures for Co-ordination

To mitigate the effects of failures of direct speech circuits, both parties will establish and maintain dial-up facilities via PABX and ATC Voice Communications Systems (VCS) as follows:

Sector Name	Tel Number (For Both Units)

Stand-alone telephones with auto-dial facilities will be maintained as a second level of fall-back to cover the event of failure of PABX or VCS:

Sector Name	Tel Number (For Both Units)

C.3.2 Alternate Fall-Back Procedures for Co-ordination

In case of communications failure where the alternatives described in paragraph C.3.1 above are not available or practicable, pilots shall be instructed, at least 5 minutes prior to the transfer of control point, to pass flight data on the appropriate frequency of the accepting ATS unit for the purpose of obtaining an ATC entry clearance from the accepting ATS unit.

If the accepting ATS unit cannot issue an entry clearance to the pilot upon his initial contact, the pilot shall be instructed to inform the transferring ATS unit accordingly via RTF.

The transferring ATS unit shall hold the aircraft within its AoR and after a minimum of 10 minutes instruct the pilot to re-establish RTF contact with the accepting ATS unit.

This procedure shall be repeated until an onward clearance has been obtained from the accepting ATS unit.

C.4 Validity

This Appendix to the LoA takes effect on xxx xxxx xxxx and supersedes previous Appendix to Letter of arrangements between the Unit 1 and Unit 2.

Date:

Date:

Name

Title

Authority 1

Name

Title

Authority 2

Attachment 1 to Appendix C

Automatic Data Exchange related to OLDI

ABI/ACT/LAM messages are exchanged between the two ATS units in accordance with the table below:

Messages	COPs	Time and/or Distance Parameters	
		Messages from Unit 1 To Unit 2	Messages from Unit 1 To Unit 2
ABI			
ACT			
LAM			
REV			
PAC			
MAC			
LOF			
NAN			

Attachment 2 to Appendix C

Automatic Data Exchange related to AIDC

This is the Generic Template available in the PAN which also contain real sample agreement
Auckland Oceanic – Brisbane ATS Centre and Auckland Oceanic – Nadi ATM Operations Centre

AIDC Procedures

1. The format of AIDC messages (*List messages used e.g. ABI, PAC, CDN, CPL, ACP, REJ, MAC, LAM and LRM*) are as defined by the Pan Regional (NAT and APAC) AIDC Interface Control Document (ICD) as amended from time to time, unless described otherwise in this LOA.
2. List messages not supported (*e.g. “EST, TOC, AOC messages are not supported”*).
3. Acceptance of CPL or CDN message is approval of the flight’s profile and requires no further voice communication (i.e. Non-Standard Altitudes, Block Altitudes, and Deviations).
4. (*Describe other procedures applicable to the use of AIDC for this LOA. Some examples are listed below*)
 - a. *Example only. If there is any doubt with regard to the final coordination data, voice coordination should be used for confirmation.*
 - b. *Example only. Receipt of a MAC message must not be interpreted as meaning that the flight plan has been cancelled. Voice coordination must be conducted by the transferring controller to confirm the status of the flight.*
 - c. *Example only. Each facility should advise the other facility of any known equipment outage that affects AIDC. In the event of AIDC outage, voice communication procedures will apply.*
 - d. *Example only. Truncation. Where route amendment outside the FIR is unavoidable.*
 - i. *Terminate the route details at the farthest possible flight plan significant point of the flight and enter “T” immediately following this.*
 - ii. *Without amending the originally received details, every effort is to be made to truncate the route at a minimum of one significant point beyond the adjacent FIR to provide an entry track in that FIR.*

AIDC Messages

(*For each message used describe when it will be sent by each ATSU under the parameter column and use the Notes column to describe other applicable information for the message use by each ATSU. The data below provides an example of the type of information that could be incorporated.*)

Messages	Parameter	Notes
ABI	ATSU1: Sends ABI approx. 80 minutes prior to boundary (73 minutes prior to the 50 nm expanded sector boundary). ATSU2: Sends ABI approx. 87 minutes prior to boundary (80 minutes prior to the 50 nm expanded sector boundary). (Note: An updated ABI will not be sent once a CPL has been sent.)	ATSU1 : ATSU2 Updated ABI's will be sent automatically if there is any change to profile. ABI is sent automatically and is transparent to the controller. ABI automatically updates the receiving unit's flight data record.
CPL	ATSU1 : ATSU2 Send CPL messages approx. 37 minutes prior to the boundary (30 minutes prior to the 50 nm expanded sector boundary).	ATSU1 : ATSU2 CPL messages should be sent by the transferring controller in sufficient time to allow the completion of coordination at least 30 minutes prior to the boundary or 30 minutes prior to the aircraft passing within 50nm of the FIR boundary for information transfers.
CDN	ATSU1 : ATSU2 CDN messages are sent by either the transferring or receiving facility to propose a change once the coordination process has been completed, i.e., CPL sent and ACP received. CDN's must contain all applicable profile restrictions (e.g. weather deviations, speed assignment, block altitude). If the use of a CDN does not support this requirement, then verbal coordination is required.	ATSU1 : ATSU2 The APS will display a flashing "DIA" until receipt of ACP. If ACPJ not received within ten (10) minutes, controller is alerted with a message to the queue. CDN messages are not normally used for coordination of reroutes; however, with the receiving facilities approval a CDN may be used to coordinate a reroute on a critical status aircraft such as in an emergency.
PAC	ATSU1 : ATSU2 PAC messages will normally be sent when the time criteria from the departure point to the boundary is less than that stipulated in the CPL.	ATSU1 : ATSU2 Will respond to a PAC message with an ACP. PAC messages should be verbally verified with receiving facility.
ACP	ATSU1 : ATSU2	ATSU1 : ATSU2 The APS will display a flashing "DIA" until receipt of ACP. If ACP not received within ten (10) minutes, controller is alerted with a message to the queue.
TOC	ATSU1 : ATSU2 Not supported. Implicit hand in/off.	
AOC	ATSU1 : ATSU2 Not supported. Implicit hand in/off.	
MAC	ATSU1 : ATSU2 MAC messages are sent when a change to the route makes the other facility no longer the "next" responsible unit.	ATSU1 : ATSU2 Receipt of a MAC message must not be interpreted as meaning that the flight plan has been cancelled. Voice coordination must be conducted by the transferring

		<i>controller to confirm the status of the flight.</i>
<i>REJ</i>	<i>ATSU1 : ATSU2</i> <i>REJ messages are sent in reply to a CDN message when the request change is unacceptable</i>	<i>ATSU1 : ATSU2</i> <i>REJ messages are sent only as a response to a CDN message.</i>

AIDC Messages

(For each message used describe when it will be sent by each ATSU under the parameter column and use the Notes column to describe other applicable information for the message use by each ATSU. The data below provides an example of the type of information that could be incorporated.)

Messages	Parameter	Notes
ABI	ATSU1: Sends ABI approx. 80 minutes prior to boundary (73 min prior to the 50 nm expanded sector boundary). ATSU2: Sends ABI approx. 87 minutes prior to boundary (80 min prior to the 50 nm expanded sector boundary). (Note: An updated ABI will not be sent once a CPL has been sent.)	ATSU1 : ATSU2 Updated ABI's will be sent automatically if there is any change to profile. ABI is sent automatically and is transparent to the controller. ABI automatically updates the receiving unit's flight data record.
CPL	ATSU1 : ATSU2 Send CPL messages approx 37 minutes prior to the boundary (30 minutes prior to the 50 nm expanded sector boundary).	ATSU1 : ATSU2 CPL messages should be sent by the transferring controller in sufficient time to allow the completion of coordination at least 30 minutes prior to the boundary or 30 minutes prior to the aircraft passing within 50nm of the FIR boundary for information transfers.
CDN	ATSU1 : ATSU2 CDN messages are sent by either the transferring or receiving facility to propose a change once the coordination process has been completed, i.e., CPL sent and ACP received. CDN's must contain all applicable profile restrictions (e.g. weather deviations, speed assignment, block altitude). If the use of a CDN does not support this requirement, then verbal coordination is required.	ATSU1 : ATSU2 The APS will display a flashing "DIA" until receipt of ACP. If ACPJ not received within ten (10) minutes, controller is alerted with a message to the queue. CDN messages are not normally used for coordination of reroutes; however, with the receiving facilities approval a CDN may be used to coordinate a reroute on a critical status aircraft such as in an emergency.

Messages	Parameter	Notes
PAC	ATSU1 : ATSU2 <i>PAC messages will normally be sent when the time criteria from the departure point to the boundary is less than that stipulated in the CPL.</i>	ATSU1 : ATSU2 <i>Will respond to a PAC message with an ACP. PAC messages should be verbally verified with receiving facility.</i>
ACP	ATSU1 : ATSU2	ATSU1 : ATSU2 <i>The APS will display a flashing “DIA” until receipt of ACP. If ACP not received within ten (10) minutes, controller is alerted with a message to the queue.</i>
TOC	ATSU1 : ATSU2 <i>Not supported. Implicit hand in/off.</i>	ATSU1 : ATSU2
AOC	ATSU1 : ATSU2 <i>Not supported. Implicit hand in/off.</i>	
MAC	ATSU1 : ATSU2 <i>MAC messages are sent when a change to the route makes the other facility no longer the “next” responsible unit.</i>	ATSU1 : ATSU2 <i>Receipt of a MAC message must not be interpreted as meaning that the flight plan has been cancelled. Voice coordination must be conducted by the transferring controller to confirm the status of the flight.</i>
REJ	ATSU1 : ATSU2 <i>REJ messages are sent in reply to a CDN message when the request change is unacceptable</i>	ATSU1 : ATSU2 <i>REJ messages are sent only as a response to a CDN message.</i>

9. IMPLEMENTATION PHASES

In line with ASBU Block 0 time lines, the AIDC/OLDI implementation shall be completed as per the MID Air Navigation Plan. In order to support and assist, the implementation could be accomplished in phases listed below. The actual targets set for the MID Region are in the MID Air Navigation Strategy.

Phase 1	• OLDI/AIDC capable ATSUs should start implementation activities. The activity should cover the following: ➤ test activities ➤ operator training ➤ Revision of LoA ➤ transition activities ➤ implementation ➤ post-implementation reviews • The ATSUs not capable of OLDI/AIDC should avail the facility of Standalone terminals with a planned implementation asap, and budget for full Integration with a planned implementation date of the MID Air Navigation Strategy.
Phase 2	• The ATSUs using OLDI/AIDC in an Operational environment should assist other ATSUs to implement OLDI/AIDC • The OLDI/AIDC software is readily available therefore the ATSUs waiting for software upgrade should expect a software package asap. On receipt of it they should start implementation activities. The activity should cover the following: ➤ test activities ➤ operator training ➤ Revision of LoA ➤ transition activities ➤ implementation ➤ post-implementation reviews
Phase 3	• All ATSUs are connected by Integrated OLDI/AIDC or Standalone terminals

MID Region AIDC/OLDI Applicability Area (Priority 1 and 2 for Implementation)

ACC	Adjacent ACCs						
Amman	Cairo (1)	Baghdad (2)	Damascus (2)	Jeddah (1)	Tel Aviv (2)		
Baghdad	Amman (2)	Ankara (1)	Damascus (2)	Jeddah (2)	Tehran (2)	Kuwait (1)	
Bahrain	Doha (1)	Emirates (1)	Jeddah (1)	Kuwait (1)	Riyadh (1)	Tehran (2) AFTN MSG	Dammam(2)
Beirut	Damascus (2)		Nicosia (1)				
Cairo	Amman (1)	Athena (1)	Jeddah (1)	Khartoum (1)	Nicosia (2)	Tel Aviv (2)	Tripoli (2)
Damascus	Amman (2)	Ankara (2)	Bagdad (2)	Beirut (2)	Nicosia (2)		
Doha*	Bahrain (1)	Emirates (1)	Jeddah (2)	Riyadh (2)			
Emirates	Bahrain (1)	Doha (1)	Jeddah (1)	Muscat (1)	Tehran (2) AFTN MSG		
Jeddah	Amman (1)	Asmara (2)	Baghdad (2)	Bahrain (1)	Cairo (1)	Doha (2)	Emirates (1)
	Khartoum (1)	Kuwait (2)	Muscat (1)	Riyadh (1)		Sana'a (2)	
Riyadh	Bahrain (1)	Doha (2)	Kuwait (2)	Jeddah (1)			
Khartoum	Addis (1)	Asmara (2)	Brazzaville (2)	Cairo (1)	Entebbe (2)	Jeddah (1)	Juba (1)
	Kinshasa (2)	N'Djamena (2)	Nairobi (2)	Tripoli (2)			
Kuwait	Baghdad (1)	Bahrain (1)	Jeddah (2)	Tehran (2)			
Muscat	Emirates (1)	Jeddah (1)	Karachi (2)	Mumbai (1)	Sana'a (2)	Tehran (1)	
Sana'a	Djibouti (Addis Ababa) (2)	Asmara (2)	Jeddah (2)	Mogadishu (2)	Mumbai (2)	Muscat (2)	
Tehran	Ankara (1)	Ashgabat (2)	Baghdad (2)	Bahrain (1)	Baku (2)	Emirates (2) AFTN MSG	Kabul (2)
	Karachi (1)	Kuwait (2)	Muscat (1)	Yerevan (2)			
Tripoli	Algiers (2)	Cairo (2)	Khartoum (2)	Malta (2)	N'Djamena (2)	Niamey (2)	Tunis (2)

(1) = Priority 1 for implementation based on the number of traffic movements and/or operational needs (Green colour means already implemented)

(2) = Priority 2 for implementation based on the number of traffic movements or if other solution is in place such as exchange of information via AFTN

APPENDIX 6.6G

MID Region ANS Cyber Security Action Plan

2023-2024

Action Number	Specific Measures/Task	by	Start date of Implementation	Traceability to Cybersecurity Action Plan
MID-01	States to develop their own national/organizational Cyber Security policies	MID States	2023	CyAP 0.1
MID-02	Plan, organize and support international and regional events to promote cybersecurity in civil aviation.	MID States ICAO MID	2023 - 2024	CyAP 1.8
MID-03	Establish a governance structure in the civil aviation for ANS cybersecurity field.	MID States	2023	CyAP 2.1
MID-04	Promote coordination mechanisms between civil aviation authorities and cybersecurity authorities.	MID States	2023	CyAP 2.4
MID-05	Establishment of a civil aviation ANS cybersecurity point of contact network.	MID States	2023	CyAP 5.5
MID-06	To share cybersecurity-related information using ADCS portal	MID States	2023 - 2024	CyAP 5.2
MID-07	develop and implement capabilities and plans for civil aviation cybersecurity incident detection, analysis and response at operational level.	MID States	2023 - 2024	CyAP 6.4
MID-08	Conduct periodically ANS Cyber Resilience table top and live exercises at Regional and national levels	MID States	2023 – 2024	CyAP6.6
MID-09	Organization of ANS Cyber Sec capacity building activities (ANS Cyber Security oversight, Managing Security risks in ATM)	ICAO MID	2023 – 2024	CyAP 7.5
MID-10	Identify potential threats and vulnerabilities for ANS systems	ACS WG MID States	2023 – 2024	-

INTERNATIONAL CIVIL AVIATION ORGANIZATION



MIDDLE EAST AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (MIDANPIRG)

Guidance on safeguarding measures to protect Radio Altimeter from potential harmful interference from Cellular 5G Communications

ICAO MID Doc 015

Edition 1.0 | May 2023

Acknowledgements

This document was produced by the International Civil Aviation Organization (ICAO), MIDANPIRG Radio Altimeter Action Group (RADALT AG)

The following individuals are recognized for their valuable contributions:

Ridha Dridi, Saudi Arabia (Rapporteur);

Fares A. Alzahrani (Saudi Arabia)

Abdullaziz Hussain (Saudi Arabia)

Nevin Askar (Jordan);

Saleh Al Masabi (UAE);

Jehad Faqir (IATA);

Hicham Bennani (ACAO);

Gerlof E Osinga, (Boeing)

Kim Kolb, (Boeing)

Muna Alnadaf, ICAO MID RO/CNS

Contents

Record of Amendments.....	6
Abbreviations	7
Executive Summary	8
Chapter 1 - Background on 5 G and frequency band allocation	10
1.1. The Role of ITU-R.....	10
1.2. Global Spectrum Situation for 5G	11
Chapter 2 - Potential impacts of 5G on Radio Altimeters during aircraft operations.....	12
2.1. Introduction	12
2.2. Radio altimeters characteristics (based on ITU-R M.2059).....	12
2.2.1. General Characteristics	12
2.2.2. FMCW radio altimeters	13
2.2.3. Pulsed radio altimeters	14
2.2.4. Technical concerns	14
2.3. Potential operational impacts of 5G on Flight Crew and Aircraft	15
2.3.1. Loss of Situational Awareness.....	15
2.3.2. Controlled Flight into Terrain	15
2.3.3. Specific Operational Impacts on Aircraft	15
Chapter 3 – Short Term Safeguarding measures adopted at regional and global levels /Long Term Planning	18
3.1. Introduction	18
3.2. Measures adopted by States, Regional Organizations & SDOs.....	18
3.2.1. Australia	18
3.2.2. Canada.....	19
3.2.3. Europe	20
3.2.4. France.....	20
3.2.5. Japan	22
3.2.6. Saudi Arabia	23
3.2.7. Oman	24
3.2.8. United Arab Emirates	24
3.2.9. United Kingdom.....	24
3.2.10. USA.....	25
3.2.11. Arab Civil Aviation Organization (ACAO)	26
3.2.12. EASA	27

3.2.13.	IATA	27
3.2.14.	ICAO – FSMP	27
3.2.15.	RTCA-EUROCAE	28
3.3.	Long Term Plan for Radio Altimeter	29
Chapter 4 - Methodologies for defining safeguarding measures for aerodromes & heliports		31
4.1.	Introduction	31
4.2.	Methodology for the protection of Radio altimeters	32
4.2.1.	General approach and Main considerations	32
4.2.2.	Main activities to define protection criteria	34
4.2.3.	Recommended methodology for the technical study	34
4.2.4.	Recommended Safeguarding and Interference Mitigation Measures	36
4.2.5.	5G devices used on board aircraft	37
Appendix A – French Methodology to set the dimensions of Special Protection Zones around airports		39

Record of Amendments

Edition	Revision number	Date	Change description
0.8	Final Draft	22 November 2022	New document structured in four chapters: describing the background, 5G bands, technical and operational concerns, activities, and measures deployed by States and International Organization to protect RADALT operations, and recommendation to States on short terms measures and actions to mitigate any source of interference that may be caused by 5G IMT networks. This Guidance Material will be presented for MIDANPIRG/20 for review and endorsement.
1.0	First Version	May 2023	First edition endorsed by MIDANPIRG/20 meeting (May 2023)

Abbreviations

CST	Communications, Space and Technology Commission in Saudi Arabi
CNS SG	Communication, Navigation, and Surveillance Sub-Group
dBi	decibel isotropic
dBm	decibels relative to one milliwatt
EIRP	Effective Isotropic Radiated Power
EUROCAE	European Organization for Civil Aviation Equipment
FCC	Federal Communications Commission
FMCW	Frequency Modulated Carrier Wave
FMSP	Frequency Spectrum Management Panel
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMT	International Mobile Telecommunications
ITU	International Telecommunications Union
ITU-R	International Telecommunications Union-Radiocommunications sector
LFMCW	Linear Frequency Modulation Continuous Wave
MIDANPIRG	Middle East Air Navigation Planning and Implementation Regional Group
NCD	No Computed Data
NFAT	National Frequency Allocations Tables
PPT	PowerPoint Presentation
RADALT	Radio Altimeter
RASG-MID	Regional Aviation Safety Group for the Middle East
RF	Radio Frequency
RO/CNS	Regional Officer CNS
RTCA	Radio Technical Commission for Aeronautics
SDO	Standards Developing Organizations
TAWS	Terrain Awareness Warning System
TCAS	Traffic Collision Avoidance System
TX/RX	Transmitter/Receiver
WP	Working Paper
WRC	World Radio-communication Conference.

Executive Summary

The radio altimeter¹, operates in the frequency band 4.2-4.4 GHz. It is a mandated critical aircraft safety system used to determine an aircraft's height above terrain and obstacles. Its information is essential to enable safety-related flight operations and navigation functions on all commercial aircraft as well as a wide range of other civil aircraft. Such functions and systems include terrain awareness, aircraft collision avoidance, wind shear detection, flight controls, and functions to automatically land an aircraft. If not properly mitigated, harmful interference to the function of the radio altimeter during any phase of flight may pose a serious safety risk to passengers, crew and people on the ground.

ICAO has received studies from several States and organizations regarding the interference potential to radio altimeters. These studies generally conclude that several makes, and models of radio altimeters will not operate as required if new cellular broadband technologies (5G) are deployed in frequency bands close to the radio altimeter's frequencies of operation (4.2-4.4 GHz). Several States have already implemented temporary technical, regulatory, and operational mitigations on new 5G systems to protect radio altimeters while the aviation industry is working on long-term solutions to update and retrofit altimeters in order to ensure compatibility between cellular broadband technologies (5G) and aviation systems.

The MIDANPIRG/19 meeting held in Riyadh, Saudi Arabia from 14 to 17 February 2022 was apprised of the ICAO State Letter (dated 25 March 2021) on the potential impact of 5G on radio altimeters in the MID Region. The meeting also acknowledged the safety concerns and potential operational impacts. Based on WP/62 presented by IATA; and WP/69 and PPT/71 presented by Saudi Arabia, the meeting agreed to:

- update the Frequency Management Working Group Terms of Reference to include tasks related to the issue of 5G & Radio Altimeter interferences.
- establish a Radio Altimeter (RADALT) Action Group (AG) to develop guidance material to protect aircraft operations from potential Radio Altimeter interference (*MIDANPIRG DECISION 19/23²*).
- task the CNS SG to coordinate with the RASG-MID relevant subsidiary bodies the 5G Safeguarding measures around the aerodromes to protect RADALT from any interference. (*MIDANPIRG DECISION 19/24*)

The AG held several virtual/online meetings and developed this guidance which is composed of:

- a) Chapter 1 - Background on 5 G and frequency band allocation. This chapter describes the working arrangements and regulatory framework managed by Radio communications sector of the International Telecommunications Union for the allocations of radiofrequency (RF) spectrum and adoption of radio regulation. It also provides an overview on the current allocations of 5G at global level including in the Middle East
- b) Chapter 2 - Potential impacts of 5G on Radio Altimeters during aircraft operations provides an overview on RADALT characteristics, its critical safety functions, the technical concerns raised following the allocations of 5G bands close to RADALT frequency band. This chapter also provides a list of potential operational safety hazards and their severity that may be caused by interference associated with the deployment of cellular broadband 5G ground infrastructure
- c) Chapter 3 – Short Term Safeguarding measures adopted at regional and global levels/Long Term Planning provides a summary on the safeguarding measures adopted by States at regional and global

¹ In some aviation publications it is also known as the radar altimeter or Low Range Radar Altimeter.

² <https://www.icao.int/MID/MIDANPIRG/Documents/MID19%20and%20RASGMID9/Final%20Report%20Full.pdf> – Page 53

levels to protect Radio Altimeter from potential harmful interference from Cellular 5G Communications. It also summarizes the on-going and planned activities by regional organizations and SDOs to define new RADALT specifications

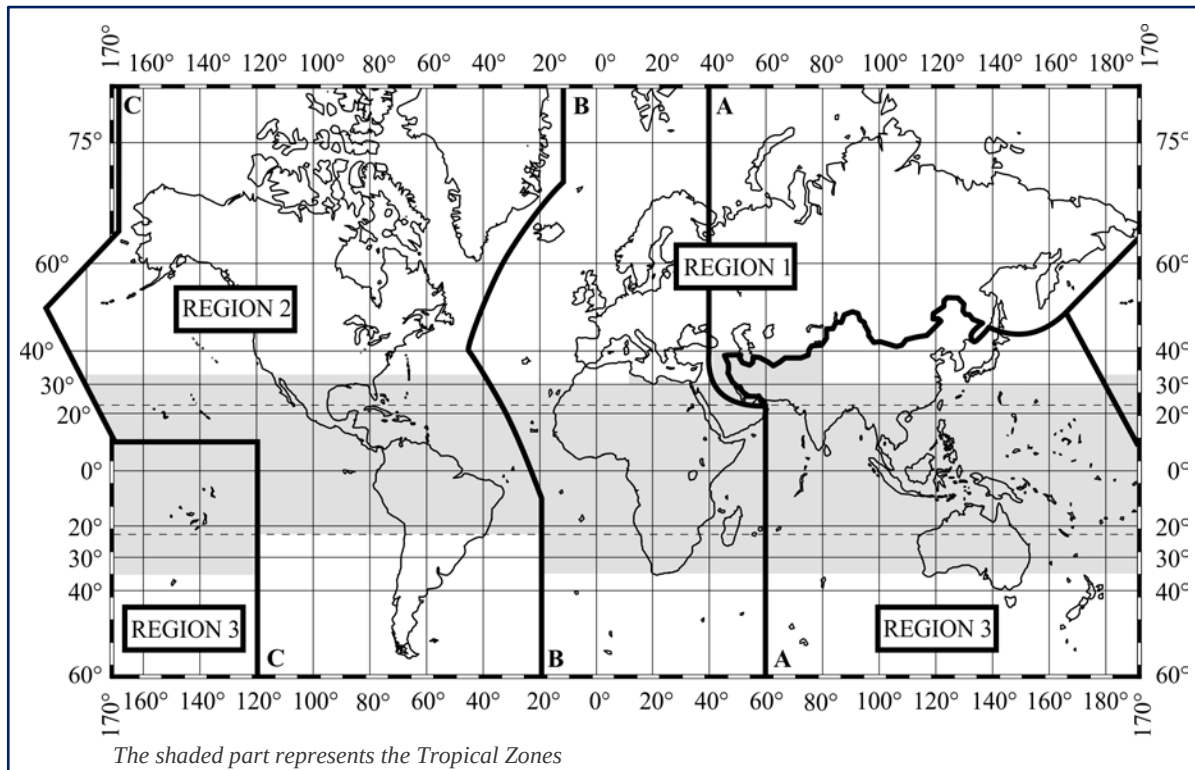
- d) Chapter 4 - Methodologies for defining safeguarding measures for aerodromes & heliports: provides a summary on approach and methodology that can be used to set protection zones considering aircraft height/altitude during the approach to reduce the probability of interference occurring by imposing limitations on the deployment of 5G base stations at aerodromes and in areas surrounding aerodromes. It also provides a set of requirements and guidance that should be implemented by aircraft operators to restrict use of 5G user equipment and devices on board an aircraft.

Note: This guidance will be kept under review by RADALT Action Group considering the last development on 5G network deployment, protection measures, and progress made in the development of RADALT specifications allowing sustainable protection from any external radio frequency interference.

Chapter 1 - Background on 5 G and frequency band allocation

1.1. The Role of ITU-R

- 1.1.1. ITU-R is the Radio communications sector of the International Telecommunications Union. ITU-R is responsible for ensuring efficient and economical use of the radiofrequency (RF) spectrum by all radio communication services. It develops and adopts the international spectrum allocations and associated regulations on the use of the RF spectrum ("Radio Regulations" or "RR").
- 1.1.2. The Radio Regulations are an internationally binding treaty on Member States regulating how RF spectrum is used. It is the basis for the global harmonization of RF spectrum use for all users of spectrum, including aviation and International Mobile Telecommunications (IMT) users. To enable new technologies and changes in spectrum usage, an ITU World Radiocommunication Conference (WRC) is held every 4 years where the Radio Regulations are revised and updated.
- 1.1.3. The radio regulations allow use of 5G in the frequency range 3400 – 4200 MHz. In Region 1, radio regulations allocate the frequency band 3400-3600 MHz to the mobile, except aeronautical mobile, service, and is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations.
- 1.1.4. For the allocation of frequencies in the RR, the world is divided into three Regions as shown in Figure 1 below:



(Figure 1)

1.2. Global Spectrum Situation for 5G

- 1.2.1. The growth in demand from mobile broadband requires access to regionally or globally harmonized spectrum to provide additional IMT services including higher data rates.
- 1.2.2. The frequency ranges 3300–4200 MHz and 4400–4900 MHz provide good propagation and data rates and are of global interest to IMT proponents. Variations of usage are seen regionally. The main band used in Europe is 3400–3800MHz, while China and India are planning for 3300–3600MHz and in Japan 3600–4100MHz is considered. Similar frequency ranges are considered in North America (3450–3980MHz), Latin America, the Middle East, Africa, India, Australia, etc. A total of 45 countries signed up to the IMT identification of the 3300–3400MHz band at ITU WRC-15. There is also interest in China to utilize the 4800– 5000 MHz frequency range and the 4500–4900 MHz frequency range in Japan. The following table provides the bands that were identified by some of the MID States for 5G deployments.

Country	Operator	5G network status	Commercial launch	Frequency bands
Bahrain	Batelco	5G deployed in network (2019)	Yes, 2019	2496-2690 MHz
	STC ¹³	5G deployed in network (2019)	Yes, 2019	2496-2690 MHz
	Zain	5G deployed in network (2019)	Yes, 2020	2496-2690 MHz
Kuwait	Ooredoo	5G deployed in network (2018)	Yes, 2019	4400-5000 MHz
	STC ¹⁴	5G deployed in network (2019)	Yes, 2019	3300-3800 MHz
	Zain	5G deployed in network (2018)	Yes, 2019	3300-4200 MHz
Oman	Omantel	5G deployed in network (2019)	Yes, 2020	3300-3800 MHz
	Ooredoo	Licensed (2018)	Yes	3300-3800 MHz
Qatar	Ooredoo	5G deployed in network (2018)	Yes, 2019	3300-3800 MHz
	Vodafone	5G deployed in network (2018)	Yes, 2019	3300-3800 MHz
Saudi Arabia	Mobily	5G deployed in network (2019)	Yes, 2019	2496-2690 MHz 3300-3800 MHz
	STC	5G deployed in network (2018)	Yes, 2019	2300-2400 MHz 3300-3800 MHz
	Zain	5G deployed in network (2019)	Yes, 2019	2496-2690 MHz 3300-3800 MHz
UAE	Du	5G deployed in network (2019)	Yes, 2019	3300-3800 MHz
	Etisalat	5G deployed in network (2018)	Yes, 2019	3300-3800 MHz ¹⁵

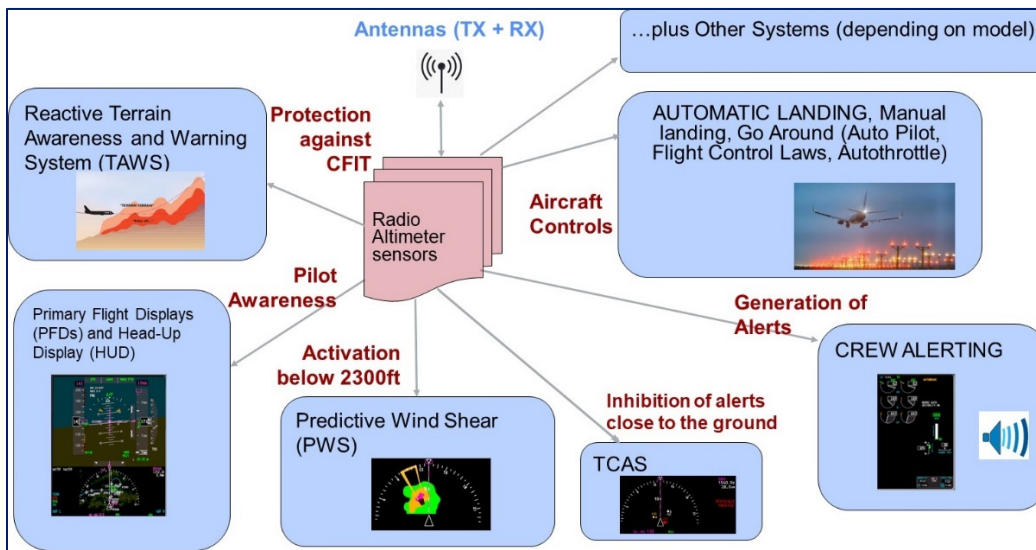
Source: Roadmaps for awarding 5G spectrum in the MENA region – GSMA Document, January 2022

- 1.2.3. Each State has responsibility to develop spectrum management policies and regulations that comply with the international treaty obligations of the Radio Regulations while meeting national spectrum needs. One of the main tools to manage the spectrum is National Frequency Allocations Tables (NFAT). NFAT shows how the spectrum can be utilized for each radio frequency service.
- 1.2.4. States and national spectrum regulators all over the world are considering (or have considered) allowing 5G cellular systems to operate in parts of the frequency ranges 3.4-4.2 GHz and 4.4 -4.9 GHz (“C-band”). These potential allocations are adjacent to the band used by radio altimeters and pose potential safety hazard if no mitigations are implemented. It is of paramount importance that, in support of safety of aircraft operations, member States and national regulators, note Article 4.10 of the ITU Radio Regulations which states, “ITU Member States recognize that the safety aspects of radionavigation and other safety services require special measures to ensure their freedom from harmful interference. It is necessary therefore to take this factor into account in the assignment and use of frequencies.”

Chapter 2 - Potential impacts of 5G on Radio Altimeters during aircraft operations

2.1. Introduction

- 2.1.1. The band 4200 - 4400 MHz is allocated to the aeronautical radionavigation service (ARNS) and is reserved for radio altimeters installed onboard aircraft by ITU Radio Regulations Art. 5 – Frequency Allocations, footnote No. 5.438.
- 2.1.2. Radio altimeters are critical sensors used to enable and enhance several different safety and navigation functions throughout all phases of flight on all commercial aircraft and a wide range of other aircraft.
- 2.1.3. The radio altimeter is the only sensor onboard the aircraft capable of providing a direct measurement of the clearance height above the terrain and any obstacles, it plays a crucial role in providing situational awareness to the flight crew and is an essential component of aeronautical safety-of-life during aircraft operations. The main radio altimeters functions are illustrated in the following figure.



- 2.1.4. Radio altimeter systems are designed to operate for the entire life of the aircraft in which they are installed. The installed life can exceed 30 years, resulting in a wide range of equipment age, performance, and tolerance.

2.2. Radio altimeters characteristics (based on ITU-R M.2059)

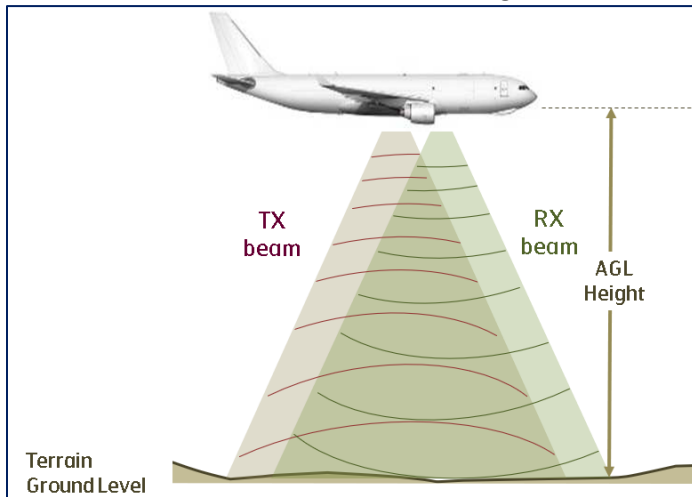
2.2.1. General Characteristics

- 2.2.1.1. Technical characteristics for several types of radio altimeters operating within the frequency band 4200-4400 MHz can be found in [Recommendation ITU-R M.2059](https://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.2059-0-201402-1!!PDF-E.pdf)³. In particular, Table 1 & Table 2 give technical parameters of several radio altimeters.
- 2.2.1.2. Because of the importance of radio altimeters to safely operate an aircraft, they are included in the minimum equipment list on aircraft certified for passenger service. Furthermore, they must be certified

³ https://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.2059-0-201402-1!!PDF-E.pdf

at a safety criticality rating or Design Assurance Level (DAL) of “A”, “Where a software/hardware failure would cause and/or contribute to a catastrophic failure of the aircraft flight control systems” for all transport aircraft and a DAL of “B”, “Where a software/hardware failure would cause and/or contribute to a hazardous/severe failure condition in the flight control systems” for business and regional aircraft. Design assurance level is a safety criticality rating from level A to E, with level A/B being the most critical and requiring the most stringent certification process.

2.2.1.3. Radio altimeter systems on a single aircraft consist of up to three identical radio altimeter transceiver (Tx/Rx) units with their associated equipment. All Tx/Rx units operate simultaneously and independently from one another. The radio altitude is computed from the time interval a signal, originating from the aircraft is reflected from the ground. Radio altimeters designed for use in automated landing systems are required to achieve an accuracy of 0.9 meters (3 feet). The following figure is an illustration of the TX/RX beams of radio altimeter signals. .



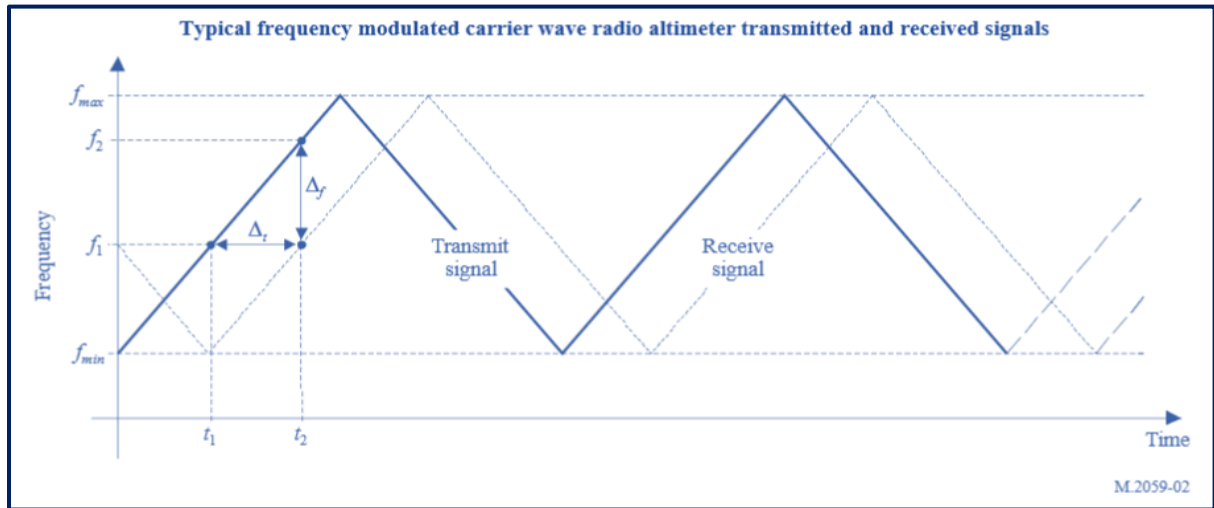
2.2.1.4. There are two types of radar waveform modulation methods for Radio altimeters:

- Continuous-wave of LFCW (Linear Frequency Modulation Continuous Wave) or FMCW Radio altimeters (Frequency Modulated Carrier Wave); and
- Pulsed modulation.

2.2.2. FMCW radio altimeters

2.2.2.1. FMCW radio altimeters operate by a Tx/Rx working in conjunction with separate transmit/receive antennas. Operation requires a signal from the transmit antenna to be directed to the ground. When the signal hits the ground, it is reflected back to the receive antenna. The system then performs a time calculation to determine the distance between the aircraft and the ground, as the altitude of the aircraft is proportional to the time required for the transmitted signal to make the round trip.

2.2.2.2. It is important to note that FMCW radio altimeters do not have a fixed frequency. One can find the chirp bandwidth of each FMCW radio altimeter type in Table 1 of Recommendation ITU-R M.2059.



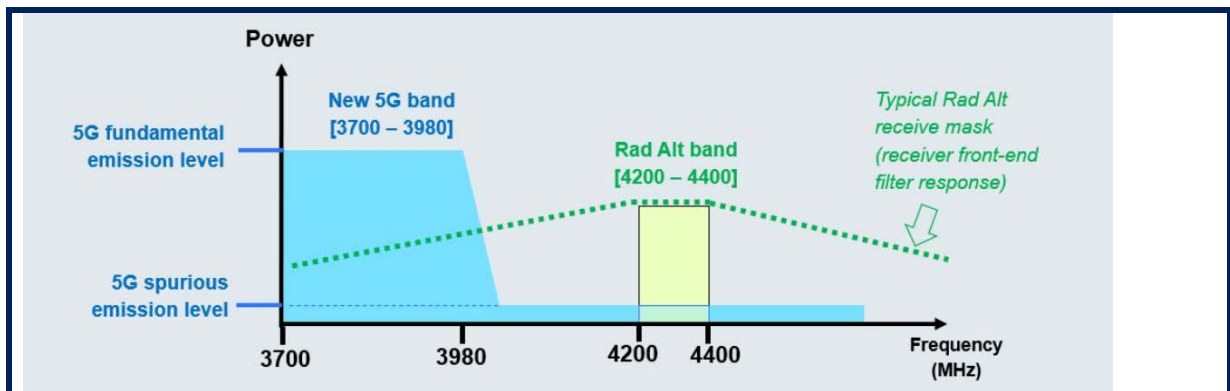
2.2.3. Pulsed radio altimeters

2.2.3.1. The pulsed-type radio altimeter uses a series of pulses of radio frequency energy transmitted towards the Earth to measure the absolute height above the terrain immediately underneath the aircraft. The time difference between the transmitted pulse and the received pulse is measured, and that time is proportional to the height of the aircraft. Pulsed radio altimeters are emitting at a fixed frequency (generally 4300 MHz). However, the emission bandwidth could vary (see for example D4 within the Table 1 from ITU-R M.2059).

2.2.4. Technical concerns

2.2.4.1. Standardized in 1980s, the radio altimeters, even though developed and deployed fully in compliance with national regulations and industry standards, have not been designed to fully withstand the high level of terrestrial interferences in its adjacent and near bands that may cause a blocking and/or spurious phenomenon. The fundamental terrestrial 5G energy is not filtered by all radio altimeters models.

2.2.4.2. In the United States, following an auction by the Federal Communications Commission (FCC) of the 3.7–3.98 GHz frequency band, RTCA formed a task force to assess the interference impact of wireless broadband operations in the 3.7–3.98 GHz band on radio altimeters. Based on the work of the task force, RTCA published a report entitled, “Assessment of C-Band Mobile Telecommunications Interference Impact on Low Range Radar Altimeter Operations” where it identified potential risk of interference that can be caused by 5G base stations operating within the band 3.7–3.98 GHz.



Source: RTCA Paper No. 274-20/PMC-2073 – (Figure 3-1: Spectrum Illustration Showing 5G Fundamental and Spurious Emissions, page 20).

2.3. Potential operational impacts of 5G on Flight Crew and Aircraft ⁴

2.3.1. Loss of Situational Awareness

2.3.1.1. On all types of aircraft, situational awareness of the flight crew is paramount to ensuring safe flight operations, especially flying in busy airspace, close to the ground, or in low-visibility scenarios such as Instrument Meteorological Conditions (IMC). The radio altimeter plays a critical role in providing situational awareness in these operating conditions, in particular. Not only do radio altimeters provide a displayed indication of height above terrain to the flight crew, but they also form the basis of auditory altitude callouts during terminal landing procedures, as well as Traffic Alert and Collision Avoidance System/Airborne Collision Avoidance System (TCAS/ACAS) and Terrain Awareness Warning System (TAWS) advisories and warnings.

2.3.1.2. Erroneous or unexpected behavior of the radio altimeter directly leads to a loss of situational awareness for the flight crew. Not only does this loss of situational awareness present an immediate impact to the ability of the flight crew to maintain safe operation of the aircraft in its own right, it also requires the flight crew to attempt to compensate for the lack of reliable height above ground information using other sensors and visual cues, if available. This further leads to a risk of task saturation for the flight crew, particularly during operations or phases of flight which require continuous crew engagement, such as final approach and landing procedures.

2.3.2. Controlled Flight into Terrain

2.3.2.1. In the most extreme cases, loss of situational awareness may lead to an occurrence of Controlled Flight into Terrain (CFIT), which is when the pilot flies the aircraft into the ground. This situation is nearly always a devastating event resulting in aircraft hull loss and a high likelihood of loss of life or severe injuries to the flight crew and passengers. The frequency of CFIT accidents in earlier generations of aircraft operations was unacceptably high, providing the key motivating factor for the introduction of radio altimeters in civil and commercial aviation in the 1970s, as well as the subsequent development of TAWS. This implementation has greatly reduced the risk of CFIT, as long as the radio altimeter and associated systems are functioning properly.

2.3.2.2. However, CFIT may still occur in modern aircraft operations due to undetected erroneous output from the radio altimeter(s), which may be considered Hazardously Misleading Information (HMI) during certain phases of flight or operational conditions (such as IMC). If HMI is presented to the flight crew, TAWS, or the AFGCS, it may lead to incorrect and dangerous flight operations, and there may not be sufficient time to correct the error before a catastrophic result such as CFIT occurs.

2.3.3. Specific Operational Impacts on Aircraft

2.3.3.1. On commercial air transport and regional aircraft, high-end business aviation aircraft, and some general aviation aircraft and helicopters, the radio altimeter serves far more purposes than providing situational awareness of the terrain clearance height to the flight crew. In these cases, in addition to providing a displayed indication of the aircraft height above terrain, the radio altimeter will be used as a safety-

⁴ Descriptions from RTCA report, https://www.rtca.org/wp-content/uploads/2020/10/SC-239-5G-Interference-Assessment-Report_274-20-PMC-2073_accepted_changes.pdf

critical navigation sensor by the Automatic Flight Guidance and Control Systems (AFGSC) and will also feed into systems such as TCAS/ACAS, Predictive Wind Shear (PWS), and TAWS. This usage by a wide variety of systems onboard the aircraft leads to the possibility of specific operational impacts that go beyond a general loss of situational awareness or risk of CFIT.

2.3.3.2. The table below illustrates typical radio altimeter failures with specific operational impacts that may be encountered due to undetected erroneous readings or unanticipated loss of output (indicated as a No Computed Data, or NCD, condition) from the radio altimeter on commercial or civil aircraft which utilize the radio altimeter for functions such as those mentioned in the preceding paragraph. For each impact, the severity is assessed in accordance with FAA system safety analysis guidelines⁵. The severity of each condition may be determined to be Minor, Major, Hazardous/Severe Major, or Catastrophic, with each severity classification having its own allowable occurrence rate. The allowable occurrence rate 1×10^{-3} per flight hour or less for Minor failure conditions, 1×10^{-5} per flight hour or less for Major failure conditions, 1×10^{-7} per flight hour or less for Hazardous/Severe Major failure conditions, and 1×10^{-9} per flight hour or less for Catastrophic failure conditions.

Radio Altimeter Failure	Operational Impact	Flight Phase	Severity
Undetected Erroneous Altitude	Just prior to touchdown, the aircraft performs a flare maneuver to avoid a hard landing. The flare may be performed manually by the flight crew, using auditory callouts of radio altimeter readings, if sufficient visibility is available. In low-visibility conditions, the flare may be controlled by an auto-land function. Erroneous radio altimeter readings in either case can result in the potential for CFIT with little or no time for the flight crew to react.	Landing – Flare	Catastrophic
Undetected Erroneous Altitude	Erroneous input to the AFGCS affects aircraft attitude commands and altitude, as well as flight control protection mechanisms	All Phases of Flight	Catastrophic
Unanticipated NCD	Undetected loss of PWS display to flight crew, preventing awareness of wind shear impact to vertical profile in front of the aircraft	Landing	Hazardous/Severe Major
Unanticipated NCD	Undetected loss of TCAS/ACAS inhibition near the ground, leading to potential erroneous descent advisory alert and associated possibility of CFIT in low-visibility conditions	Approach, Landing, Takeoff	Hazardous/Severe Major

⁵ See references in RTCA report paragraph 5.3, https://www.rtca.org/wp-content/uploads/2020/10/SC-239-5G-Interference-Assessment-Report_274-20-PMC-2073_accepted_changes.pdfhttps://www.rtca.org/wp-content/uploads/2020/10/SC-239-5G-Interference-Assessment-Report_274-20-PMC-2073_accepted_changes.pdf

Radio Altimeter Failure	Operational Impact	Flight Phase	Severity
Undetected Erroneous Altitude	Erroneous triggering of TAWS reactive terrain avoidance maneuver, forcing mandatory response from flight crew and leading to potential traffic conflicts in surrounding airspace	Approach, Landing, Takeoff	Major
Unanticipated NCD	Aircraft landing guidance flight control laws violated leading to unnecessary missed approach and go-around, jeopardizing safety of surrounding airspace	Approach, Landing	Major
Unanticipated NCD	Loss of capability to perform approach and landing in low-visibility conditions (Category II/III approach), leading to unnecessary diversion and jeopardizing safety of surrounding airspace	Approach, Landing	Hazardous/Severe Major
Unanticipated NCD	Loss of capability to warn flight crew in case of excessive aircraft descent rate or excessive terrain closure rate (TAWS Mode 1 and 2 alert protection not active)	All Phases of Flight	Major
Unanticipated NCD	Loss of capability to warn flight crew of potentially dangerous loss of height after takeoff (TAWS Mode 3 alert protection not active)	Takeoff, Go-around	Major
Unanticipated NCD	Loss of capability to warn flight crew of potentially dangerous aircraft configuration—e.g., landing gear, slats, flaps—based on height above terrain (TAWS Mode 4 alert protection not active)	Landing	Major
Unanticipated NCD	Loss of capability to warn flight crew that aircraft is dangerously below glide path during precision instrument approach (TAWS Mode 5 alert protection not active)	Landing	Major

2.3.3.3. The operational impacts listed in the table above are not exhaustive, and other operational impacts which can compromise aviation safety may be encountered. The examples provided are intended to give a general idea of the types of specific impacts that may be experienced and their severity.

Chapter 3 – Short Term Safeguarding measures adopted at regional and global levels /Long Term Planning

3.1. Introduction

- 3.1.1. The aviation community has raised concerns about potential interference to radio altimeters operating in the frequency band 4.2 – 4.4 GHz from 5G networks deployed in adjacent and nearby bands. To this end, a detailed technical analysis was performed by RTCA, and a report was published in October 2020. The RTCA report studies the impact of 5G operations in the 3.7 – 3.98 GHz band based on US Federal Communication Commission (FCC)’s decision to allow the deployment of mobile networks in this band. Two main interference mechanisms are considered:
- spurious emissions from 5G transmitters falling into the main altimeter operating band and causing the altimeter receiver desensitization; and
 - emissions from the main 5G operating band falling into altimeter sidebands and causing the altimeter receiver blocking.
- 3.1.2. The RTCA report considers the protection criteria established in [ITU-R Recommendation M.2059](#) for altimeters. It describes the measurement tests conducted to determine interference tolerance thresholds for different aviation commercial altimeter models. The test results were presented for three user categories: Category 1 representing commercial air transport airplanes; Category 2 representing regional, business and general aviation airplanes; and Category 3 covering helicopters. For each user category, 5G interference levels are then calculated for different 5G deployment scenarios (urban, suburban, and rural) and compared against measured threshold levels. The report concludes that there is a risk of exceeding altimeter interference threshold levels by interference caused by 5G networks operating in 3.7 – 3.98 GHz band. The values are potentially based on worst-case noting that no information is available on the specific altimeters considered.
- 3.1.3. Within ICAO, the Frequency Spectrum Management Panel (FMSP) has considered the issue and reviewed submissions from several States. In addition, a group has been established to collect information related to 5G/Radio Altimeter compatibility and a State Letter has been produced advising ICAO member States of the issue.
- 3.1.4. Several States have already implemented temporary technical, regulatory, and operational mitigations on new 5G systems in order to protect the RA while more permanent solutions are being explored.

3.2. Measures adopted by States, Regional Organizations & SDOs

3.2.1. Australia

- 3.2.1.1. The Australian spectrum regulator (the ACMA) held a public consultation in May 2022 on replanning parts of the frequency band 3 400-4 000 MHz for 5G and wireless broadband expansion. Currently, 5G operates in Australia in the frequency range 3 565-3 700 MHz. The Australian Civil Aviation Safety Authority (CASA) published an [Airworthiness Bulletin⁶](#) asking operators to report any Radio-Altimeter interference that occurs below 2500 feet.

⁶ <https://www.casa.gov.au/files/awb-34-020-issue-3-potential-interference-radio-altimeter-systems>

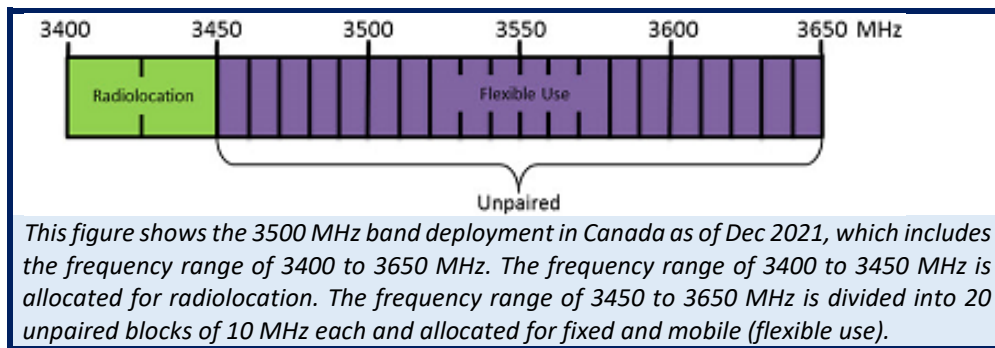
3.2.1.2. In late December 2021, CASA issued an [exclusion from the Operation of Airworthiness Directives FAA AD 2021-23-12 and FAA AD 2021-23-13](#)⁷. This Exclusion applies to any Australian registered aircraft when it is operated outside the airspace of the United States of America.

3.2.2. Canada

3.2.2.1. Transport Canada Civil Aviation (TCCA) has published a [Civil Aviation Safety Alert \(CASA\) \(2021-08\)](#)⁸ Potential Risk of Interference of 5G Signals on Radio Altimeters (June 2021 and Dec 2021) to raise awareness of the potential risk of 5G interference worldwide and to recommend precautionary operational measures before confirmation of the impact of 5G to Radio Altimeters. It also recommends switching off all 5G passenger/flight crew devices and in case of interference, to report the event to the Air Traffic Service as soon as possible and to file a Radio Altimeter disturbance/interference report on a provided form.

3.2.2.2. In August 2021, Innovation, Science and Economic Development Canada (ISED) consulted the telecom and aviation industry on the interim technical mitigations to protect Radio Altimeters from 5G interference in the 3450-3650 MHz band. On Nov 18th, 2021, ISED established temporary restrictions to 5G based on available information and mitigations taken in France and Japan. ISED protection measures include:

- exclusion and protection zones to mitigate interference to aircraft around certain airport runways where automated landing is authorized
- a national antenna down-tilt requirement to protect aircraft used in low altitude military operations, search and rescue operations and medical evacuations all over the country.
- Outdoor non-Active antenna system (AAS) and AAS fixed point-to-point and multipoint stations with a positive angle with reference to the horizon with limiting power.
- Airborne operations (e.g., drones) are not permitted in the 3450-3650 MHz band.
- Active antenna system (AAS), Non time division duplexing (TDD) systems, fixed point-point stations restriction.
- Frequency divided into 20 unpaired blocks of 10 MHz each as shown in the following figure.



- Maximum power is 68 dBm/5 MHz up to 305 metres and 61 dBm/MHz for channel bandwidth less than 5 MHz. Antenna above 305 m need to calculate the maximum power emission

⁷ <https://www.legislation.gov.au/Details/F2021L01909>

⁸ <https://tc.canada.ca/en/aviation/reference-centre/civil-aviation-safety-alerts/potential-risk-interference-5g-signals-radio-altimeter-civil-aviation-safety-alert-casa-no-2021-08>



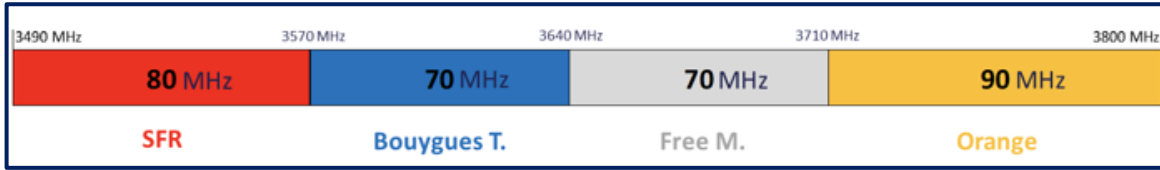
3.2.2.3. ISED has completed the Over-The-Air (OTA) testing and it is currently analyzing the enormous amount of data from the OTA testing to determine the in-flight susceptibility of interference of various radio altimeters to 5G operating in the 3500 MHz, 3800 MHz and 3900 MHz bands under specific test conditions. In addition, ISED is currently testing and analyzing a few additional radio altimeters in the laboratory setting and the analysis is on-going.

3.2.3. Europe

3.2.3.1. In Europe, Electronic Communications Committee (ECC) has adopted a work item that covers the analysis of unwanted emissions from Mobile/Fixed Communications Networks (MFCN) i.e., 5G operating in 3400 – 3800 MHz into 4200 – 4400 MHz radio altimeters band as well as the impact of blocking of radio altimeters from 3400 – 3800 MHz MFCN in-band emissions. The meeting further agreed to work on long-term Mobile Fixed Communication Network (MFCN) operational parameters for the update of the Minimal Operational Performance Standards (MOPS) to be provided to RTCA/EUROCAE. The target date for the ECC report as the deliverable for the analyses is set for July 2023.

3.2.4. France

3.2.4.1. The National Frequency Agency (ANFR), the spectrum regulator in France allows flexible use of networks and technology (including 5G) in the frequency band 3400-3800 MHz. The allocation of the band to the operators is illustrated in the following figure and the power spectral density (PSD) of the base stations varies according to the operators between 62.44dBm/5MHz to 67.34 dBm/5MHz. However, these limits are not binding and can evolve upwards.



3.2.4.2. Based on RTCA report, French Civil Aviation Authority (DGAC) in coordination with ANFR have defined provisional precautionary measures relating to the geographical location of some 5G antennas in the vicinity of airports with IFR procedures in mainland France to mitigate the risk interference from 5G systems into Radio altimeter system. These measures can be summarized as follows:

- 1) Operators must implement only downward tilt⁹;
- 2) Operators have to take measures to avoid grating lobes as far as practicable;
- 3) Special protection zones are applied to all IFR aerodromes equipped with ILS CAT III facilities¹⁰ and to some helicopter platforms. The methodology used for the calculation of the dimensions of special protection zones is provided in [Appendix A to this document](#).

3.2.4.3. Measure 3) are verified by Civil aviation authority (DGAC) on the basis of the information provided by mobile operators and in close cooperation with National Frequency Agency (ANFR). Moreover, French DGAC has also published a [Safety info leaflet¹¹](#) in addition to the mitigation measures implemented around all IFR aerodromes.

3.2.4.4. The Special protection zones around all IFR aerodromes, as illustrated hereafter, are defined as follows:

- **Safety Zone:** where 5G base stations are not authorized to transmit and defined to protect the Radio altimeters in the phase where the aircraft is at or below 200 ft (61 m). Safety zone based on the following assumption:
 - a) 3° slope with a tolerance of 0.375° (i.e. 2.625°). Therefore, the aircraft may be below 200 ft (61 m) on the approach path to the runway threshold extended by 1130 m each side of a Base Station with a maximum Effective Isotropic Radiated Power (EIRP).
 - b) 6 dB ICAO Safety margin
 - c) 0 dBi maximum Radio altimeters antenna gain below 3.8 GHz based on RTCA Report
 - d) -19 dBm interference threshold based on RTCA report (Cat.1 below 200 ft)

The rectangular safety zone has a width on each side of the runway (protection distance) calculated with pervious assumptions and a length extended from each runway threshold by (1130 m + the protection distance). The protection distance value depends on the max EIRP of the BASE Station (e.g., for a Base Station with the Maximum EIRP of +78dBm, the protection distance value is 910m¹²)

- **Precaution zone:** where 5G base stations implementation are coordinated and defined on each side of the Safety Zone to protect the landing approach below 1000 ft (305 m)

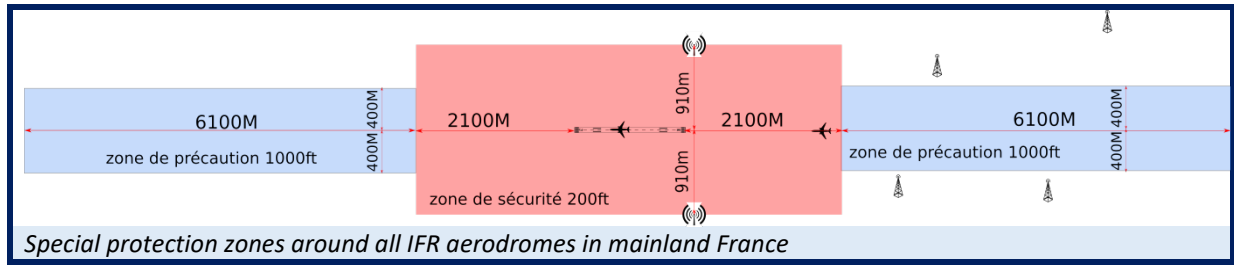
3.2.4.5. The protection zones dimensions are based on Minimum Coupling Loss (MCL) calculations and take into account the free space model (ITU-R P.525) at the frequency of 3750 MHz.

⁹ Following a complaint and legal threats from an operator, this constraint has been lifted during 2021 following a high-level political decision but his constraint remains valid in the “zone de précaution”.)

¹⁰ During the same decision as for the antenna tilt (Previous footnote refers), it was decided to limit these restrictions to airfields equipped with ILS CAT III. These decisions were made out of concern for the loss of all means of mitigation

¹¹ https://www.ecologie.gouv.fr/sites/default/files/Safety_Info_Leaflet_2021_01_5G_interferences.pdf

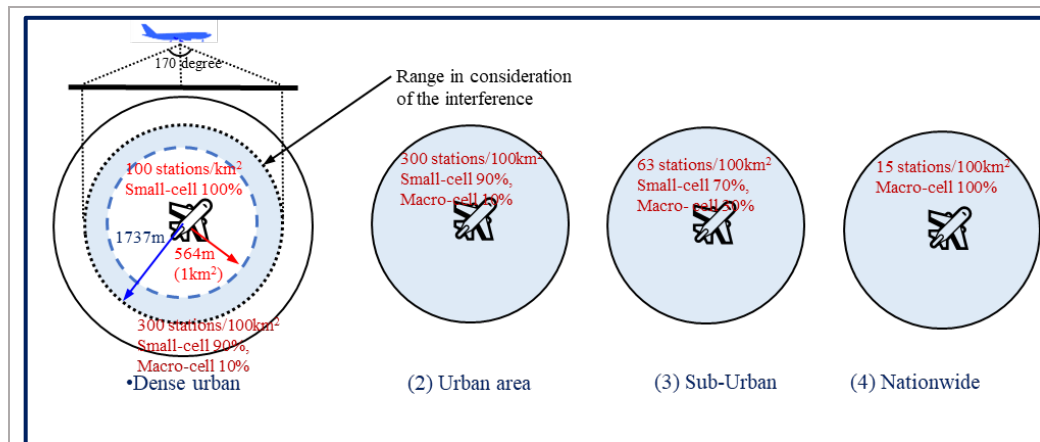
¹² Protection distance = $(\lambda / (4\pi)) \times 10^{((Max\ EIRP - interference\ threshold) / 20)}$



3.2.5. Japan

3.2.5.1. In Japan, 5G allocations are in the bands 3.6 – 4.1 GHz and 4.5 – 4.6 GHz which imply a 100 MHz guard band relevant to the radio altimeters band. The Ministry of Internal Affairs and Communications, the spectrum regulator in Japan, in coordination with specialized Institutes conducted a compatibility study using the parameters described in Recommendation ITU-R M.2059. The study has considered the following main factors:

- The BS deployment model is divided into 4 types of areas that have different densities and ratios of the 5G BSs as shown in the following figure. The angle of the range for aggregation is 170 degrees downward, and the area on the surface is calculated by the flight altitude. The maximum radius of the dense urban area model is 564m (1km²). The urban area model is placed surrounding the dense urban area model if the radius of the range of considerations is exceeding the maximum radius of the dense urban area model according to the flight altitude



- Two types of 5G BS were considered as typical models for study. One is the macro-cell BS (with the higher power radiation and higher antenna height) and another is the small-cell (with the lower power radiation and lower antenna height). The specifications of the 5G BS are described in the following Table.

	Small-cell BS	Macro-cell BS
Maximum EIRP (dBm/MHz)	25	48
Maximum Antenna Gain (dBi)	23	23
Ohmic loss of Active Antenna System (AAS) (dB)	3	3
Mechanical tilt (degrees)	10	6

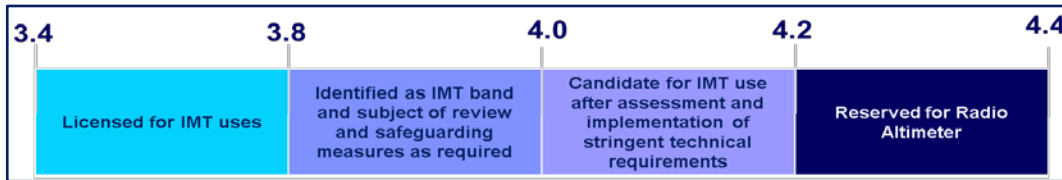
Antenna Height (m)	10	40
Spurious Level	-16 dBm/MHz	-4 dBm/MHz

3.2.5.2. Considering the results of the compatibility study between the RAs and 5G Base Station (BS), the Ministry of Internal Affairs and Communications set the following regulation for 5G BS:

- To avoid harmful interference to the RAs, a 100 MHz guard band is mandated.
- Additional requirement for the compatibility to the RAs near the aerodromes are applicable:
 - a) To avoid unwanted emission interference, unwanted emission of the 5G BS into the RA band should be reduced.
 - b) To avoid the blocking of radio altimeters, the location of the bands 4.0 – 4.1 GHz and 4.5 – 4.6 GHz used for 5G base station should be avoided within 200 m from the approaching path of aircraft.
 - c) For the heliports, the bands 4.0 – 4.1 GHz and 4.5 – 4.6 GHz used for 5G BS should be kept the physical separation more than 50 m for macro-cell and 20m for small-cell.

3.2.6. Saudi Arabia

3.2.6.1. The Communications, Space and Technology Commission (CST) is responsible for managing radio spectrum for all users in the Kingdom of Saudi Arabia. CST has planned allocation of 5G IMT in the band 3.4 – 4.0 GHz as shown hereafter.



3.2.6.2. CST conducted consultation with aircraft manufactures and operators in February 2021 to take views and comments on the impact of 5G deployment in 3.8 – 4.0 GHz band on the RADALT. The main recommendations can be summarized as follows:

- The allocation in the band 3.8-4.0 GHz must be subject to protection criteria, technical and operational requirements considering the performance of RADALT to avoid any harmful interferences, which may include but not limited to (separation distance, antenna height, tilt, and power).
- Consideration should be given to the protection of altimeters operating on-board helicopters using helipads in built-up areas where 5G deployment is likely to be high-density.
- These arrangements need to be reviewed once the aviation industry has developed new radio altimeter standards taking account of 5G deployments and developed a transition plan. Once new standards are deployed for RADALT, the allocation for 5G IMT may be extended in the band 4.0-4.2 GHz.

3.2.6.3. CST and General Authority of Civil Aviation (GACA) are collaborating with “Spectrum Advisory Group” to develop protection criteria for the altimeter systems to avoid harmful interference from the 5G networks. Interim measures using the French approach where exclusion and protection zones are established around major airports, are under consideration.

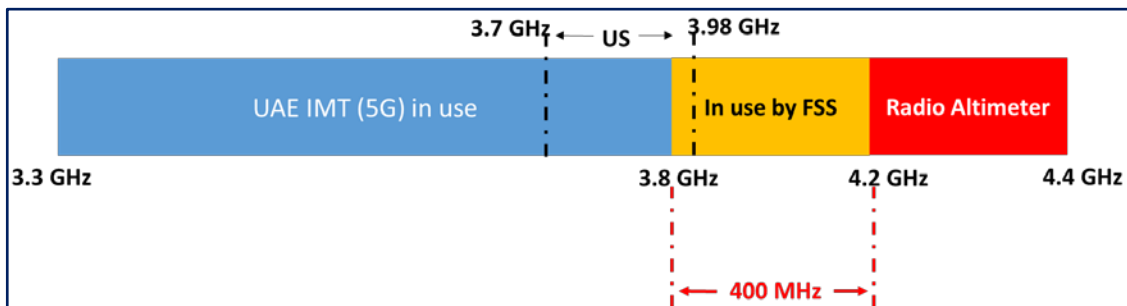
3.2.6.4. GACA published [an Advisory Circular¹³](#) to all operators of aircraft equipped with radio altimeters and air traffic service providers within the Kingdom of Saudi Arabia, informing them about the likelihood of 5G interferences on aircraft system. This Circular provides operational recommendations and invite aircraft operators, pilots, and Air Traffic Service Units to report to GACA any 5G interference events.

3.2.7. Oman

3.2.7.1. The Civil Aviation Authority (CAA - Sultanate of Oman) published an [Aeronautical Information Circular \(AIC\)¹⁴](#). The purpose of this Civil Aviation Safety Alert is to raise awareness of the potential risk of 5G interference and to recommend precautionary operational measures before confirmation of impact of 5G radio waves on radio altimeters.

3.2.8. United Arab Emirates

3.2.8.1. Telecommunications and Digital Government Regulatory Authority is responsible for managing radio spectrum in UAE. 5G allocations in UAE are in the band 3.3 – 3.8 GHz as illustrated in the following figure.



3.2.8.2. The UAE gives high priority to RADALT protection in 4.2- 4.4 GHz. The UAE plans to use the band 3.8 – 4.0 GHz for IMT only after completion of technical studies to protect RADALT in 4.2- 4.4 GHz and in the future may extend this use up to 4.2 GHz.

3.2.8.3. The General Civil Aviation Authority (GCAA – UAE) published a [Safety Alert¹⁵](#) at the attention of United Arab Emirates Aircraft Operator, informing them about the likelihood of 5G interferences on aircraft systems. This safety alert also recommends monitoring and reporting any 5G interference events.

3.2.9. United Kingdom

3.2.9.1. In the UK, Ofcom are responsible for managing the radio spectrum for all users in UK. In consultation with the Civil Aviation Authority and the Ministry of Defence, Ofcom decided to release the frequency band 3.6-4.2 GHz for mobile applications.. The frequency band was split in two with the 3.6-3.8 GHz being auctioned off for 5G mobile services and 3.8-4.2 GHz was made available through coordinated local licenses to meet local wireless connectivity needs and innovation in rural areas with a lower radiated power.

3.2.9.2. Prior to the release of the consultation document for both frequency bands, UK conducted a number of theoretical study with respect to the potential impact on radio altimeters. Various scenarios based

¹³ [GACA Advisory Circular](#)

¹⁴ https://www.caa.gov.om/upload/files/AIC_04-21.pdf

¹⁵ [https://www.gcaa.gov.ae/en/epublication/admin/Library/Pdf/Safety Alerts/SAFETY ALERT 2021-03 - REQUIREMENTS TO MITIGATE 5G INTERFERENCE OPERATIONAL RISKS - ISSUE 01.pdf](https://www.gcaa.gov.ae/en/epublication/admin/Library/Pdf/Safety%20Alerts/SAFETY%20ALERT%202021-03-%20REQUIREMENTS%20TO%20MITIGATE%205G%20INTERFERENCE%20OPERATIONAL%20RISKS%20-%20ISSUE%2001.pdf)

on International Telecommunication Union, European Commission & UK regulations and taking into account that signals will continue to roll-off in the spurious emission domain as well as other perceived reasonable assumptions. The initial study did not consider the impact of active antenna system due to modelling difficulties and user equipment was ignored as the power levels are significantly lower and therefore presumed not to be a threat. Subsequent studies have taken into account active antenna.

- 3.2.9.3. Whilst Ofcom, the Civil Aviation Authority and the Ministry of Defence were confident that the deployment of 5G services, especially around airports, would not pose a threat to radio altimeters. However, given the results of the RTCA studies the UK has monitored the situation carefully but there has been no evidence of interference caused by the introduction of high power 5G services in the frequency band 3.6-3.8 GHz or rural wireless services.

3.2.10. USA

- 3.2.10.1. The USA allocated 3.7-3.98 GHz to services including 5G in Feb 2020 in 20 MHz license blocks that can be aggregated by the same operator up to 100 MHz. The FCC limited the fundamental power to 65 dBm/MHz maximum EIRP for rural areas, and 62 dBm/MHz in urban areas, though no limits were placed on antenna positioning or vertical direction of the signal. Additionally, the FCC limited out of band spurious emissions levels to -13 dBm/MHz though 3rd Generation Partnership Project (3GPP) standards recommend -30 dBm/MHz. In some cases, based on testing, the aviation community has recognized the need for emission levels to be as low as -48 dBm/MHz to ensure adequate performance of the radio altimeter system.

- 3.2.10.2. The United States Federal Aviation Administration (FAA) on 18 October 2022 issued a [Special Airworthiness Information Bulletin \(SAIB\) on the Risk of Potential Adverse Effects on Radio Altimeters](#)¹⁶, as well as, [a Safety Alert for Operators \(SAFO\) on the Risk of Potential Adverse Effects on Radio Altimeters when Operating in the Presence of 5G C-Band Interference](#)¹⁷. Concurrently, two Airworthiness Directives (ADs), FAA ADs 2021-23-12 and 2021-23-13, were issued: An [Airworthiness Directive on altimeter interference for fixed wing aircraft](#)¹⁸, and an [Airworthiness Directive on altimeter interference for rotary wing aircraft](#)¹⁹. Subsequently, seven additional ADs have been issued. These ADs revise the landing requirements, and in certain cases, prohibit landing at certain airports due to the reliance aircraft systems have on radio altimeters. The FAA issued Notices to Air Missions NOTAMs prohibiting certain operations. Therefore, FAA ADs must be followed when operating in the USA where a NOTAM is in place.

- 3.2.10.3. The FAA has defined protection areas around active runways as follows:

- **Runway Safety Zone (RSZ)** – The RSZ is defined as the volume where aircraft are highly likely to be operating during low altitude operations near the runway with 5G C-band emissions meeting maximum power requirements. The RSZ is based on instrument approach procedure (IAP) obstacle clearance surfaces (OCS) applicable to these low altitude operations (e.g., below 500 feet AGL) near the runway, specifically, the approach, missed approach, and CAT II/III OCS. Therefore, the RSZ is a 3D volume that begins at the surface on and near the runway, extends

¹⁶<https://drs.faa.gov/browse/excelExternalWindow/DRSDOCID199898867620221018133547.0001>

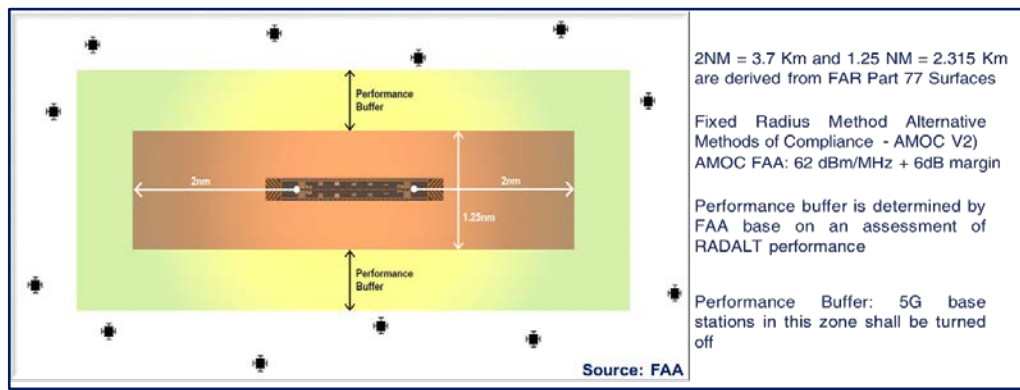
¹⁷ https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos/media/2021/SAFO21007.pdf

¹⁸https://www.faa.gov/sites/faa.gov/files/2021-12/FRC_Document_AD-2021-01169-T-D.pdf

¹⁹ https://www.faa.gov/sites/faa.gov/files/2021-12/FRC_Document_AD-2021-01170-R-D.pdf

approximately 2 nm into the approach area along the extended runway center line, and slopes up based on the OCS as defined by the IAP glide path angle. The width of the RSZ is based on the OCS width at a specific distance from the landing threshold, and varies between 1300 and 3000 feet each side of the runway center line. In this area unreliable Radio Altimeter function can lead to a catastrophic outcome. Acceptance criteria: The Radio Altimeter must function accurately and reliably in the RSZ.

- **Performance Buffer (PB)** – Initially, the FAA defined PB as the zone in which 5G base stations were turned off based on an assessment of radio altimeter performance. Through collaboration with the aviation and wireless industry, this evolved into the current approach, where the 5G signal in space must meet specific power spectral density (PSD) requirements in the RSZ volume. Specific PSD requirements vary based on altitude above ground level, and are based on minimum required RA performance. These PSD requirements will continue to evolve as more minimum required RA performance increases (e.g., as more RAs are retrofitted or replaced), to support increased wireless base station power..



3.2.10.4. Since January 2022, the FAA has issued monthly Alternative Means of Compliance (AMOC) based on the performance capabilities of the Radio Altimeter while also considering antennas, cabling, and any other system integration issues. The method aims to determine the minimum distance away from a 5G antenna the aircraft needs to be to meet the acceptance criteria of the RSZ.

3.2.10.5. More information on historical FAA assessment, documentation, and actions can be found at www.faa.gov/5g.

3.2.11. Arab Civil Aviation Organization (ACAO)

3.2.11.1. Air Navigation Committee endorsed the following recommendation:

- Urge ACAO member states to take appropriate measures to reduce the impact of the installation of 5G cellular networks on the air traffic movement in coordination with the concerned national authorities of each country (national telecommunications regulatory bodies) including determining the levels of use of 5G cellular networks near airports and their future plans.....
- Task the General Administration of ACAO in coordination with the recently established 5 G Working Group of ICAO Middle East Regional Office to work on the development of a mechanism at the national and regional levels to report and analyze interference reports resulting from the use of 5G networks
- Urge ACAO member states to support ICAO's position during the 2023 World Telecommunications Conference WRC-23 meeting to be held on 2023 through coordination with the national telecommunications regulatory bodies of each member State.

3.2.12. EASA

- 3.2.12.1. European Aviation Safety Authority issued a Safety Bulletin: SIB No. 2021-16 on the subject of Operations to aerodromes located in United States with potential risk of interference from 5G ground stations.

3.2.13. IATA

- 3.2.13.1. IATA continues engaging with governments to mitigate threats to the civil aviation spectrum, including encouraging responsible deployments of 5G. IATA activities focus under four strategic pillars including:

- 1) Safe and uninterrupted airline operations - civil aviation should not be negatively impacted by any spectrum deployments.
- 2) Cooperative coordination - government agencies should plan spectrum deployments collaboratively together with industry stakeholders.
- 3) Protection of civil aviation spectrum resources and establishment of predictable global spectrum environment
- 4) Robust aircraft and avionics design with clear and cost-effective migration path

- 3.2.13.2. IATA and its member airlines understand the economic importance of 5G deployments. However, in line with Article 4.10 of the International Telecommunications Union Radio Regulations (pdf) and ICAO Standards and Recommended Practices, IATA insists that maintaining current levels of safety for civil aviation must continue to be one of the governments' highest priorities.

- 3.2.13.3. IATA has developed a website that includes the Global 5G C-Band status Dashboard and be accessed at: <https://www.iata.org/en/programs/ops-infra/air-traffic-management/5g/>

3.2.14. ICAO – FSMP

- 3.2.14.1. Within ICAO, the Frequency Spectrum Management Panel (FSMP) has considered the issue and reviewed submissions from several States and International Organizations. In addition, a Working Group (WG) has been established to collect information on 5G/Radio Altimeter compatibility. Based on a proposal from FSMP-WG, the ICAO Secretary General issued a State Letter expressing potential safety concerns regarding interference to radio altimeters ([ICAO SL 21/22 “Potential safety concerns regarding interference to radio altimeters”, published on 25 March 2021²⁰](#)). This letter encourages administrations to consider as a priority, public and aviation safety when deciding how to enable cellular broadband/5G services in radio frequency bands near that used by radio altimeters. The FSMP-WG continues to work on the subject and expects additional contributions from States, and specialized international organizations. The material produced by FSMP is publicly available through this link: <https://www.icao.int/safety/FSMP/Pages/default.aspx²¹>.

- 3.2.14.2. Based on [WP30²²](#) presented jointly by Air Transport Association (IATA), the International Business Aviation Council (IBAC), the International Coordinating Council of Aerospace Industries Associations (ICCAIA), the International Federation of Air Line Pilots' Associations (IFALPA) and RTCA on “Safety concerns regarding interference to aircraft radio altimeters”, ICAO High Level Conference On COVID-19 (HLCC 2021) adopted the following Recommendation:

²⁰ [https://www.icao.int/safety/FSMP/Documents/5G and Radio Altimeters/StateLetter_2021_022e.pdf](https://www.icao.int/safety/FSMP/Documents/5G%20and%20Radio%20Altimeters/StateLetter_2021_022e.pdf)

²¹ <https://www.icao.int/safety/FSMP/Pages/default.aspx>

²² https://www.icao.int/Meetings/HLCC2021/Documents/WP/EN/SAF/wp_030_en.pdf

Recommendation 5/5 — Mitigating the risk of 5G implementation to safety-critical radio altimeter functions That States:

- a) consider, as a priority, public and aviation safety when deciding how to enable cellular broadband/5G services;*
- b) consult with aviation safety regulators, subject matter experts and airspace users, to provide all necessary considerations and regulatory measures to ensure that incumbent aviation systems and services are free from harmful interference;*

and That ICAO:

- c) continue coordinated aviation efforts, particularly at the International Telecommunication Union (ITU), to protect radio frequency spectrum used by aeronautical safety systems.*

3.2.14.3. The Technical commission of the ICAO Assembly 41st session held from 29 September to 5 October 2022 reviewed several working papers on potential interference from 5G deployment to the radio altimeter and has encouraged States and regions to actively participate in spectrum protection activities and to endorse the ICAO position for the twenty-third meeting of the International Telecommunication Union World Radiocommunication Conferences (ITU WRC-23) (ICAO State letter E 3/5-21/37).

3.2.14.4. Based on a proposal of the technical commission, the Assembly adopted a resolution which supersedes Assembly Resolution A38-6: *Support of the ICAO policy on radio frequency spectrum matters*. This resolution urges Member States to consider, as a priority, public and aviation safety when deciding how to enable new or additional services, and to consult with aviation safety regulators, subject matter experts and airspace users, to provide all necessary considerations and to establish regulatory measures to ensure that incumbent aviation systems and services are free from harmful interference²³.

3.2.14.5. In addition, ICAO adopted the following additional actions:

- Updating its positions on Frequency spectrum use to highlight concerns on 5G band allocations and potential interference with RADALT. The position will be submitted for ITU World Radiocommunication Conference (WRC) 2023 highlighting the concerns.
- Amending ICAO-MID Frequency Management Ad-hoc working group ToRs to add a task to Collect and share information on the best practices implemented by States and Regional Organizations to mitigate potential radio altimeters (RADALT) interference caused by 5G operation
- Updating ICAO Spectrum Policy and Handbook to strengthen the need to protect the radio altimeter.
- Raising awareness and emphasizing the importance of the issue with State regulators, both aviation and spectrum, through its regional offices and meetings.
- Issuing of several ICAO liaison statements to the European spectrum regulator (CEPT) highlighting the need to protect the radio altimeter and to encourage conditions on 5G deployment that can ensure the functionality of current radio altimeters and thus can be accepted by aviation stakeholders.

3.2.15. RTCA-EUROCAE

3.2.15.1. Following the US national Communication Regulator i.e., Federal Communication Commission (FCC)'s decision to allow 5G services in the 3.7-3.98 GHz, an additional study was encouraged given the

²³ https://www.icao.int/Meetings/a41/Documents/WP/wp_623_en.pdf - from page 10 to 12.

questions raised by the aviation community. With this respect, RTCA established a public multi-stakeholder group under its Special Committee 239 (SC-239) that conducted an extensive theoretical study of the simulated 5G interference, assessing it against radio altimeter performance data from the major manufacturers in common and real-world scenarios. With the regulatory limits defined by the US FCC for base stations and handsets, combined with data from the 5G interests, the [RTCA SC-239 Report](#)²⁴ found that all aircraft types and multiple operations received interference from both simulated fundamental and spurious 5G emissions. The RTCA Report concluded that “5G base stations present a risk of harmful interference to radio altimeters across all aircraft types, with far-reaching consequences and impacts to aviation operations”. RTCA published [YouTube presentation of the Radio Altimeter issue](#)²⁵.

- 3.2.15.2. RTCA and EUROCAE (SC-239/WG-119) have jointly initiated the drafting of new minimum operational performance standards (MOPS) for the Radio Altimeter, the completion of the work is scheduled for December 2023 as described in the following section.

3.3. Long Term Plan for Radio Altimeter

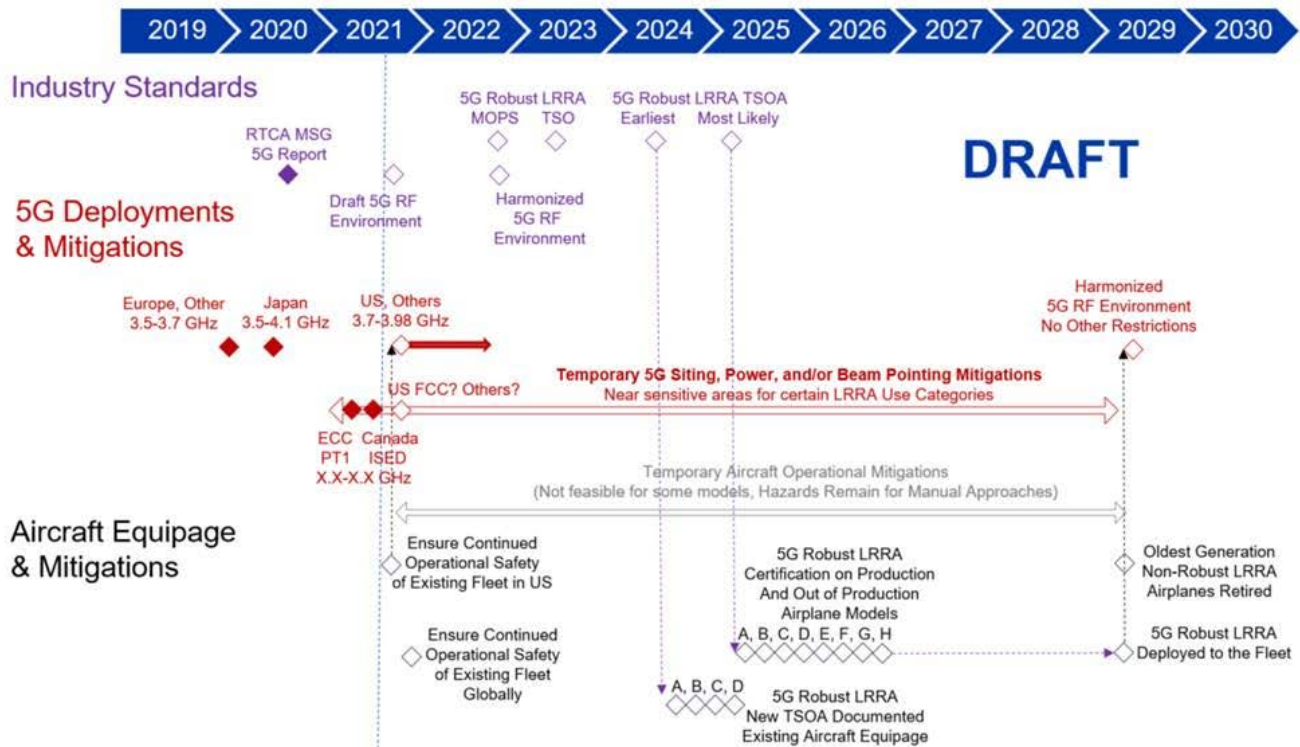
- 3.3.1. While the aviation industry has recognized that changes to the RF environment in which radio altimeters operate are inevitable and performance standards must be updated accordingly, this process necessarily takes a significant amount of time given the extreme rigor and caution with which aviation systems manufacturers, aircraft manufacturers, aircraft operators, and Civil Aviation Authorities (CAAs) work to develop and implement such changes. Even a technical solution which may be viable for retrofit installations, would take several years to properly validate, and deploy across all affected civil aircraft operating in the world. Therefore, it is critical that the performance of radio altimeters which are currently in service across tens of thousands of civil aircraft (The number of commercial aircraft in MENA is 2126 of which 1919 in MID Region) be understood and the risks and operational impacts due to interference be acknowledged.
- 3.3.2. New Radio Altimeter Standards are being developed to sustain planned 5G environment The effort for updating equipment standards for future radio altimeters has already started with the development of new Minimum Operational Performance Standards (MOPS) by the RTCA Special Committee SC-239 and EUROCAE working Group WG-119. The plan calls for completely re-write the MOPS document including the addition of new RF interference and test procedures and to release a new doc. DO-XXX/ED-XXX “Technical Standard on RF Interference Environment for Radio Altimeter “in December 2022 followed by document DO-155A/ED-30A MOPS revision in December 2023. While this new radar altimeter standard will define significantly more interference immunity to external RF sources, the limits of current technology will still have boundaries to the protection against all possible interference. Aircraft operating in close proximity to high power cellular towers with frequencies near the edges of the radar altimeter’s 4 200 – 4 400 MHz band will still require national regulator action to protect certain aircraft operations.
- 3.3.3. Once the MOPS is completed, ICAO in coordination with IATA and ICCAIA has agreed to include the new equipment standards into the ICAO Annexes. Moreover, ICAO has also agreed to assist with future coordination with ITU for the inclusion of important regulatory provisions into ITU global telecommunication treaty – the ITU Radio Regulations - aiming to provide appropriate legal protections for future radio altimeters.

²⁴ https://www.rtca.org/wp-content/uploads/2020/10/SC-239-5G-Interference-Assessment-Report_274-20-PMC-2073_accepted_changes.pdf

²⁵ <https://www.youtube.com/watch?v=OpYhJK2MDqM>

3.3.4. After the MOPS are updated, it is anticipated that they will be referenced by CAAs, to define new performance standards that must be met for equipment-level design approvals of radio altimeters. However, the new MOPS will only result in improved radio altimeter designs in the future—currently installed radio altimeters on commercial and civil aircraft will still be exposed to 5G and would operate for many years.

3.3.5. Below figure shows the plan and schedule for the development of new RTCA/EUROCAE Radio Altimeter standards:



Chapter 4 - Methodologies for defining safeguarding measures for aerodromes & heliports

4.1. Introduction

- 4.1.1. Recommendation ITU-R M.2059 explains three primary electromagnetic interference coupling mechanisms between radio altimeters and interfering signals from other transmitters: receiver overload, desensitization, and false altitude generation.
- 4.1.2. Any compatibility analysis between radio altimeters and other systems must utilize those protection criteria for the maximum acceptable degradation for a radio altimeter. These criteria are defined as followed:
- Receiver front-end overload where the value depends on each radio altimeters type
 - Receiver desensitization which is the common I/N protection criteria of -6dB, and
 - the False altitude reports which are defined by -143 dBm/100 Hz (-143 dBm considering 100 Hz detector bandwidth following the instantaneous altimeter local oscillator (LO) frequency).
- 4.1.3. It should be understood that any interference that is unpredictable and that can mix with the linear FM waveform, thereby causing the radio altimeter to mistake the mixed signal as terrain has the potential to cause a radio altimeter to report a false altitude. The fact that all radio altimeter antennas are necessary pointing at the Earth's surface makes the system vulnerable to all possible interference sources illuminated during the approach.
- 4.1.4. The radio altimeter antennas, due to their location on aircraft, do not have the benefit of being shielded or screened from many of the possible interference sources on the Earth's surface. Instead, it can virtually "see all possible radiation sources "as they escape buildings and via direct transmission from devices operating outside of any structure.
- 4.1.5. For studies focusing on emissions into the frequency band 4200-4400 MHz, only the false altitude reports and the receiver desensitization are applicable. A false altitude report is a serious radio altimeter error that may cause critical aircraft systems such as ground proximity warning, weather radar, traffic collision avoidance system (TCAS), flight controls and other critical systems to respond inappropriately. In the case of FMCW-based radio altimeters, false altitude reports occur when interference signals are detected as frequency components during spectral frequency analysis of the overall IF bandwidth.
- 4.1.6. As described in Chapter 3 of this document, the safeguarding measures and mitigations adopted by competent spectrum regulators and aviation authorities around the world, to protect RADALT from 5G BS deployment are mainly focusing on setting protection zones considering aircraft height/altitude above the BS²⁶. These measures are aimed to reduce the probability of interference occurring by imposing limitations on the deployment of 5G base stations at aerodromes and in areas surrounding aerodromes. Chapter 3 provides an overview of protection zones measures applied in France, Canada, Japan, and USA.
- 4.1.7. The main practical measures that have been codified in national telecommunication regulations and successfully deployed include:

²⁶ Note: The analysis of 5G BS is assuming that the proposed height is meeting the requirements of [obstacle limitations surfaces defined under ICAO Annex 14, Chap. 4 Vol. I \(aerodromes\) and Vol. II for heliports](#)

- 1) Ensure through testing sufficient spectrum separation between 5G C-band deployments and 4.2-4.4 GHz frequency band used by existing radio altimeters
- 2) Clearly codify and enforce the maximum power limit for 5G C-band transmission and downward tilting (electronically or mechanically) of 5G C-band antenna.
- 3) Establishment of sufficient 5G C-band prohibition and pre-cautionary zones around airports.

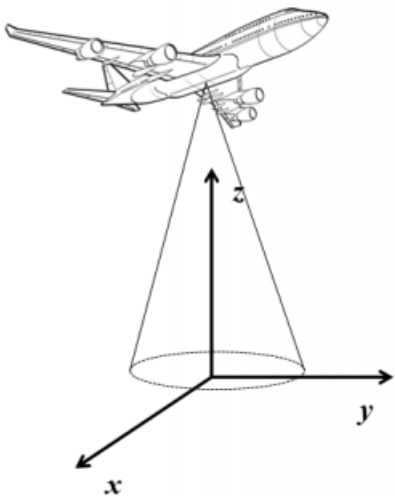
4.2. Methodology for the protection of Radio altimeters

4.2.1. General approach and Main considerations

4.2.1.1. To identify the protection areas around airports and heliports for proper mitigations, ICAO recommends to consider the following parameters when performing the analysis:

- The aircraft can have a maximum roll of up to ± 30 degrees from the horizontal in all directions,
- The air-to-ground propagation model ([Recommendation ITU-R P.528-4²⁷](#)) with a minimum time percentage should be used. It should be noted that Rule of Procedure on RR 5.441B was adopted by the ITU Radio Regulatory Board and proposes to use this Recommendation with a time percentage of 1% for the calculation of IMT interference into non-safety aircraft applications. As a result, for safety applications such as radio altimeters a percentage value less than 1% should be considered. If the Recommendation is not capable of calculating path losses with time percentage less than 1%, then 1% should be used and appropriate margins added.

4.2.1.2. The characteristics of 5G BS are key information to check whether the protection criteria are met for an airplane flying at different heights (50, 200, 1000 ft and 2000 ft (15, 61, 310 and 610 meters)) above the base station. The figure below shows the geometry of the scenario.



4.2.1.3. With reference to the coordinate systems in this figure:

- The base station is located at (0,0,0);
- The aircraft is flying along a horizontal path defined by the coordinates (0, ya, ha). The altitude ha of the aircraft is fixed, so that its position varies along the axis y only;

²⁷ <https://www.itu.int/rec/R-REC-P.528/en>

- The radio-altimeter antenna beam is modeled based on the antenna pattern formula available in [Report ITU-R M.2319](#)²⁸ (§A-3.1.1).
- 4.2.1.4. The analysis should be based on a single base station to verify whether it can pose a threat to the aeronautical systems in the band (for simplicity the aircraft can have zero roll and pitch). If a single base station is predicted to not cause interference, the analysis can be expanded to consider the aggregation of multiple interferers and the roll and pitch of the aircraft.
- 4.2.1.5. As the main concern with aircraft being provided with erroneous radio altimeter data or loss of radio altimeter data during approach is infringement of minimum safe altitude/height above terrain/obstacles and incorrect execution of the flare. The flare is the pitch up movement of the aircraft just before touchdown that reduces the vertical speed and ensures a 'soft' touch down. The data provided by the radio altimeter is essential to determine the height above the terrain/obstacles and runway at which the flare is initiated.
- 4.2.1.6. As radio altimeter data is more critical during the approach phase for landing, the analysis of the impact of 5G BS should focus on the approach path considering the location of the Base station (BS). This would identify the minimum possible distance between the aircraft path and base station ensuring proper protection of the altimeter while providing height information to the autopilot during landing.
- 4.2.1.7. The assessment of the impact (Risk of interference) of deployment of a 5G network on radio altimeters is a complex activity (identification of protection areas) and depends on many parameters and factors such as:
- **Power of the 5G base station** (xxx dBm) call TRP (True Radiated Power)
 - **Antenna gain** (yy dBi) depending on the type of antenna: Two different technologies are available for 5G antennas with different antenna gain:
 - 1) AAS antenna (Active Antenna System) is the general term used to describe antenna using adaptive beamforming. Depending on the information available, the gain can exceed 25dBi²⁹.
 - 2) Non AAS antennas are antennas with a fixed beam, usually 120° where the gain where the gain is constant around 15dBi.
 - **Maximum Effective Isotropic Radiated Power** (E.I.R.P = power of the 5G base station (xxx) + antenna gain (yy))
 - **The location of the Base station antenna**
 - **The antenna tilt** should be below the horizon³⁰, and therefore the maximum gain towards the aircraft is lower (about 5dB) than the maximum gain of the antenna.
 - **The vertical scan (Scan angle):** There are no restrictions on the vertical scan angle in the Telecommunication regulations. The level of the grating lobes depends directly on the amplitude of the vertical scan angle.
 - **The rate of use of a base station:** The power radiated by a base station depends on the data traffic passing through it. By the end of 2021, in France, data transmitted in 5G represents less than 1.5% of mobile data but since the number of 5G subscriptions doubles every 3 months.
 - **The ground scattering and altitude:** The susceptibility of radio altimeters also depends on the ratio of the 5G signal to the radio altimeter return signal. The higher the ground scattering is,

²⁸ https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-M.2319-2014-PDF-E.pdf

²⁹ [Although this is often dependent on the choice of the mobile operator and confidential, the knowledge of the elevation of the Radiation pattern, of the 5G antenna, is an important element to accurately assess the interference risks.](#)

³⁰ [Until now, there is no restriction in Europe.](#)

the more resistant the radio altimeter is. The altitude of the aircraft increases the path loss of the Radio altimeter signal, and therefore makes its receiver more sensitive, but at the same time the altitude of the aircraft moves it away from the 5G base stations and increases 5G the path loss. Studies and simulations have shown that the most unfavorable altitude is around 200ft.

- **The frequency band used.**
- **Aggregated unwanted emission level**
- **Filtering characteristics of each radio altimeters and associated installation**

4.2.2. Main activities to define protection criteria

4.2.2.1. To identify the protection criteria for RADALT systems from the 5G networks, the regulators should perform the following approach is proposed for joint activities by relevant national spectrum and aviation regulatory authorities:

- a) Development of detailed report summarizing the main findings of the international working groups and the corresponding administrations. The results and recommendations will be used as temporary and interim measures to protect the radio altimeters until the review of technical standards for RADALTs has been completed;
- b) Conduct a detailed scientific technical study including simulations, and lab experiments. The study should accurately determine the level of coexistence between the RADALT systems and the 5G networks based on national 5G deployment plans in relation to the aviation environment. The study shall include at least the procedures, used tools and software, path loss model, references and findings. The findings shall include the following but not limited to:
 - The level of potential harmful radio interference;
 - The effect on the RADALT systems in case of potential interference;
 - A clear technical parameters or separation distance in case of a potential harmful interference.
- c) The spectrum and aviation regulators should share the detailed report summarizing the main findings of scientific studies and lab experiments with all stakeholders;
- d) The protection criteria will be updated according to the reported findings of scientific studies and lab experiments.
- e) The research project team, in coordination with national spectrum and aviation regulators should perform a field trial, if feasible, to validate the scientific studies, simulations, and lab experiments findings and to ensure the coexistence between the RADLAT and 5G networks based on the applied protection criteria. The research project team should prepare a detailed report summarizing the main findings of field trials.
- f) Finally, the protection criteria should be updated based on the reported findings of field trials.

4.2.2.2. In States with limited resources, consideration of work conducted in other States is acceptable, but care must be taken to ensure it is relevant to the national plan and scenario for the deployment of 5G networks.

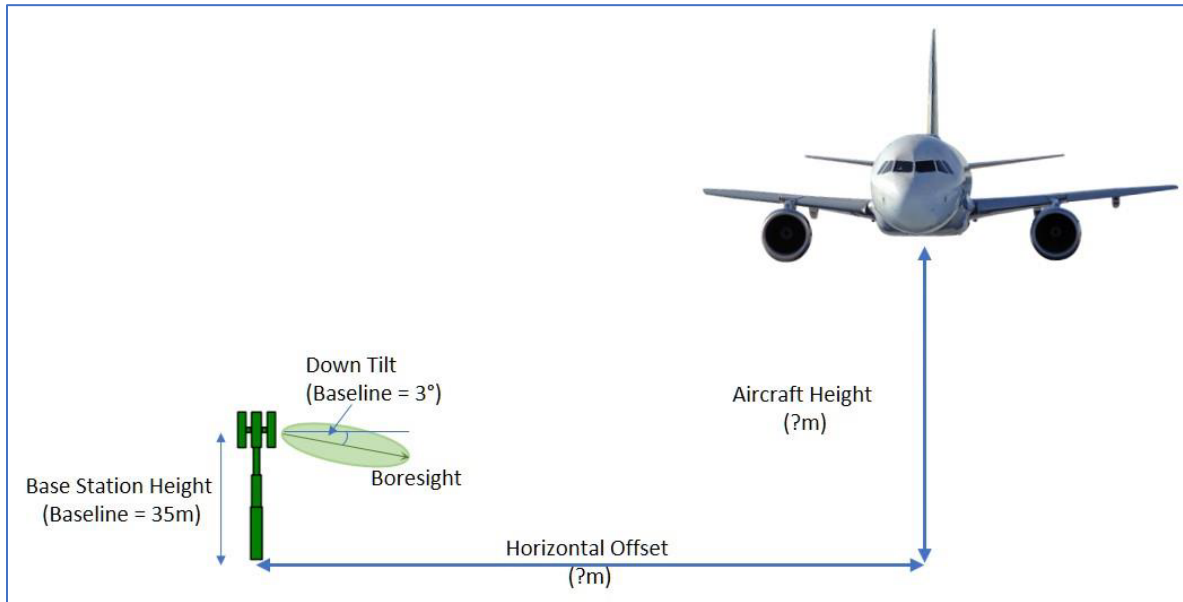
4.2.3. Recommended methodology for the technical study

4.2.3.1. The UK presented a study at FSMP-Working Group (WG)/11 WP/27³¹ outlining a methodology which could be used to assess the impact of 5G on RADALT. It investigates the potential interference from 5G base stations operating in the frequency range 3.6-4.2 GHz into radio altimeters under various scenarios as defined by the information contained in International Telecommunication Union,

³¹ https://www.icao.int/safety/FSMP/MeetingDocs/FSMP%20WG11/WP/FSMP-WG11-WP27_Mobile%20vs%20Radalt%20Ev.1.docx

European Commission and UK regulations/documents. The methodology used in the study is based on the receiver overload threshold and it can be summarized as the following:

- The study considers the separation distance relative to the mobile base station's antenna required between a rural mobile base station and an aircraft in flight level flight, as illustrated in the next Figure.
- The study does not consider the impact of active antenna systems due to modelling difficulties and user equipment as the power levels are significantly lower and therefore presumed not to be a threat.



Scenario considered

(Source: WG/27 Rev.1 presented by John Mettrop, FSMP Eleventh Working Group meeting)

- For each angle during the approach of an aircraft, the required separation distance is calculated using the following ITU formula assuming free space path loss:

$$PRx = PTx + GTx + AFTx - FSPL + GRx + RxRej - FLRx + SM$$

Where:

PRx = Power received (assumed to be the receiver overload threshold)

PTx = Mobile base station power supplied to the antenna port

GTx = Gain of the mobile base station antenna in the direction of the aircraft

$AFTx$ = Transmitter activity factor

$FSPL$ = Free space path loss ($=32.4+20\log(FMHz)+20\log(Dkm)$)

$FMHz$ = Frequency

Dkm = Separation distance

GRx = Gain of the radio altimeter antenna in the direction of the mobile base station

$RxRej$ = Adjacent channel rejection of the radio altimeter receiver

$FLRx$ = Feeder loss in the radio altimeter

SM = Safety margin (assumed to be 6dB)

Note: The above parameters might be changed according to the considered environment, i.e. based on the aerodromes, heliports. The radio altimeter information were taken from the ITU reports and studies.

After re-arranging the above equation, it can be re-written as follow:

$$DKM = 10^{\left(\frac{PTx+GTx+AFTx+GRx+RxRej-FLRx-32.4 \ 20 \ Log \ (FMHz)+SM}{20}\right)}$$

- Having established the above baseline scenario, the following variations in the baseline scenario should be investigated for radio altimeters A1 and A3 taken from Recommendation ITU-R M.2059.
- The following parameters were considered in the study:
 - **Pitch/Roll:** The impact of the aircraft pitching/rolling by 15°, 30°, 45° towards the mobile base station antenna.
 - **Mobile Antenna Height & Tilt:** Variations in the height and down tilt angle of the mobile base station for urban (25m & 6°) and suburban masts (20m & 10°) and this is based on
 - **Aggregate Effects:** The level of aggregate interference that should be applied assuming a standard rural macro deployment scenario taken from Recommendation ITU-R M.2101 & Report ITU-R M.2292
 - **Radio Altimeter Receiver Frequency Dependent Rejection:** Use the frequency dependent rejection at 3.75 GHz based on ITU-R M.2059 assuming the octave is based on the size of the frequency band & band edge frequency, radio regulatory guidance, RTCA worst case measured results.

4.2.4. Recommended Safeguarding and Interference Mitigation Measures

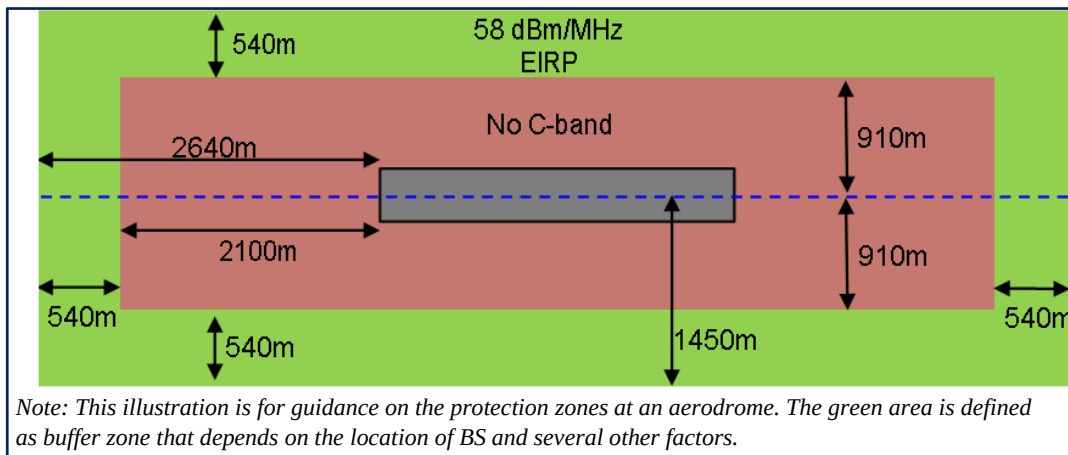
4.2.4.1. As a minimum, the list of regulatory actions and measures that need to be taken to protect Radio Altimeters may include the following:

- Regulators to consider safety notices or circulars to aircraft operators highlighting the potential interference of 5G network emissions with aircraft RADALTs which may include:
 - 1) PEDs be turned off (or in airplane mode) during flight.
 - 2) Passengers must be advised to ensure that all electronic devices in checked baggage are turned off.
 - 3) Operators must advise the air traffic service provider of any disturbance to the radio altimeter and report the occurrence to the CAA using normal company safety reporting procedures. Flight crew should include as much as possible, details regarding the type of malfunction, including duration and location (particularly if during an approach or departure phase), the runway in use and the height above the ground that the malfunction was observed
 - 4) Air Traffic Service Providers are encouraged to inform their controllers of the possibility of such reports by crews.
 - 5) Operators should ensure their flight crew are aware of the possible implications of radio altimeter malfunctions for the types of aircraft operated; this may be particularly relevant when conducting Precision Instrument Approaches during Low Visibility Operations
 - 6) Where a State, based on the safety analysis of its own 5G roll out, has issued a NOTAM or similar directive, OT operators are required to adhere to any state operational restrictions. The absence of a NOTAM does not necessarily imply that interference will not be encountered.

- 7) Flight crew experiencing radio altimeter or auto flight malfunctions should not assume that this has been caused by 5G interference and should follow normal operating procedures for any malfunctions or failures. Although flight crew should be aware of the possibility of 5G interference, any malfunctions observed may well be caused by other factors such as radio altimeter and associated antenna technical failures.

4.2.4.2. State spectrum management authorities in coordination with Civil aviation authorities should consider adopting the following measures when approving the installation of 5G Ground stations around aerodromes:

- through testing by aviation subject matter experts and validation by aviation safety authorities, ensuring sufficient spectrum separation between 5G C-band deployments and 4.2-4.4 GHz frequency band used by existing radio altimeters
- clearly codifying and enforcing the maximum power limit for 5G band transmission which has been proven to the satisfaction of the State aviation safety regulators to not harmfully interfere with all existing aircraft radio altimeters
- prescribing a downward-looking radiation pattern for 5G C-band transmitting stations (Antenna downward tilting)
- establishing two protection zones, namely Safety and Precautionary zones, around aerodromes with sufficient technical conditions (such as restricting 5G transmission power) for each zone. Example of these protection zones as published by a State spectrum regulator are provided below:
 - a) 'Safety zone' around the airport for the protection of the RA where the aircraft is below 200 ft (61m)
 - b) Precaution zone on each side of the 'safety zone' to protect the landing approach below 1000ft (305m)
- 5G service providers have to take measures to avoid grating lobes as far as practicable.



4.2.4.3. For such efforts to be effective, timely transparency and cooperation from 5G network service providers in coordination with State spectrum regulators with regards to the provision of location information for their stations as well as details of the transmission characteristics (e.g., antenna radiation patterns, power levels) is required.

4.2.5. 5G devices used on board aircraft

4.2.5.1. A number of 5G user equipment and devices are expected to be transmitting on board an aircraft while the radio altimeter is operational. Many safety advisories and leaflets published by civil aviation

authorities address this issue. An example is [the Advisory Circular \(AC\) issued by General Authority of Civil Aviation \(GACA – KSA\)](#)³² defines operational recommendations for aircraft operators and pilots related to this subject. The following rules are the first three statements of the AC:

Operators and pilots of aircraft equipped with radio altimeters:

- 1) Remind passengers that all portable electronic devices allowed for transport in checked baggage (including smartphones and other devices) should be turned off and protected from accidental activation.*
- 2) Remind passengers to set all portable electronic devices in the cabin and any carried on the aircraft to a non-transmitting mode or turn them off.*
- 3) Instruct crew to use 3G or 4G communication devices only when essential communication is required, such as during emergency medical service operations.*

4.2.5.2. Similar rules may be adopted as interim measures to protect radio altimeter from any interference that may be caused by 5G user equipment and devices used onboard an aircraft.

³² [The Advisory Circular issued by General Authority of Civil Aviation \(GACA – KSA\)](#)

Appendix A – French Methodology to set the dimensions of Special Protection Zones around airports

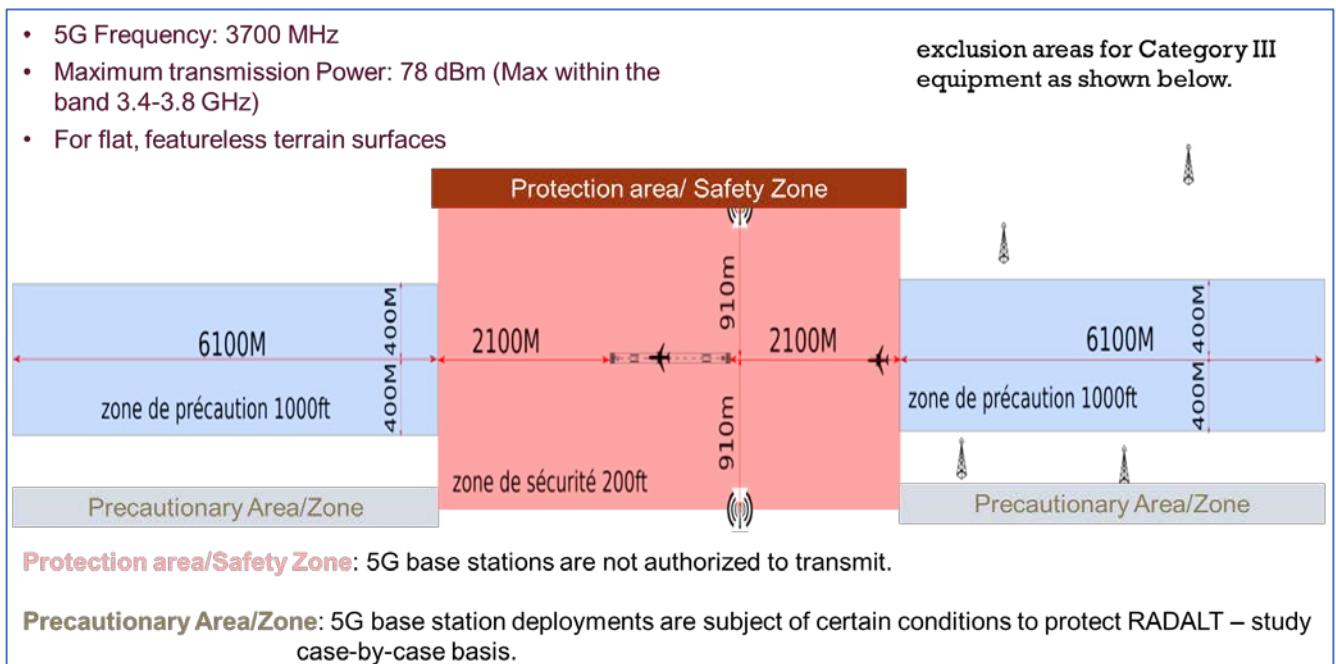
A.1 The French frequency management authority (ANFR) in coordination with the Civil Aviation Authority (CAA) adopted interim arrangements to protect aircraft RADALT from any interference of the 5G network deployed around the aerodromes. The main technical considerations and the dimensions of the protection areas are described in the following sections.

A.2 Protection areas

The protection areas identified around the French aerodrome used for IFR operations are divided into two types:

- Safety area/zone where no 5G network infrastructure deployment is allowed.
- Precautionary zone/area where 5G BS may be allowed only after case-by-case assessment..

The main criteria and the dimensions of the protection areas are illustrated in the following figure.



The width of the safety zone is calculated based on the attenuation of maximum effective radiated power (e.g. 78 dBm) increase by the fundamental tolerance threshold defined under the RTCA report and ICAO safety margin (6 dB) that should be considered for compatibility study. The length of the safety area/zone is based on the calculation of the distance required for an aircraft in the final approach phase at 200 ft until the touchdown zone with 3° slope with a tolerance of 0.375° (i.e. 2.625°)Glide Slope. The following illustrations provide details on the calculation of the dimensions of the safety zone.

Table 7-2: Comparison of VSG Spurious Output to Spurious Tolerance Thresholds

Usage Category	Altitude	Maximum VSG Output for 5G Fundamental Tolerance Threshold ³²	Predicted Worst-Case VSG Spurious in 4.2–4.4 GHz Band	Measured 5G Spurious Tolerance Threshold
1	200 ft	+7 dBm	-112 dBm/MHz	-80 dBm/MHz
	1,000 ft	-1 dBm	-120 dBm/MHz	-85 dBm/MHz
	5,000 ft	-7 dBm	-126 dBm/MHz	-107 dBm/MHz
2	200 ft	-19 dBm	-138 dBm/MHz	-112 dBm/MHz
	1,000 ft	-26 dBm	-145 dBm/MHz	-103 dBm/MHz
	2,000 ft	-35 dBm	-154 dBm/MHz	-119 dBm/MHz
3	200 ft	-14 dBm	-133 dBm/MHz	-96 dBm/MHz
	1,000 ft	-26 dBm	-145 dBm/MHz	-103 dBm/MHz
	2,000 ft	-35 dBm	-154 dBm/MHz	-119 dBm/MHz

As shown in Table 7-2, the expected spurious output from the VSG which reaches the radar altimeter receiver input during the 5G fundamental emissions tolerance threshold tests is far lower (by at least 19 dB) than the measured tolerance thresholds for spurious interference in the 4.2–4.4 GHz band for all altimeters and test conditions.

Interference Safety Margin

The ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation [17] states in paragraph 9.2.23 that an additional safety margin should be considered for interference analysis concerning aeronautical safety systems. This paragraph, in its

The attenuation of the maximum transmission power in space is: 78 dBm + 19 dBm + 6 dB

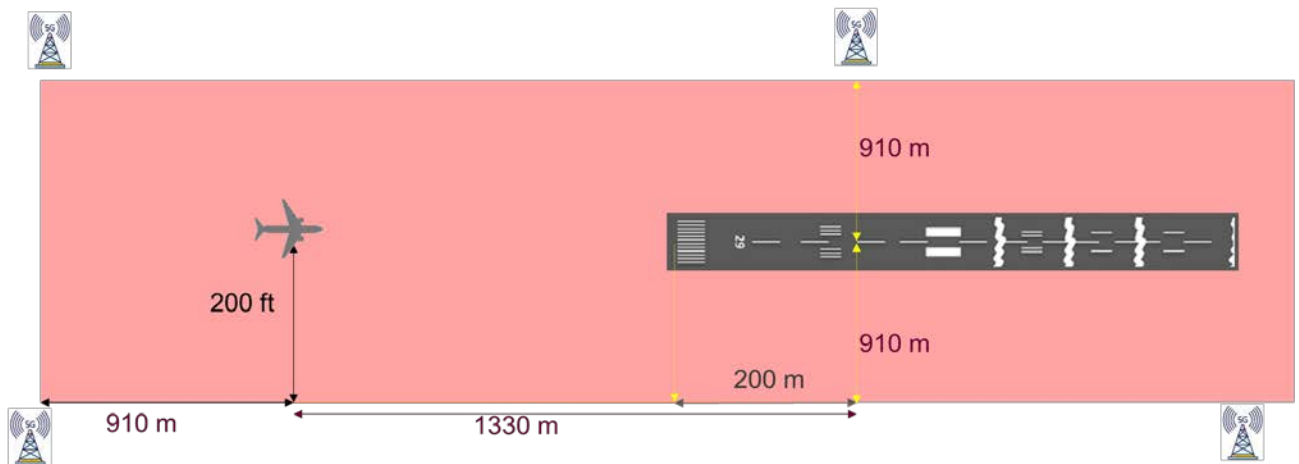
103 dB

This requires a minimum distance between an aircraft and any 5G Ground Station of at least: **910 m.**

19 dBm attenuation at the level of RADALT

ICAO Safety margin to be included in the interference study: 6 dB.

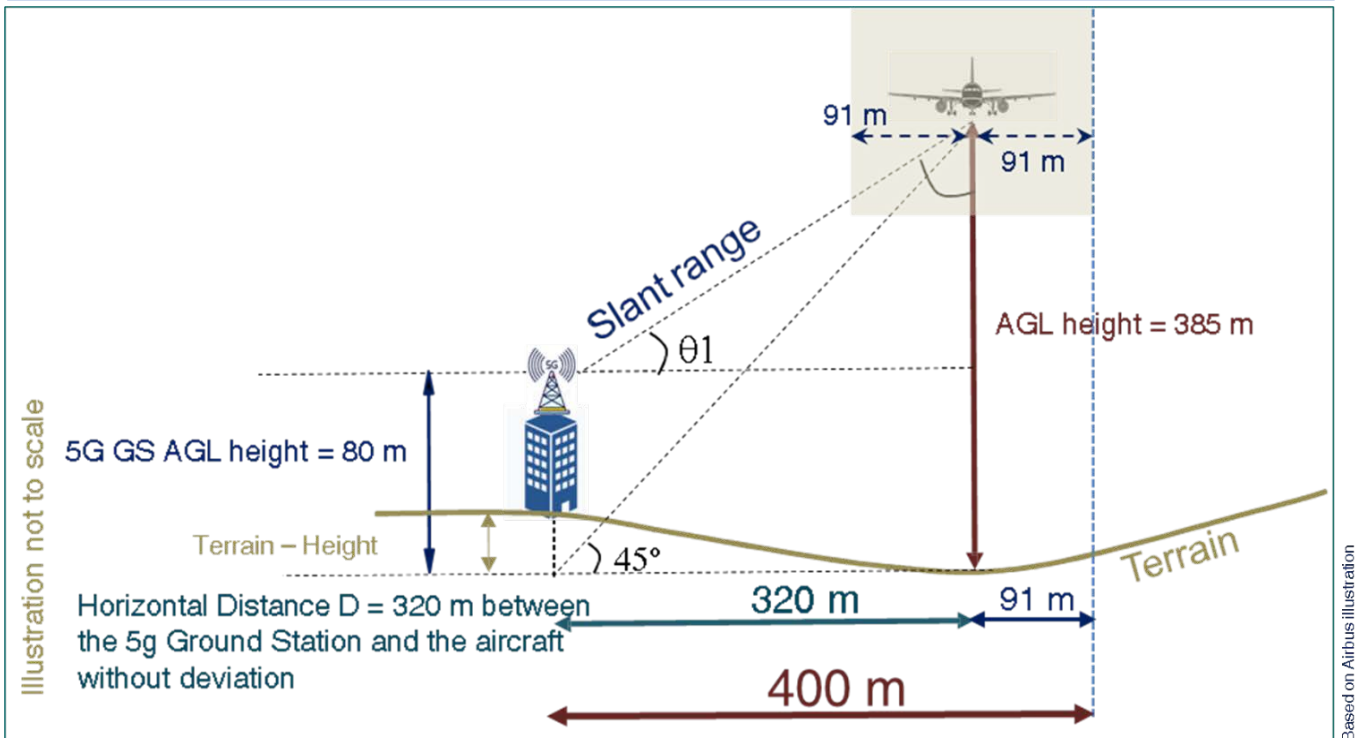
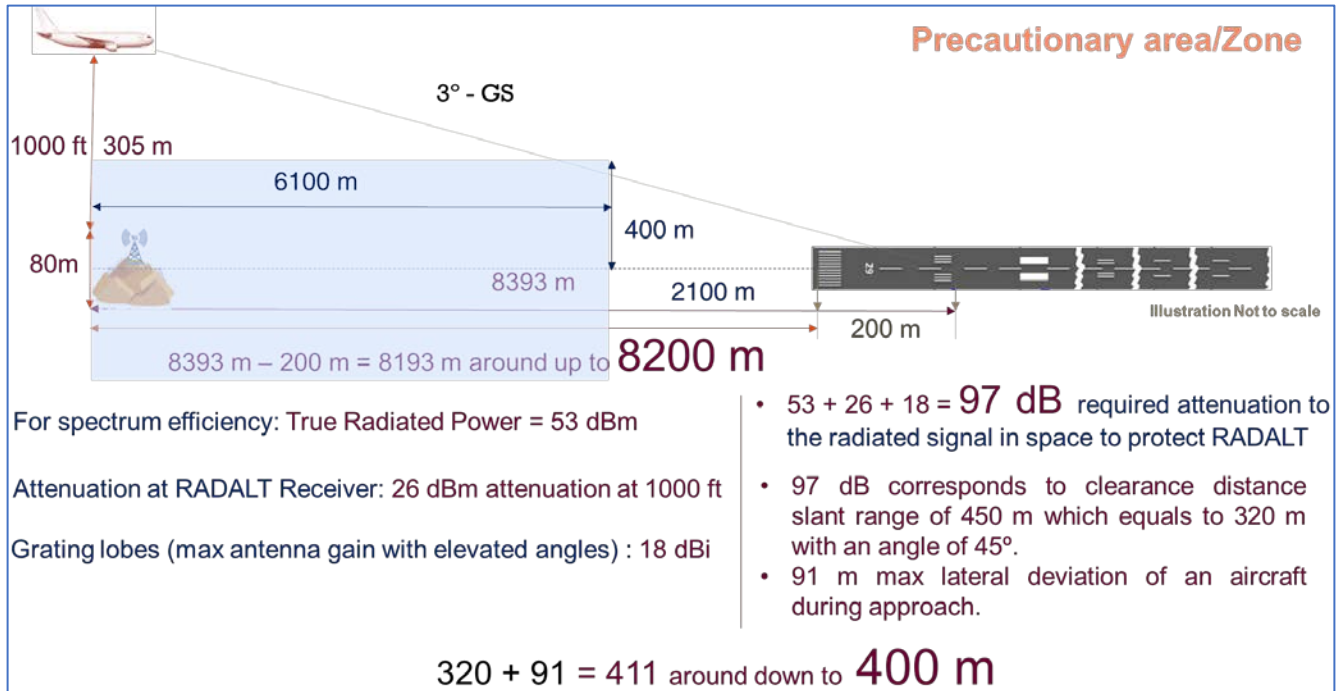
Protection area & Safety zone



910 m: is the required Distance to protect RADALT from 5G Base Station / Ground Station and ensure an attenuation of maximum transmission power by 103 dB.

The dimensions of the protection area/safety zone is: $(910 + 1330 - 200) = 2040$ m around up to **2100m**

The dimensions of the precautionary area/zone are calculated based on the attenuation of true radiated power (53 dBm) increase by the fundamental tolerance threshold defined under RTCA report and the antenna gain as defined by ITU. The length of the precautionary area/zone is based on the calculation of the distance required for an aircraft in the final approach path at 1000 ft above terrain until the touchdown zone with a 3°Glide Slope. The following illustrations provide details on the calculation of the dimensions of the precaution area/zone.





INTERNATIONAL CIVIL AVIATION ORGANIZATION

**MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)**

MID REGION SURVEILLANCE PLAN

EDITION MAY 2023

Developed by:

**MIDANPIRG COMMUNICATION, NAVIGATION AND SURVEILLANCE SUB-
GROUP (CNS SG)**

TABLE OF CONTENTS

1. Background.....	3
2. Introduction.....	3
3. Surveillance in GANP.....	4
4. Surveillance Technologies.....	5
4.1 Primary Radar.....	5
4.2 Secondary Radar (SSR/MSSR).....	5
4.3 Mode S Radar.....	6
4.4 ADS-B.....	6
4.5 ADS-C.....	7
4.6 MLAT.....	7
4.7 Surveillance Camera.....	8
5. Comparison between Surveillance Technologies.....	8
6. Operational Requirements.....	9
7. Baseline in the MID Region.....	9
8. MID Region Surveillance Plan.....	10
References.....	12

1- BACKGROUND

Aeronautical surveillance systems are major elements of modern air navigation infrastructure required to safely manage increasing levels and complexity of air traffic. The sixteenth meeting of Air Navigation Planning and Implementation Regional Group in the Middle East (MIDANPIRG/16) tasked the CNS SG through Decision 16/24 to develop the MID Region Surveillance Plan based on the Regional operational requirements, Users' capabilities and specificities of the Region:

DECISION 16/ 23: MID REGION SURVEILLANCE PLAN

That, the MID Region Surveillance Plan be developed by the CNS SG, based on the operational needs identified by the ATM SG.

The Global Air Navigation Plan (GANP) through B0-ASUR, defined the possibility of using lower-cost ground surveillance supported by technologies such as ADS-B OUT and Wide Area Multilateration (MLAT) systems.

This document reviews the available surveillance technologies and highlight their strengths and weaknesses. The plan timelines are divided into three stages; short-term until 2020, mid-term from 2021 to 2025, and long-term beyond 2025.

2- INTRODUCTION

The surveillance service delivered to users may be based on a mix of three main types of surveillance:

- a) independent non-cooperative surveillance: the aircraft position is derived from measurement not using the cooperation of the remote aircraft; like Primary Surveillance Radar (PSR);
- b) independent cooperative surveillance: the position is derived from measurements performed by a local surveillance subsystem using aircraft transmissions. Aircraft derived information (e.g., pressure altitude, aircraft identity) can be provided from those transmissions, like Secondary Surveillance Radar (SSR) and Multilateration; and
- c) dependent cooperative surveillance: the position is derived on board the aircraft and is provided to the local surveillance subsystem along with possible additional data (e.g., aircraft identity, pressure altitude), like Automatic Dependent Surveillance-Broadcast (ADS-B) and Automatic Dependent Surveillance-Contract (ADS-C).

The main applications of ATC Surveillance in civil aviation are:

- 1- Aerodrome Control Service;
- 2- Approach Control Service;
- 3- Area Control Service;and
- 4- Surface/ Ground Management

3- SURVEILLANCE IN GANP

The GANP addressed operating and emerging Surveillance technologies through the thread Alternative Surveillance (ASUR), the technologies laid down in that module are ADS-B, MLAT, and Mode S.

The lower costs of dependent surveillance infrastructure (ADS-B and MLAT) in comparison to conventional radars support business decisions to expand radar-equivalent service volumes and the use of radar-like separation procedures into remote or non-radar areas.

The eleventh Air Navigation Conference recommended ADS-B on 1090MHz for international use and this is happening. Equipage rate is growing for Mode S, airborne collision avoidance system (ACAS) and ADS-B OUT. ADS-B OUT, Version 2 also provides ACAS RA DOWNLINK information.

The GANP Surveillance roadmap is depicted in *figure (1)*. Alternative Surveillance elements as mentioned in the GANP 7th edition, are listed in *figure (2)*

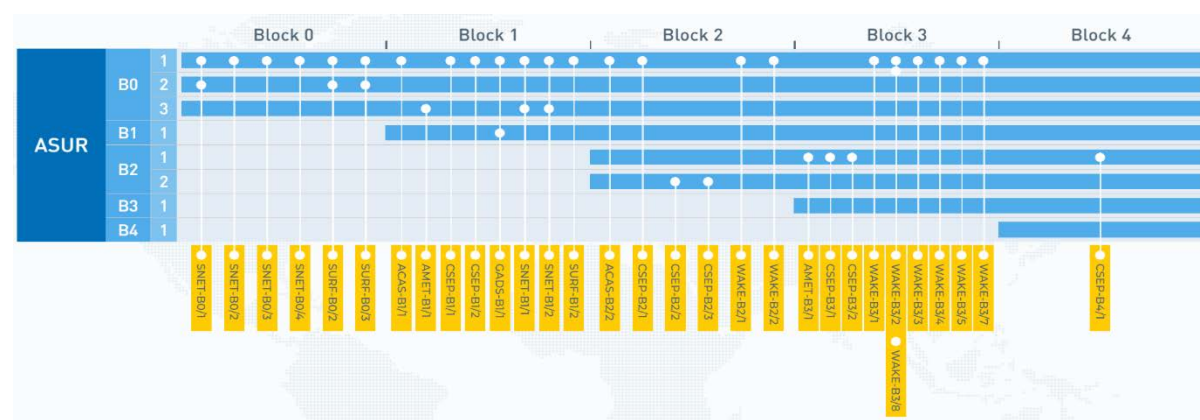


Figure (1)

Element ID	Title
ASUR-B0/1	Automatic Dependent Surveillance – Broadcast (ADS-B)
ASUR-B0/2	Multilateration cooperative surveillance systems (MLAT)
ASUR-B0/3	Cooperative Surveillance Radar Downlink of Aircraft Parameters (SSR-DAPS)
ASUR-B1/1	Reception of aircraft ADS-B signals from space (SB ADS-B)
ASUR-B2/1	Evolution of ADS-B and Mode S
ASUR-B2/2	New community based surveillance system for airborne aircraft (low and higher airspace)
ASUR-B3/1	New non-cooperative surveillance system for airborne aircraft (medium altitudes)
ASUR-B4/1	Further evolution of ADS-B and MLAT

Figure (2)

4- RFI

the potential increase of safety risks due to 1090 MHz congestion; it was highlighted that States should monitor and report the performance and the use of this RF band; detect and investigate the unexpected transmissions on these frequencies; and study the interoperability impact between existing and new systems on this RF band.

5- SURVEILLANCE TECHNOLOGIES

4-1 Primary Radar

Primary Surveillance Radar (PSR) derives aircraft position based on radar echo returns, PSR transmits a high-power signal, some of which is reflected by the aircraft back to the radar. The radar determines the aircraft's position in range from the elapsed time between transmission and reception of the reflection.

Surface Movement Radar (SMR) is the most widely used non-cooperative surveillance system for aerodrome surveillance. SMR may use a primary radar for providing surveillance cover for the manoeuvring area, which is defined as that used for the take-off, landing and taxiing of aircraft. In A-SMGCS, the non-cooperative surveillance service is typically provided by one or several SMRs.

Millimetre radar is an emerging technology used for aerodrome surveillance which provides higher resolution than traditional SMR. Millimetre Radar and SMR can be used for FOD Detection.

The strengths and weaknesses below are related to the PSR.

4-1-1 Strengths

- ✚ independent Radar, does not require any specific equipment of the aircraft (Transponder).

4-1-2 Weaknesses

- ✚ does not provide the identity or the altitude of the Aircraft
- ✚ cannot be easily sited in oceanic locations, or rough terrain such as in mountainous regions
- ✚ PSR has a heavy reliance on mechanical components with large maintenance requirements
- ✚ high CAPEX
- ✚ can report false target
- ✚ depends on the cross section of the target
- ✚ Silence Cone
- ✚ Requires high transmission power.

4-2 Secondary Surveillance Radar (SSR/MSSR)

A surveillance radar system which uses transmitters/receivers (interrogators) and Aircraft transponders.

4-2-1 Strengths

- ✚ receive aircraft data for barometric altitude and, identification code
- ✚ depends on Reply pulses, which are stronger than echo signals used in Primary Radar.
- ✚ Separate frequency spectrum for transmission and reception, Clutter reduction

4-2-2 Weaknesses

- ✚ high CAPEX
- ✚ cannot be easily sited in oceanic locations, or rough terrain such as in mountainous regions
- ✚ has a heavy reliance on mechanical components with large maintenance requirements
- ✚ Silence Cone

4-3 Mode S Radar

An enhanced mode of SSR that permits selective interrogation and reply capability.

4-3-1 Strengths

- ✚ improve shortage and constraints in Mode A codes (Aircraft ID)
- ✚ backward compatible with transponder mode A/C
- ✚ ability to download enhance surveillance information
- ✚ increase in data integrity by the use of a parity check mechanism.
- ✚ high parametric altitude accuracy (Coding of altitude data in 25-foot increments).

4-3-2 Weaknesses

- ✚ has a heavy reliance on mechanical components with large maintenance requirements
- ✚ cannot be easily sited in oceanic locations, or rough terrain such as in mountainous regions
- ✚ high CAPEX
- ✚ Silence Cone

4-4 ADS-B

Dependent surveillance is a surveillance technology that allows avionics to broadcast an aircraft's identification, position, altitude, velocity, and other information.

4-4-1 Strengths

- ✚ improve shortage and constraints in Mode A codes (Aircraft ID)
- ✚ Low ground infrastructure cost
- ✚ Easy to maintain
- ✚ The non-mechanical nature of the ADS-B ground infrastructure make it easy to relocate and maintain.
- ✚ it to be sited in locations that are difficult for radar installations, like hilly areas, filling the surveillance gap between radar coverage
- ✚ provide radar-like separation procedures into remote or non-radar areas
- ✚ Use of dependent surveillance also improves the search and rescue support provided by the surveillance network, ADS-B's positional accuracy and update rate allows for improved flown trajectory tracking allowing for early determination of loss of contact and enhances the ability for search and rescue teams to pinpoint the related location
- ✚ no Silence Cone

4-4-2 Weaknesses

- ✚ aircraft must be equipped with ADS-B OUT
- ✚ dependent on GNSS, outage of GNSS affect ADS-B

4-5 ADS-C

The aircraft uses on-board navigation systems to determine its position, velocity and other data. A ground ATM system establishes a “contract” with the aircraft to report this information at regular intervals or when defined events occur. This information is transmitted on point-to-point data links.

4-5-1 Strengths

- ✚ can be easily sited in oceanic locations, or rough terrain such as in mountainous regions
- ✚ does not need ground infrastructure when supported via satellite systems
- ✚ low investment cost at ANSP
- ✚ use of dependent surveillance also improves the search and rescue support provided by the surveillance network

4-5-2 Weaknesses

- ✚ high cost per report, as the airline use third party network.
- ✚ long latency when satellite used.

The ADS-C used in Oceanic and remote areas (non-Radar area), therefore, it will be excluded in the next section as it's not applicable in the MID Region.

4-6 MLAT

MLAT is a system that uses existing aircraft transponder signals to calculate, usually as a minimum, a three-dimensional position. It requires a minimum of four receiving stations to calculate an aircraft's position. If the aircraft's pressure altitude is known, then the position may be resolved using three receiving stations.

MLAT can act in two modes; Passive mode where it uses the existing transmissions made by the aircraft, or active mode, one interrogator (at least) to trigger replies in the manner of Mode S SSR interrogations.

The technique can be used to provide surveillance over wide area (wide area MLAT system - WAM).

4-6-1 Strengths

- ✚ can make use of currently existing aircraft transmissions, does not require specific avionics.
- ✚ improve shortage and constraints in Mode A codes (Aircraft ID)
- ✚ provides a transition to an environment where the majority of aircraft will be equipped with ADS-B.
- ✚ no Silence Cone.

4-6-2 Weaknesses

- ✚ requires multiple receiving sensors to calculate aircraft's positions
- ✚ high running cost; including maintenance; telecommunication; multiple secured sites
- ✚ needs a common time reference to determine the relative TOA of the signal at the receiving stations (time-stamped by a common clock or synchronism by a common reference such as GNSS)

4-7 Surveillance Cameras

Surveillance Camera can be used to send high-resolution images at the airport to a workstation in the control tower. Surveillance Camera is an enabler to run remotely aerodrome control as in ASBU module B1-RATS. The air traffic controller can monitor air traffic via screens which provide an image that corresponds to the view through the window in a traditional control tower.

4-8 Precision Approach Radar (PAR)

Primary radar equipment used to determine the position of an aircraft during final approach, in terms of lateral and vertical deviations relative to a nominal approach path, and in range relative to touchdown. PAR is still used by military organizations, with ILS being part of the standard aircraft equipment (together with VHF radio and VOR), airline users no longer derive benefit from this technology

5- Comparison between Surveillance Technologies

	PSR	MSSR	Mode S	ADS-B	MLAT
1)Required Avionics	No avionics required	Transponder is required Mode A/C	Transponder is required Mode S transponder	Transponder is required ADS-B or 1090 ES (Mode S + ADS-B)	Transponder is required Can process data from all ADS-B/ES, Mode S, Mode A/C
2)Information Provided	Range and Azimuth	Mode A codes, Pressure altitude	Mode A codes; Pressure altitude; 24-bit address of the aircraft; aircraft “on-the-ground” status; aircraft ID; aircraft pressure-altitude with 25-ft resolution; and other information	Position, flight level (barometric), position integrity, geometric altitude (GPS altitude), 24 bit unique code, Flight ID, velocity vector, vertical rate, emergency flags, aircraft type category	Position, flight level (barometric), calculated altitude, 4 digit octal identity, calculated velocity vector +mode s data
3)Accuracy & update rate	Accuracy depends on target cross-section and range	Dependent on range	Dependent on range	High accuracy ,inherent accuracy of the GPS determined position, and very high update rate	High accuracy at Local Area (LAM), less accurate for Wide Area (WAM) Some MLAT has its own of source

					of synchronization GNSS is critical for some MLAT for time synchronization.

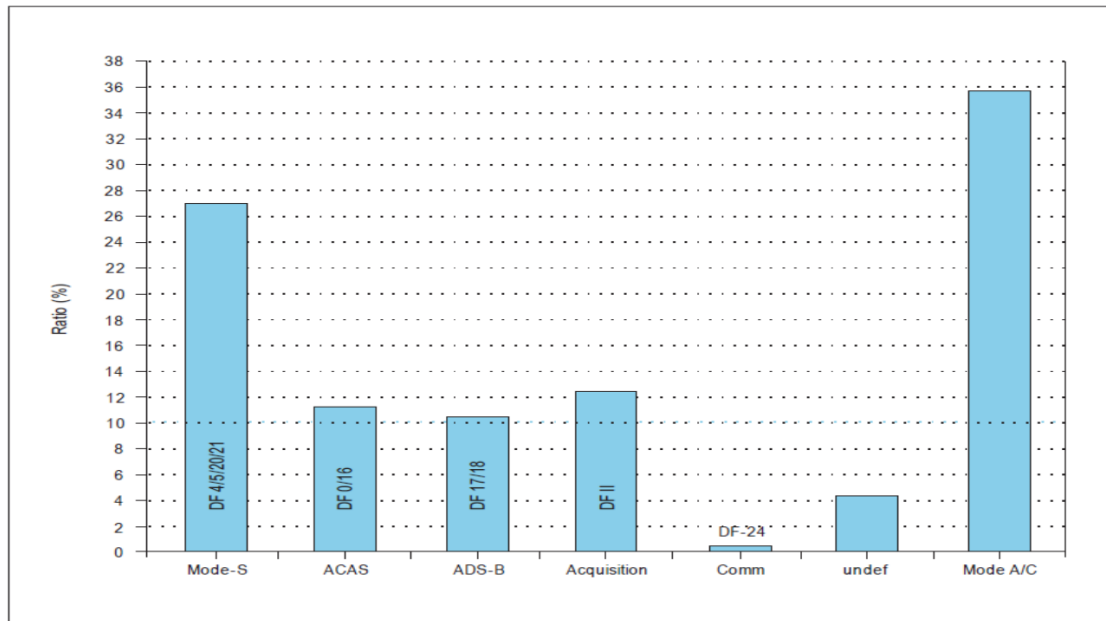
4)Coverage	Up to 250 NM	250 NM	250 NM	250 NM Traffic density can affect the coverage	**Depending on the geometry,number of sensors, hilly areas requires more sensors
5)Failure effect		Total loss of coverage	Total loss of coverage	Total loss of coverage	Partial or negligible, (N-1) principle
		6) Cost*			
		6.1 CAPEX			
Sensor Purchase	Very high	High	high	very low	Depending on geometry,
Site requirement (Civil work, renting/buying land(s), fence,..., etc.)	One site required High cost of the tower	One site required High cost of the tower	One site required High cost of the tower	One site required Cost less	Multiple sites required
		6.2 OPEX			
Maintenance cost (periodic, preventive, emergency)	Heavy maintenance (mechanical parts)	Heavy maintenance (mechanical parts)	Heavy maintenance (mechanical parts)	Low maintenance cost	High maintenance costs to multiple sites
Telecommunication media	Dual Telecom. connections Required from the sensor site. to the ATM centre	Dual Telecom. connections Required from the sensor site to the ATM centre	Dual Telecom. connections Required from the sensor site to the ATM centre	Dual Telecom. connections Required from the sensor site to the ATM centre	Multiple Dual Telecom. connections Required From the sensors sites to the ATM centre
Site physical Security	One secured site	One secured site	One secured site	One secured site	Multiple secured Sites

**The cost does not take into consideration fleet equipage cost*

6. 1090 SPECTRUM CONGESTION

1090 CONGESTION SOURCES:

- SSR/MLAT replies
- TCAS/ACAS replies
- Squitters
 - Acquisition Squitter (Mode S)
 - Extended Squitter (ADS-B OUT)



SOURCE CONTRIBUTION EXAMPLE (ICAO Doc 9924)

1090ES (ADS-B) utilization of 1090 MHz grows linearly with equipped aircraft in a given airspace volume but is typically not the biggest user. TCAS/ACAS utilization of 1090 MHz grows by more than the square of equipped aircraft in a given airspace volume, use of Extended Hybrid Surveillance, which is required in ACAS Xa may be the mitigation measure

The 1090 MHz activity results from both SSR Mode A/C and Mode S type interrogators, however SSR Mode A/C operation is less spectrum efficient than Mode S SSR. Therefore, Managing interrogations in heavily surveilled airspace is very important o SSRs sharing surveillance data via networking (aka, “clustering”), thereby eliminating redundant surveillance coverage in overlapping geographic regions o Use of Passive Acquisition by SSRs and Wide-Area Multilateration

Mode S Downlink of Aircraft Parameters (DAPs) adds to 1090 MHz utilization, it should be used with caution. States with high dense FIR are encouraged to monitor 1090 MHz RF utilization.

States should ensure that aircraft transponders are not subject to excessive interrogations and that the use of a ground based transmitter do not produce harmful interference on other surveillance systems. States should monitor and report the performance and the use of this RF band; detect and investigate the unexpected transmissions on these frequencies; and study the interoperability impact between existing and new systems on this RF band.

States are urged to develop their contingency plans/procedures and back-up systems, to ensure continuous surveillance services/safe operations in the event of RFI or any malfunction of the Surveillance Systems. Furthermore, States are encouraged to take measures to mitigate RFI on surveillance systems:

- Use of multi constellation/multi frequency GNSS
- Employing multiple surveillance sensors in critical areas

- Use of monitoring and prediction tools/applications

7. OPERATIONAL REQUIREMENTS

The need to increase the availability of Surveillance services and to cover the gap areas in the MID Region.

States to ensure that sufficient terrestrial CNS capabilities remain available to ensure safe operations and complement aircraft-level integration of position, velocity and time with independent surveillance information (Resolution A41-8, Appendix C)

7. BASELINE IN THE MID REGION (1/12/2020)

- All MID State uses SSR/MSSR, some States Uses PSR for Security and Safety purposes. Any user charges associated with existing PAR installations should be eliminated.
- Bahrain, Egypt, Oman and UAE implemented MLAT at International Aerodromes and Lebanon plan to do same.
- ADS-B has been implemented at some States as backup and complementary means to the MSSR in Egypt, Iraq, Jordan, Sudan and UAE.
- Bahrain has implemented ADS-B for Vehicle Tracking purpose.
- Bahrain, Egypt, Iraq, Jordan, Oman, Qatar, Saudi Arabia, Sudan and UAE have installed SSR Mode S.
- Saudi Arabia is using Combined PSR/MSSR and standalone MSSR Mode S in major TMAs to ensure adequate level of surveillance redundancy and identification of all flights;
- UAE issued ADS-B/Out carriage Mandate as of 01 January 2020, ADS-B IN capability shall not be carried unless approved by the GCAA. Saudi Arabia issued ADS-B/Out carriage Mandate as of 01 January 2023 for all airspace users flying in Class A, B, C, D and E.
- Other ICAO Regions/States mandated carriage of ADS-B; Australia, Europe and United States (FAA) in 2020.
- Several ADS-B mandates worldwide may accelerate the ADS-B equipage. However, Regional Airline, General flights and Military aircraft impeding the ADS-B implementation in the MID Region.
- Saudi Arabia is implementing A-SMGCS systems at all Intl. airports listed in ICAO MID ANP. Each A-SMGCS system is composed of: 1) an SMR system, 2) a network of MLAT and ADS-B ground Stations with required central processing and monitoring systems.

8- Surveillance Plan

8.1 Short Term (2020 – 2024)

- Make full use of SSR Mode 'S' capabilities, reduce reliance on 4-digit octal code.
- States to consider emerging dependent Surveillance technologies (ADS-B and MLAT) in their National Surveillance Plans.
- Non-cooperative Surveillance radars maybe retained for Airports and approach services based on States operational needs (detection drones with large Radar Cross Section (RCS), detection of non-equipped vehicle,...,etc).
- ADS-B/Out Implementation:

- 1- Prioritize ADS-B/Out implementation in areas where there is no radar coverage surveillance.
 - 2- State shall conduct safety assessment for ADS-B/ MLAT implementation as per *Reference [6]*.
 - 3- The proportions of equipped aircraft are critical for the ADS-B deployment. Therefore, States should involve early in their joint planning and decision-making process. Subsequently, States should effectively communicate the change, the rationale and the impact
 - 4- States are encouraged to use INCENTIVE strategy with stakeholders to accelerate ADS-B equipage; incentive approach might be financial or operational incentive or combined (e.g. Most Capable Best Served principle, waive fees).
- MLAT/SMR/ADS-B to be implemented at Aerodrome to enable A-SMGCS.
 - Where there is a lack of ADS-B avionics equipage, MLAT can be an alternative mean to meet specific surveillance requirements, such as being a gap-filler of SSR coverages or supporting airport ground movement operations.
 - States to share SSR/ADS-B data to improve boundary coverage and enhance the surveillance availability services. These type of surveillance data have very limited military.
 - Space based ADS-B can be used where installation of ground based surveillance sensor is not possible due to geography and other security reasons.
 - Video Surveillance System can be used to operate Remote Control Tower (RATS B1/1).
 - When operationally required, MLAT/SMR/Video Surveillance System may be implemented at Aerodrome for Ground/ Surface Management service.

8.2 Mid Term (2025 - 2030)

- ADS-B/Out Implementation (*High proportion of ADS-B equipage is anticipated*):
 - 1- ADS-B to be implemented for Area and approach Control Services, where implementation would bring capacity and operational efficiencies;
 - 2- Relocate, as appropriate, any existing MLAT Sensors to work as ADS-B receiver.
- Retain some SSR Mode S Radar as supplement/ backup to ADS-B. States should develop progressive rationalization plans base on consultations with aviation stakeholders.
- The Introduction of Multi-constellation GNSS (GPS, Galileo, GLONASS, ..., etc.) may reduce the likelihood of ADS-B outage linked to GNSS interference events. However, necessary ICAO standards will need to be completed before any avionics deployment can be expected. Any use of multi-constellation capability should follow natural avionics life-cycle and should not be mandatory.

- Implementation of Airborne Collision Avoidance System (ACAS X) adapted to trajectory-based operations with improved surveillance function supported by ADS-B aimed at reducing nuisance alerts and deviations (ACAS B2/1)
- States to develop required certification requirements for RPAS equipped with ACAS X (detect and avoid system), the ACAS systems for RPAS use multiple surveillance sensor inputs to determine the position and velocity of nearby aircraft (ACAS B2/2)
- ICAO will be able to assign additional 24-bit addresses (adoption of Annex 10, VOL III amendment) to States who have a small number of addresses (such as 1024) and for allocating codes to surface vehicle.

8.3 Long Term (2031 Onward)

- ADS-B is foreseen to be main Surveillance technology. Globally harmonized avionics requirements and clear definition of roles, responsibilities, and liabilities of pilots and air traffic controllers should be developed in support of ADS-B IN applications. Subsequently, airlines and ATS providers should conduct a cost and benefit analysis for ADS-B IN to determine if a positive business case for airlines and ATS providers can be obtained.

REFERENCES

- [1] ICAO Annex 10, Aeronautical Telecommunication.
- [2] ICAO Doc 9924, Aeronautical Surveillance Manual
- [3] ICAO Doc 9869, Performance-Based Communication and Surveillance (PBCS) Manual
- [4] ICAO Doc 9994, Manual on Airborne Surveillance Applications
- [5] The Global Air Navigation Plan (9750), 6th edition <https://www4.icao.int/ganpportal/>[6] ICAO Doc 9871, Technical Provisions for Mode S Services and Extended Squitter.
- [6] ICAO circular 326, Assessment of ADS-B and Multilateration Surveillance to Support Air Traffic Services and Guidelines for Implementation
- [7] EUROCONTROL Standard Document for RADAR Surveillance in EN-Route Airspace and Major Terminal Areas.
- [8] Guidance Material on Comparison of Surveillance Technologies (GMST), APAC Region.
- [9] ICAO Global Navigation Satellite System (GNSS) Manual (Doc 9849)



MID Doc 009

INTERNATIONAL CIVIL AVIATION ORGANIZATION

**MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)**

MID REGION SIGMET GUIDE

EDITION 27 APRIL 2023

RECORD OF AMENDMENTS AND CORRIGENDA

[illegible][illegible]

TABLE OF CONTENTS

		Page
Part 1:	Introduction	
1.1	General.....	1-1
Part 2:	Responsibilities and coordination	
2.1	General.....	2-1
2.2	Meteorological watch office (MWO) responsibilities	2-1
2.3	Air traffic services (ATS) unit responsibilities.....	2-3
2.4	Pilot responsibilities	2-3
2.5	Coordination between MWOs and ATS units	2-4
2.6	Coordination between MWOs, VAACs, TCACs and State volcano observatories.....	2-4
Part 3:	Procedures for preparation of SIGMET information	
3.1	General.....	3-1
3.2	SIGMET phenomena	3-1
3.3	Allowable abbreviations	3-2
3.4	SIGMET structure	3-3
3.5	SIGMET format.....	3-3
	3.5.1 WMO header	3-4
	3.5.2 First line of SIGMET.....	3-4
	3.5.3 Structure of the meteorological part of SIGMET for weather phenomena other than for volcanic ash and tropical cyclone	3-5
13	3.5.4 Structure of the meteorological part of SIGMET for volcanic ash.....	3-
19	3.5.5 Structure of the meteorological part of SIGMET for tropical cyclone.....	3-
21	3.5.6 Cancellation of SIGMET	3-
22	3.5.7 Amendment of SIGMET	3-
23	3.6 Dissemination of SIGMET	3-
Appendices		
	Appendix A — SIGMET guidance table: Simplified from Annex 3 Table A6-1	A-1
	Appendix B — SIGMET examples.....	B-1
	Appendix C — SIGMET test procedures	C-1
	Appendix D — SIGMET WMO headers - MID	D-1
	Appendix E — Special air-report WMO headers - MID.....	E-1
	Appendix F — SIGMET examples - MID	F-1

1. INTRODUCTION

1.1. General

- 1.1.1. The main purpose of this regional SIGMET guide is to provide guidance for standardization and harmonization of the procedures and formats related to the preparation and issuance of aeronautical meteorological information pertaining to specified en-route hazardous weather, and other phenomena in the atmosphere, which may affect safety of aircraft operations, known as SIGMET. The guidance is complementary to Annex 3 to the Convention on International Civil Aviation – *Meteorological Services for International Air Navigation*, the Standards and Recommended Practices (SARPs) contained therein regarding SIGMET, and to the SIGMET-related provisions in ICAO Regional Air Navigation Plans (ANPs).
- 1.1.2. The guidance is specifically provided for the provision of SIGMET in traditional alphanumeric code (TAC) form. As the provision and use of SIGMET data in digital form (IWXXM XML/GML) is used increasingly across ICAO communications networks it is expected that the conventions of the digital form will result in more compliant and less ambiguous SIGMET messages. During the period of transition, where it is likely that originating MWOs will issue both TAC and digital forms of SIGMET and until TAC SIGMET is formally retired, it is considered necessary to make available a guidance document of this form.
- 1.1.3. ICAO provisions concerning the preparation and issuance of SIGMET information are primarily contained in:
- Annex 3 - *Meteorological Service for International Air Navigation*, Part I, Chapters 3 and 7 and Part II, Appendix 6;
 - Annex 11 - *Air Traffic Services*, Chapter 4, 4.2.1 and Chapter 7, 7.1;
 - Regional Air Navigation Plans, Basic ANP, Part VI - Meteorology (MET);
 - Regional Air Navigation Plans, Volume II, FASID, Part VI – Meteorology (MET) FASID, Tables MET 1B, MET 3A and MET 3B;
 - *Procedures for Air Navigation Services – Air Traffic Management (PANS-MET*, Doc 4444), Chapter 9, 9.1.3.2;
 - Regional Supplementary Procedures (Doc 7030), Chapter 6, 6.13.2;
 - *ICAO Abbreviations and Codes* (Doc 8400);
 - *Handbook on the International Airways Volcano Watch (IAVW) – Operational Procedures and Contact List* (Doc 9766);
 - *Manual of Aeronautical Meteorological Practice* (Doc 8896), Chapters 1 and 4;
 - *Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services* (Doc 9377).
- 1.1.4. This regional SIGMET guide is primarily intended to assist meteorological watch offices (MWOs) in preparing and disseminating SIGMET information in conformance with the format prescribed in Annex 3. The explanations of the format to be used are accompanied by examples. The regional SIGMET guide also provides information regarding the necessary coordination between the MWOs, air traffic services (ATS), volcanic ash advisory centres (VAACs), tropical cyclone advisory centres (TCACs) and pilots, and their respective responsibilities.
- 1.1.5. To support regional management of SIGMET issuance and dissemination, Appendix C of the regional SIGMET guide contains guidance on the purpose, scope and procedures for conducting regional SIGMET tests.

2. RESPONSIBILITIES AND COORDINATION

2.1. General

- 2.1.1. SIGMET messages provide information on hazardous meteorological and other phenomena which may affect safety of aircraft operations; hence they are considered a high priority among other types of meteorological information provided to the aviation users. The primary purpose of SIGMET is for in-flight service, which requires timely transmission of the SIGMET messages to pilots by the ATS units and/or through VOLMET and D-VOLMET. Further information on the responsibilities of each party involved in the SIGMET process can be found in the *Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services* (Doc 9377).
- 2.1.2. Airlines are the main users of the SIGMET information. They contribute to the effectiveness of the SIGMET service through issuance of special air-reports reported by pilots to the ATS units. Special air-reports are among the most valuable sources of information for the MWOs in the preparation of SIGMET. The ATS units receiving special air-reports should forward them to their associated MWOs without delay.
- 2.1.3. In view of the foregoing, it should be well understood that the effectiveness of the SIGMET service depends strongly on the level of collaboration between the MWOs, ATS units, pilots, TCACs, VAACs and State volcano observatories. That is why, close coordination between these parties, as well as mutual understanding of their needs and responsibilities are essential for the successful implementation of the SIGMET service.
- 2.1.4. For the special cases of SIGMET for volcanic ash and tropical cyclones, the MWOs are provided with advisories from VAACs and TCACs respectively, as designated in the regional ANPs.
- 2.1.5. SIGMET is also used for flight planning. This requires global dissemination of SIGMET through the regional OPMET data banks (RODBs), the Internet-based SADIS FTP service and the WAFS Internet File Service (WIFS). SIGMET should also be distributed to the World Area Forecast Centres (WAFCs) London and Washington for use in the preparation of the significant weather (SIGWX) forecasts.

2.2. Meteorological watch office (MWO) responsibilities

- 2.2.1. SIGMET is to be issued by the MWO in order to provide timely information on the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere affecting the safety of the flight operations in the MWO's area of responsibility. SIGMET provides information concerning the location, extent, intensity and expected evolution of the specified phenomena.
- 2.2.2. Information about the provision of the SIGMET service, including details on the designated MWO(s), is to be included in the State's Aeronautical Information Publication (AIP) as required by Annex 15 – *Aeronautical Information Service*, Appendix 1, GEN 3.5.8.
- 2.2.3. If a State is temporarily unable to meet its obligations for establishing MWO(s) and for provision of SIGMET, arrangements have to be made for another State to assume this responsibility. Such delegation of responsibilities is to be agreed by the meteorological authority of each State concerned and should be notified by a NOTAM, within the State's AIP and in a letter to the ICAO Regional Office concerned.
- 2.2.4. The meteorological authority concerned should ensure that the MWO obligations and responsibilities are clearly defined and assigned to the unit designated to serve the

MWO. Corresponding operational procedures should be established and the meteorological staff should be trained accordingly.

2.2.5. In preparing SIGMET information MWOs should follow the format prescribed in Annex 3, Appendix 6, Table A6-1A. Whilst Table A6-1A is the authoritative source, Appendix A of this regional SIGMET guide, includes an enhanced SIGMET specific guidance based on Table A6-1A and provides more specific instructions on how SIGMET should be compiled. The aim is to ensure that SIGMET is produced reliably and consistently worldwide.

2.2.6. SIGMET must be issued only for those phenomena listed in Annex 3, Appendix 6, 1.1.4 and only when specified criteria for their intensity and spatial extent are met.

2.2.7. The MWOs should be adequately equipped in order to be able to identify, analyze and forecast those phenomena for which SIGMET is required. The MWO should make use of all available sources of information including:

- special air-reports passed to the MWO from ATS (voice communication);
- special air-reports received from automated downlink;
- numerical Weather Prediction (NWP) data, especially high resolution models where available;
- meteorological observations, including those from automatic weather stations and human observers;
- upper wind information;
- information from meteorological satellites;
- weather radar (including Doppler radar);
- State volcano observatories;
- International Atomic Energy Agency (IAEA) through the relevant World Meteorological Organization (WMO) Regional Specializes Meteorological Centre (RSMC) for radioactive cloud;
- local knowledge;
- volcanic ash or tropical cyclone advisory messages.

2.2.8. On receipt of a special air-report from the associated ACC or FIC, the MWO shall:

- a) issue SIGMET information based on the special-air report; or
- b) send the special air-report for onward transmission to MWOs, WAFCs and other meteorological offices in accordance with regional air navigation agreement in the case that the issuance of SIGMET information is not warranted (e.g., the phenomenon concerned is of transient nature).

2.2.9. Appropriate telecommunication means should be available at the MWO in order to ensure timely dissemination of SIGMET according to a dissemination scheme, which should include transmission to:

- local ATS users;
- aerodrome MET offices within its area of responsibility, where SIGMET is required for briefing and/or flight documentation;
- other MWOs in accordance with regional air navigation plans;
- Centres designated for transmission of VOLMET or D-VOLMET where SIGMET is required for those transmissions;
- responsible ROBEX centres and regional OPMET data bank (RODB). It should be arranged that, through the ROBEX scheme, SIGMETs are sent to the designated RODB in the other ICAO regions, to the WAFCs and to the SADIS and WIFS providers;

- 2.2.10. In issuing SIGMET for tropical cyclones or volcanic ash, the MWOs should include as appropriate the advisory information received from the responsible TCAC or VAAC. In addition to the information received from the TCAC and VAAC, the MWOs may use the available complementary information from other reliable sources.

2.3. Air traffic service (ATS) unit responsibilities

- 2.3.1. Close coordination should be established between the MWO and the corresponding ATS unit (ACC or FIC) and arrangements should be in place to ensure:
- receipt without delay and display at the relevant ATS units of SIGMET issued by the associated MWO;
 - receipt and display at the ATS unit of SIGMETs issued by MWOs responsible for the adjacent FIRs/ACCs if these SIGMETs are required according to 2.3.4 below; and
 - transmission without delay by the ATS unit of special air-reports received through voice communication to the associated MWO.
- 2.3.2. SIGMET information should be transmitted to aircraft with the least possible delay on the initiative of the responsible ATS unit, by the preferred method of direct transmission followed by acknowledgement or by a general call when the number of aircraft would render the preferred method impracticable.
- 2.3.3. SIGMET information transmitted to aircraft-in-flight should cover a portion of the route up to two hours flying time ahead of the aircraft. SIGMET should be transmitted only during the time corresponding to their period of validity.
- 2.3.4. Air traffic controllers should ascertain whether any of the currently valid SIGMETs may affect any of the aircraft they are controlling, either within or outside the FIR/CTA boundary, up to two hours flying time ahead of the current position of the aircraft. If this is the case, the controllers should at their own initiative transmit the SIGMET promptly to the aircraft-in-flight likely to be affected. If necessary, the controller should pass to the aircraft available SIGMETs issued for the adjacent FIR/CTA, which the aircraft will be entering, if relevant to the expected flight route.
- 2.3.5. The ATS units concerned should also transmit to aircraft-in-flight the special air-reports received, for which SIGMET has not been issued. Once a SIGMET for the weather phenomenon reported in the special air report is made available this obligation of the ATS unit expires.

2.4. Pilot responsibilities

- 2.4.1. Timely issuance of SIGMET information is largely dependent on the prompt receipt by MWOs of special air-reports. It is essential that pilots prepare and transmit such reports to the ATS units whenever any of the specified en-route hazardous conditions are encountered or observed.
- 2.4.2. It should be emphasized that, even when automatic dependent surveillance (ADS) is being used for routine air-reports, pilots should continue to make special air-reports.
- 2.4.3. Pilots should compile special air-reports and disseminate to ATS by air-ground data link as per Annex 3, Appendix 4, 1.2 and *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444), 4.12.3.2, or by voice communication as per Annex 3, Appendix 4, 1.3 and PANS-ATM (Doc 4444), 4.12.3.3.

Note. — The MWO will compile special air-reports for uplink as per Annex 3, Appendix 6, and as reported using the instructions given PANS-ATM, Appendix 1.

2.5. Coordination between MWOs and ATS units

- 2.5.1. To achieve the best service to aviation and as part of the collaborative decision-making process, close coordination between the MWO and the ATS units is required. This is of particular importance for the avoidance of hazardous weather.
- 2.5.2. A Letter of Agreement between the ATS authority and the meteorological authority is also recommended (as per Annex 3, 4.2) to outline the responsibilities and coordination processes between the MWOs and ATS units.

2.6. Coordination between MWOs, VAACs, TCACs and State volcano observatories

- 2.6.1. Amongst the phenomena for which SIGMET information is required, volcanic ash and tropical cyclones are of particular importance.
 - 2.6.2. Since the identification, analysis and forecasting of volcanic ash and tropical cyclones requires considerable scientific and technical resources, normally not available at each MWO, VAACs and TCACs have been designated to provide volcanic ash advisories and tropical cyclone advisories respectively to the users and assist the MWOs in the preparation of SIGMETs for those phenomena. Close coordination should be established between the MWO and its responsible VAAC and/or TCAC.
 - 2.6.3. Information regarding the VAACs and TCACs areas of responsibility and lists of MWOs and ACC/FICs to which advisories are to be sent is provided in the regional ANPs FASID Tables MET 3A and MET 3B. Volcanic ash advisories and tropical cyclone advisories are required for global exchange through SADIS and WIFS as they are used by the operators during the pre-flight planning. Nevertheless, it should be emphasized that SIGMET information is still required especially for in-flight re-planning. SIGMETs should be transmitted to aircraft-in-flight through voice communication, VOLMET or D-VOLMET, thus providing vital information for making in-flight decisions regarding large-scale route deviations due to volcanic ash clouds or tropical cyclones.
 - 2.6.4. Information from State volcano observatories is an important part of the process for issuance of volcanic ash advisories and SIGMETs. Information from a State volcano observatory should be in the form of a Volcano Observatory Notification for Aviation (VONA) and include information on significant pre-eruption volcanic activity, volcanic eruptions or the presence of volcanic ash clouds. Guidance including responsibilities for the issuance of the VONA is given in the *Handbook on the International Airways Volcano Watch (IAVW) – Operational Procedures and Contact List* (Doc 9766); the format of the VONA is given in Appendix E of the Doc 9766.
-

3. PROCEDURES FOR PREPARATION OF SIGMET INFORMATION

3.1. General

- 3.1.1. SIGMET is intended for transmission to aircraft in flight either by ATC or by VOLMET or D-VOLMET, and therefore, SIGMET messages should be kept concise. To this end, SIGMET information is prepared using approved ICAO abbreviations, a limited number of non-abbreviated words and, numerical values of a self-explanatory nature.
- 3.1.2. The increasing use of automated systems for handling the aeronautical meteorological information by the users makes it essential that all types of OPMET information, including SIGMET messages, are prepared and issued in the prescribed standardized format. Therefore, the format of the SIGMET message, as specified in Annex 3, Appendix 6, should be strictly followed by the MWOs.
- 3.1.3. The MWO should maintain watch over the evolution of the phenomenon for which a SIGMET has been issued. If the phenomenon persists or is expected to persist beyond the period of validity of the SIGMET, another SIGMET message for a further period of validity should be issued with updated information. SIGMETs for volcanic ash and tropical cyclone should be updated at least every 6 hours, while SIGMET for all other phenomena should be updated at least every 4 hours.
- 3.1.4. SIGMET should be promptly cancelled when the phenomenon is no longer occurring or no longer expected to occur in the MWO's area of responsibility.
- 3.1.5. Some SIGMET are generated using information from special air-reports (received by voice communications or data link (downlink)). The reporting of turbulence and icing used in special air-reports includes both moderate and severe categories (as per Doc 4444, Appendix 1).

Note. — Although the categories for the reporting, by pilots, of moderate and severe turbulence in special air-reports is provided in PANS-ATM (Doc 4444), some pilots report turbulence as “moderate to severe”. A MWO is then faced with determining which category to use in a special air-report (uplink) or in a SIGMET message for severe turbulence. Some States elect to treat such “moderate to severe” observations as ‘severe’ in the context of using the report to prompt the issuance of a special air-report (uplink) or a SIGMET message.

3.2. SIGMET phenomena

- 3.2.1. SIGMET shall only be issued for the phenomena listed in Table 1 below and only using the abbreviations as indicated.

Phenomena Abbreviation	Description
OBSC TS	Thunderstorms that are obscured by haze or smoke or cannot be readily seen due to darkness.
EMBD TS	Thunderstorms that are embedded within cloud layers and cannot be readily recognized by the pilot in command
FRQ TS	Frequent thunderstorms where, within the area of thunderstorms, there is little no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75%.
SQL TS	A squall line indicating that a line of thunderstorms with little or no space between individual cumulonimbus clouds (CB).
OBSC TSGR	Thunderstorms with hail that are obscured by haze or smoke or cannot be readily seen due to darkness.
EMBD TSGR	Thunderstorms with hail that are embedded within cloud layers and cannot be readily recognized.

Phenomena Abbreviation	Description
FRQ TSGR	Frequent thunderstorms with hail, within the area of thunderstorms, there is little or no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75%.
SQL TSGR	A squall line indicating that a line of thunderstorms with hail with little or no space between cumulonimbus clouds (CB).
TC	A tropical cyclone with a 10 minute mean surface wind speed of 17m/s (34 kt) or more.
SEV TURB	Severe turbulence referring to: • low-level turbulence associated with strong surface winds; • rotor streaming; or • clear air turbulence, whether in cloud or not in cloud. <i>Note. — Turbulence should not be used in connection with convective clouds. Severe turbulence shall be considered whenever the peak value of the cube root of EDR exceeds 0.7.</i>
SEV ICE	Severe icing not associated with convective cloud.
SEV ICE (FZRA)	Severe icing caused by freezing rain and not associated with convective cloud.
SEV MTW	Severe mountain wave the accompanying downdraft is 3 m/s (600 ft/min) or more or when severe turbulence is observed or forecast.
HVY DS	Heavy duststorm where the visibility is below 200 m and the sky is obscured.
HVY SS	Heavy sandstorm where the visibility is below 200 m and the sky is obscured.
VA	Volcanic ash
RDOACT CLD	Radioactive cloud

Table 1: SIGMET phenomena abbreviations and descriptions

3.3. Allowable abbreviations

3.3.1. Abbreviations that can be used in the meteorological section of SIGMET are given in Table 1 above and in Table 2 below.

Abbreviation	Meaning	Abbreviation	Meaning
ABV	Above	NE	North-east
APRX	Approximate or approximately	NNE	North-north-east
AT	At (followed by time)	NNW	North-north-west
BLW	Below	NM	Nautical miles
BTN	Between	NO	No
CB	Cumulonimbus cloud	NW	North-west
CLD	Cloud	OBS	Observe or observed or observation
CNL	Cancel or cancelled	PSN	Position
E	East or eastern longitude	S	South or southern latitude
ENE	East-north-east	SE	South-east
ESE	East-south-east	SFC	Surface
EXP	Expect or expected or expecting	SSE	South-south-east
FCST	Forecast	SSW	South-south-west
FIR	Flight information region	STNR	Stationary

Abbreviation	Meaning	Abbreviation	Meaning
FL	Flight level	SW	South-west
FT	Feet	TO	To
INTSF	Intensify or intensifying	TOP	Cumulonimbus cloud top (height)
KM	Kilometres	W	West or western longitude
KT	Knots	WI	Within (area)
LCA	Location	WID	Width or wide
M	Metres	WKN	Weaken or weakening
MOV	Move or moving or movement	WNW	West-north-west
MT	Mountain	WSW	West-south-west
N	North or northern latitude	Z	Coordinated Universal Time
NC	No change		

Table 2: SIGMET phenomena abbreviations and descriptions.

3.4. SIGMET structure

3.4.1. A SIGMET message consists of:

- **WMO Abbreviated Heading Line (WMO AHL)** – all SIGMETs are preceded by an appropriate WMO AHL;
- **First line**, containing location indicators of the respective ATS unit and MWO, sequential number and period of validity;
- **SIGMET main body**, containing information concerning the observed or forecast phenomenon for which the SIGMET is issued together with its expected evolution within the period of validity;

3.5. SIGMET format

Note. — In the following text, square brackets - [] - are used to indicate an optional or conditional element, and angled brackets - < > - for symbolic representation of a variable element, which in a real SIGMET accepts a discrete numerical value.

3.5.1. WMO header

T₁T₂A₁A₂ii CCCC YYGGgg [BBB]

- 3.5.1.1. The group **T₁T₂A₁A₂ii** is the bulletin identification (WMO AHL) for the SIGMET message. It is constructed in the following way:

T₁T₂	Data type designator	WS – for SIGMET for phenomena other than volcanic ash cloud or tropical cyclone WC – for SIGMET for tropical cyclone WV – for SIGMET for volcanic ash
A₁A₂	Country or territory designators	Assigned according to Table C1, Part II of <i>Manual on the Global Telecommunication System</i> , Volume I – <i>Global Aspects</i> (WMO Publication No. 386)
ii	Bulletin number	Assigned on national level according to p 2.3.2.2, Part II of <i>Manual on the Global Telecommunication System</i> , Volume I – <i>Global Aspects</i> (WMO Publication No. 386)

Table 3: Specification of the WMO Abbreviated Header Line for SIGMET

Note 1 — Tropical cyclone and volcanic ash cloud SIGMETs will be referred to hereafter as WC SIGMET (due to the T₁T₂ section of the WMO AHL being set to WC) and WV SIGMET (due to the T₁T₂ section of the WMO AHL being set to WV) respectively. All other SIGMET types will be referred to by WS (due to the T₁T₂ section of the WMO AHL being set to WS).

Note 2. — WMO AHLs for SIGMET bulletins used by [INSERT REGION NAME] MWOs are listed in Appendix D to this SIGMET Guide.

- 3.5.1.2. **CCCC** is the ICAO location indicator of the communication centre disseminating the message (this may be the same as the MWO location indicator).

- 3.5.1.3. **YYGGgg** is the date/time group; where **YY** is the day of the month and **GGgg** is the time of transmission of the SIGMET in hours and minutes UTC (normally this time is assigned by the disseminating (AFTN) centre).

Examples:

WSTH31 VTBS 121200

WVJP31 RJTD 010230

WCNG21 AYPY 100600

3.5.2. First line of SIGMET

CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-

- 3.5.2.1. The meaning of the groups in the first line of the SIGMET is as follows:

CCCC	ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET refers
SIGMET	Message identifier
[n][n]n	Daily sequence number (see 3.5.2.2)
VALID	Period of validity indicator
YYGGgg/YYGGgg	Validity period of the SIGMET given by date/time group of the beginning and date/time group of the end of the period (see 3.5.2.3)
CCCC	ICAO location indicator of the issuing MWO
-	Mandatory hyphen to separate the preamble from the text

Table 4: Elements making up the first line of SIGMET

3.5.2.2. The numbering of SIGMETs starts every day at 0001 UTC. The sequence number should consist of up to three alphanumeric characters and may be a combination of letters and numbers, such as:

- **1, 2, ...**
- **01, 02, ...**
- **A01, A02, ...**

Examples:

**RPMM SIGMET 3 VALID 121100/121700 RPLL -
WSJC SIGMET A04 VALID 202230/210430 WSSS -**

*Note 1. — No other combinations should be used, like “**CHARLIE 05**” or “**NR7**”.*

Note 2. — Correct numbering of SIGMET is very important since the number is used for reference in communication between ATC and pilots and in VOLMET and D-VOLMET.

Note 3. — In accordance with Annex 5 – Units of Measurement to be Used in Air and Ground Operations, when the validity period begins or ends at midnight, YY should be set for the following day and GGgg should be '0000'. i.e. SIGMET validity ending at midnight on the 23rd day of the month should be expressed as '240000'.

3.5.2.3. The following regulations apply when determining the validity period:

- The period of validity of a **WS** SIGMET should not be more than 4 hours;
- The period of validity of a **WC** or **WV** SIGMET should not be more than 6 hours;
- In case of a SIGMET for an observed phenomenon, the filing time (date/time group in the WMO header) should be the same or very close to the time in the date/time group indicating the start of the SIGMET validity period;
- When the SIGMET is issued for a forecast phenomenon:
 - o the beginning of validity period should be the time of the expected commencement (occurrence) of the phenomenon in the MWO area of responsibility;
 - o the time of issuance of a **WS** SIGMET should not be more than 4 hours before the start of validity period (i.e., expected time of occurrence of the phenomenon); and for **WC** (tropical cyclone) and **WV** (volcanic ash) SIGMET the lead time should not be more than 12 hours.

3.5.2.4. The period of validity is that period during which the SIGMET information is valid for transmission to aircraft in flight.

Examples:

- 1) First two lines of a SIGMET for an observed phenomenon:

**WSTH31 VTBS 241120
VTBB SIGMET 3 VALID 241120/241500 VTBS-**

- 2) First two lines of a SIGMET for a forecast phenomenon (expected time of occurrence 1530)

**WSSR20 WSSS 311130
WSJC SIGMET 1 VALID 311530/311930 WSSS-**

3.5.3. Structure of the meteorological part of SIGMET

- 3.5.3.1. The meteorological part of a SIGMET for the phenomena consists of elements as shown in the table below.

Start of the second line of the message

1	2	3	4	5	6	7	8	9
Name of the FIR/UIR or CTA (M)	Phenomenon (M)	Observed or forecast phenomenon (M)	Location (C)	Level (C)	Movement or expected movement (C)	Changes in intensity (C)	Forecast time (C)	Forecast position (C)
See 3.5.3.2	See 3.5.3.3	See 3.5.3.4	See 3.5.3.5	See 3.5.3.6	See 3.5.3.7	See 3.5.3.8	See 3.5.3.9	See 3.5.3.10

Table 5: Elements making up the meteorological part of SIGMET.

Note 1) Item 6, 'Movement or expected movement' should not be used if the 'forecast time' and 'forecast position' elements are used.

Note 2) M = inclusion mandatory, part of every message. C = inclusion conditional, include whenever applicable.

3.5.3.2. Name of the FIR/UIR or CTA

CCCC <name> FIR[/UIR]

or

CCCC <name> CTA

The ICAO location indicator and the name of the FIR/CTA are given followed by the appropriate abbreviation: FIR, FIR/UIR or CTA. The name may consist of up to 10 characters.

Examples:

VTBB BANGKOK FIR

3.5.3.3. Phenomenon

The phenomenon description consists of a qualifier and a phenomenon abbreviation. SIGMET should be issued only for the following phenomena observed and forecast to persist for more than a transitory period.:

- thunderstorms – if they are **OBSC**, **EMBD**, **FRQ** or **SQL** with or without hail (**GR**);
- turbulence – only **SEV**
- icing – only **SEV** with or without **FZRA**
- mountain waves – only **SEV**
- dust storm – only **HVY**
- sand storm – only **HVY**
- radioactive cloud – **RDOACT CLD**

For volcanic ash SIGMET (WV) only, the following conventions should be used

In the case when the eruption is from a previously unknown or un-named volcano.

VA ERUPTION PSN Nnn[nn] or Snn[nn] Ennn[nn] or Wnnn[nn] VA CLD

In the case when the eruption is from a known and named volcano. The name may be up to 10 alphanumeric characters.

VA ERUPTION MT nnnnnnnnnn PSN Nnn[nn] or Snn[nn] Ennn[nn] or Wnnn[nn] VA CLD

In the case when a region of volcanic ash cloud is known to exist, but the precise origin of its source is unknown (the ash cloud may be of large horizontal extent, and obscuring the precise vent from which it emanates, and is otherwise in an area sparse of observation to identify the source).

VA CLD

For tropical cyclone SIGMET (WC) only, the following conventions should be used

In the case when the tropical cyclone is known and named. The name may be up to 10 alphanumeric characters.

**TC nnnnnnnnnn PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]
CB**

In the case when the tropical cyclone is not yet named.

TC NN PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] CB

The appropriate abbreviations and combinations, and their meaning are given in Table 1.

3.5.3.4. Indication whether the phenomenon is observed or forecast

OBS

or

OBS AT GGggZ

or

FCST

or

FCST AT GGggZ

The indication whether the phenomenon is observed or forecast is given by using the abbreviations **OBS** or **FCST**. **OBS AT** and **FCST AT** may be used, in which case they are followed by a time group in the form **GGggZ**. If the phenomenon is observed, **GGggZ** is the time of the observation in hours and minutes UTC. If the exact time of the observation is not known the time is not included. When the phenomenon is based on a forecast without a reported observation, the time given for **GGggZ** represents the time of commencement of the validity period.

Examples:

OBS

OBS AT 0140Z

FCST

FCST AT 0200Z

3.5.3.5. Location of the phenomenon

The location of the phenomenon is given with reference to geographical coordinates (latitude and longitude). Latitude and longitude may be reported in degrees, or in degrees and minutes. When reporting in degrees the format will be **Nnn** or **Snn** for latitude, and **Ennn** or **Wnnn** for longitude.

When reporting in degrees and minutes the format will be **Nnnnnn** or **Snnnnn** for latitude, and **Ennnnnn** or **Wnnnnnn** for longitude. The MWOs should try to be as specific as possible in reporting the location of the phenomenon and, at the same time, to avoid overwhelming the SIGMET with too many coordinates, which may be difficult to process or follow when transmitted by voice radio.

The following are the possible ways to describe the location of the phenomenon:

- 1) An area of the FIR defined by a polygon. Minimum 4 coordinates¹, and not normally more than 7 coordinates. This is the format preferred operationally by users.

Symbolically, this is indicated as:

WI <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
 <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
 <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
 <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
 <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
 <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
 <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>

For example:

**WI N6030 E02550 - N6055 E02500 - N6050 E02630 -
 N6030 E02550**

WI N60 E025 - N62 E027 - N58 E030 - N59 E026 - N60 E025

Note. — The points of a polygon should be provided in a clockwise order, and the end point should be a repeat of the start point.

Use of polygons with complex FIR boundaries.

*Annex 3 (19th Edition, July 2016) specifies that the points of a polygon '... should be kept to a minimum and should not normally exceed seven'. However, some FIR boundaries are complex, and it would be unrealistic to expect that a polygon would be defined that followed such boundaries exactly. As such, some States have determined that the polygon points be chosen in relation to the complex boundary such that the FIR boundary approximates, but is wholly encompassed by, the polygon, and that any additional area beyond the FIR boundary be the minimum that can be reasonably and practically described. Caution should however be exercised in those instances where international aerodromes are located in close proximity to such a complex FIR boundary. **Appendix B** provides examples and advice with regard to describing such areas.*

- 2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and end points on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at that point).

Symbolically this is indicated as:

¹ Including the last point as a repeat of the first point to explicitly close the polygon

<N OF> or <NE OF> or <E OF> or <SE OF> or <S OF> or
 <SW OF> or <W OF> or <NW OF> LINE <Nnn[nn]> or
 <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or
 <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>

For example:

NE OF LINE N2500 W08700 - N2000 W08300

W OF LINE N20 E042 - N35 E045

- 2b) In a sector of the FIR defined as being **between** two specified lines, or **between** two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points).

<N OF> or <NE OF> or <E OF> or <SE OF> or <S OF> or
 <SW OF> or <W OF> or <NW OF> LINE <Nnn[nn]> or
 <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or
 <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>[- <Nnn[nn]> or
 <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>][- <Nnn[nn]> or
 <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>] AND <N OF> or <NE
 OF> or <E OF> or <SE OF> or <S OF> or <SW OF> or <W
 OF> or <NW OF> LINE <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]>
 or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
 <Ennn[nn]> [- <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
 <Ennn[nn]>][- <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
 <Ennn[nn]>]

For example:

**NE OF LINE N2500 W08700 - N2000 W08300 AND SW OF LINE
 N2800 W08500 - N2200 W08200**

**W OF LINE N20 E042 - N35 E045 AND E OF LINE N20 E039 -
 N35 E043**

- 2c) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant);

Symbolically this is indicated as:

<N OF> or <S OF> <Nnn[nn]> or <Snn[nn]> AND
 <E OF> or <W OF> <Wnnn[nn]> or <Ennn[nn]>

For example:

N OF N1200 AND E OF W02530

S OF N60 AND W OF E120

- 2d) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment), where a coordinate of latitude (or longitude) defines a line, and the preceding descriptor defines on which side of the line the phenomena is expected

Symbolically, this is indicated as:

<N OF> or <S OF> <Nnn[nn]> or <Snn[nn]> or
<E OF> or <W OF> <Wnnn[nn]> or <Ennn[nn]>

For example:

N OF S2230

W OF E080

- 3) Defined by a 'corridor' of specified width, centred upon a line, of up to three connected segments, described by;

APRX nnKM WID LINE BTN <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]>
or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
<Ennn[nn]>[- <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
<Ennn[nn]>][- <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
<Ennn[nn]>]

or

APRX nnNM WID LINE BTN <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]>
or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
<Ennn[nn]>[- <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
<Ennn[nn]>][- <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
<Ennn[nn]>]

- 4) At a specific point within the FIR, indicated by a single coordinate of latitude and longitude.

Symbolically, this is indicated as:

<Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>

For example:

N5530 W02230

S23 E107

- 5) Within a specified radius of the centre of a tropical cyclone.

Symbolically, this is indicated as:

WI nnnKM OF TC CENTRE
WI nnnNM OF TC CENTRE

- 6) A reference to the whole FIR, FIR/UIR, or CTA .

Symbolically, this is indicated as:

ENTIRE FIR[/UIR]

ENTIRE CTA

More detail on reporting the location of the phenomenon is given in the examples provided in **Appendix B** to this guide.

3.5.3.6. Flight level

Symbolically, the options permitted are:

FLnnn
or
nnnnM
or
[n]nnnnFT
or
SFC/FLnnn
or
SFC/nnnnM
or
SFC/[n]nnnnFT
or
FLnnn/nnn
or
TOP FLnnn
or
ABV FLnnn
or
TOP ABV FLnnn

or
TOP BLW FLnnn (only to be used for tropical cyclone)
or
nnnn/nnnnM
or
[n]nnnn/[n]nnnnFT
or
nnnnM/FLnnn
or
[n]nnnnFT/FLnnn

In more detail, the location or extent of the phenomenon in the vertical is given by one or more of the above methods, as follows:

1) reporting at a single flight level

For example: **FL320**

2) reporting at a single geometric level, in metres or feet

For example: **4500M or 8250FT or 12000FT**

3) reporting a layer extending from the surface to a given height in meters, feet or flight level

For example: **SFC/3000M or SFC/9900FT or SFC/11000FT or SFC/FL350**

4) reporting a layer extending from a given FL to a higher flight level

For example: **FL250/290**

5) reporting a layer where the base is unknown, but the top is given:

For example: **TOP FL350**

6) reporting phenomenon above a specified flight level, but where the upper limit is unknown:

For example: **ABV FL350**

7) reporting phenomenon that has an unknown lower limit, but has an upper limit that is known to extend above a known flight level:

For example: **TOP ABV FL350**

8) reporting phenomenon expected between a lower and upper geometric level expressed in metres or feet:

For example: **3500/9000M or 8000/12000FT or 11000/14000FT**

9) reporting phenomenon expected between a lower geometric level expressed in metres or feet and a higher flight level:

For example: **4000M/FL220 or 6000FT/FL140 or 11000FT/FL190**

10) reporting the CB upper limit for tropical cyclone SIGMET

For example: **TOP BLW FL450**

Additional examples:

**EMBD TS ... TOP ABV FL340
SEV TURB ... FL180/210
SEV ICE ... SFC/FL150
SEV MTW ... FL090**

3.5.3.7. Movement

Note. — Footnote 24 to Table A6-1A of ICAO Annex 3 states that “The elements ‘Forecast Time’ and ‘Forecast Position’ are not to be used in conjunction with the element ‘Movement or Expected Movement’”.

Rate of movement is indicated in the following way:

MOV <direction> <speed>KMH[KT]
or
STNR

Direction of movement is given with reference to one of the sixteen points of compass (**N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW**). Speed is given in **KMH** or **KT**. The abbreviation **STNR** is used if no significant movement is expected.

Examples:

MOV NNW 30KMH

MOV E 25KT

STNR

Note – Movement information should not be provided when a forecast position is explicitly given

3.5.3.8. Expected changes in intensity

The expected evolution of the phenomenon's intensity is indicated by one of the following abbreviations:

INTSF
or
WKN
or
NC

3.5.3.9. Forecast time

This section is used, with ‘Forecast position’ to explicitly provide a forecast of the position of the phenomena at the time specified. The format is fixed, and is of the form

FCST AT nnnnZ

for example

FCST AT 1600Z

where the forecast time is the same as the SIGMET validity end time.

Note. — In accordance with Annex 5 – Units of Measurement to be Used in Air and Ground Operations, when the validity period ends at midnight, YY should be set for the following day and GGgg should be '0000'. i.e. SIGMET validity ending at midnight on the 23rd day of the month should be expressed as '240000'.

3.5.3.10. Forecast position of the hazardous phenomenon at the end of the validity period of the SIGMET message

The available methods of describing the forecast position of the phenomenon in the 'Forecast position' section is exactly as detailed in section 3.5.3.5 with the addition of:

- a) The forecast centre position of a tropical cyclone is given by:

TC CENTRE PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]

TC CENTRE PSN N2740 W07345

- b) For volcanic ash which is not expected to be present within the FIR at the end of the validity of the SIGMET, the following is permitted:

NO VA EXP

Note. — Currently, there is no provision for indicating changes to the levels affected by phenomena between the initial position and the forecast position. As such, and as per footnote 28 to Table A6-1A of Annex 3 (19th Edition, July 2016), it should be assumed that the levels affected remain the same for both initial and forecast positions. If levels differ significantly then separate SIGMET should be issued.

3.5.3.11. Repetition of elements (volcanic ash and tropical cyclone SIGMET only)

Inclusion of instances of volcanic ash phenomenon and tropical cyclone phenomenon in the same SIGMET is permitted for volcanic ash and tropical cyclone only.

With regard to the portrayal of complex volcanic ash events (which implies areas of volcanic ash at different levels) guidance in this regard is provided in **Appendix B**.

With regard to the portrayal of two tropical cyclones, guidance is provided in **Appendix B**.

3.5.4. Cancellation of SIGMET

- 3.5.4.1. Annex 3, 7.1.2 requires that "SIGMET information shall be cancelled when the phenomena are no longer occurring or are no longer expected to occur in the area".

- 3.5.4.2. As such, it is mandatory for an MWO to cancel any SIGMET that is currently valid but for which the specified phenomena no longer exists or is expected to exist.
- 3.5.4.3. The cancellation is done by issuing the same type of SIGMET (i.e. WS, WV or WC) with the following structure:
- WMO heading with the same data type designator;
 - First line that contains as period of validity the remaining time of the original period of validity;
 - Second line, which contains the name of the FIR or CTA, the combination CNL SIGMET, followed by the sequence number of the original SIGMET and its original validity period.
- 3.5.4.4. A cancellation SIGMET should have a unique sequence number, and should follow the format below.

For a SIGMET that is cancelled during its period of validity, the cancellation SIGMET will be of the form:

As an example, an original SIGMET of:

```
YMMM SIGMET A01 VALID 260300/260700 YPRF-
YMMM MELBOURNE FIR EMBD TS FCST WI S4000 E12000 - S3830 E12200
- S4200 E12100 - S4000 E12000 TOP FL450 MOV SW 05KT INTSF=
```

If it were to be cancelled early (i.e. prior to 0700 UTC), then the following would be appropriate:

```
YMMM SIGMET A02 VALID 260600/260700 YPRF-
YMMM MELBOURNE FIR CNL SIGMET A01 260300/260700=
```

Where:

- the sequence number will be the next incrementing, unique sequence number.
- the validity time will be the time remaining between issuance and the end time of the original SIGMET.
- the sequence number of the original (and to be cancelled) SIGMET shall follow 'CNL SIGMET '.
- the original validity time of the original (and to be cancelled) SIGMET shall be included in the message after the reference to the original SIGMET's sequence number.

For SIGMET for volcanic ash only, the following is permitted:

```
WSAU21 ADRM 202155
YBBB SIGMET E03 VALID 202155/210000 YPDM-
YBBB BRISBANE FIR CNL SIGMET E01 202000/210000 VA MOV TO WXYZ
FIR=
```

Where the FIR (WXYZ in the example) into which the volcanic ash has moved is indicated.

3.5.5. **Amendment/correction of SIGMET**

- 3.5.5.1. If it is known that an existing SIGMET no longer accurately describes the existing or expected future evolution of the phenomena a new SIGMET, correctly describing the hazard should be issued, followed immediately by a cancellation of the original, erroneous SIGMET.

The new SIGMET should be issued before the cancellation in order to ensure there is always a SIGMET in force and that the cancellation is not mistakenly understood to mean that the hazard has completely dissipated.

Originally issued SIGMET, later determined to no longer be accurate (bold text identifies points that will be changed):

```
WSAU21 ADRM 201855
YBBB SIGMET E01 VALID 202000/210000 YPDM-
YBBB BRISBANE FIR SEV TURB FCST WI S1530 E13700 - S1900 E13730
- S2000 E13130 - S1600 E13500 - S1530 E13700 SFC/FL120 MOV SE
12KT WKN=
```

Updated SIGMET (bold text identifies points that have been changed):

```
WSAU21 ADRM 202155
YBBB SIGMET E02 VALID 202200/210000 YPDM-
YBBB BRISBANE FIR SEV TURB FCST WI S1530 E13700 - S2000 E13750
- S2045 E13245 - S1600 E13500 - S1530 E13700 SFC/FL120 MOV SE
12KT WKN=
```

Cancellation SIGMET (this cancels the original SIGMET):

```
WSAU21 ADRM 202156
YBBB SIGMET E03 VALID 202155/210000 YPDM-
YBBB BRISBANE FIR CNL SIGMET E01 202000/210000=
```

Note, it is essential that the times of issuance of the updated (correct) SIGMET and the cancellation are separated by at least one minute to prevent inadvertent suppression by message switches. However, it is also important that the minimum delay between issuance of the updated and the cancellation messages.

3.6. Dissemination of SIGMET

- 3.6.1. SIGMET is part of operational meteorological (OPMET) information. According to Annex 3, the telecommunication facilities used for the exchange of the operational meteorological information should be the aeronautical fixed service (AFS).
- 3.6.2. The AFS consists of a terrestrial segment, AFTN or ATN (AMHS), as well as the Internet-based SADIS FTP and WIFS services provided by WAFC London and WAFC Washington respectively. Note that SIGMET priority indicator is **FF** for flight safety messages (Annex 10, Volume II, 4.4.1.1.3 refers).
- 3.6.3. Currently, AFTN links should be used by the MWOs to send the SIGMET, as follows:
 - to the adjacent MWOs and ACCs² using direct AFTN addressing;
 - when required for VOLMET or D-VOLMET, SIGMET should be sent to the relevant centre providing the VOLMET service;
 - SIGMET should be sent to all regional OPMET Data Banks (RODB);

² For this dissemination it is required that SIGMET is available at the ACCs for transmission to aircraft in flight for the route ahead up to a distance corresponding to two hours flying time.

- it should be arranged that SIGMET is relayed to the SADIS and WIFS providers for satellite/public internet dissemination, as well as to the WAFCs London and Washington, either through the ROBEX scheme, or directly by the issuing MWO;
- SIGMET for volcanic ash should be disseminated to the responsible VAAC.

3.6.4. Through SADIS and WIFS, SIGMET is disseminated to all authorised users. In this way, SIGMET is available on a global basis, meeting the aeronautical requirements.

— — — — —

APPENDIX A

ENHANCED SIGMET GUIDANCE TABLE DEVELOPED FROM ANNEX 3 TABLE A6-1A

Note. — The table below seeks to provide more detailed guidance than that given in Table A6-1A of Annex 3 (19th Edition, July 2016). It does this by removing all references to the AIRMET message. Table A6-1A. The table below simplifies the available options and provides more specific expansion of the symbolic structure of SIGMET messages, with guidance sub-titles where appropriate. It should be noted that Annex 3, Appendix 6, Table A6-1A remains the authoritative reference.

Ref No.	Element as specified in Chapter 5 and Appendix 6	Detailed Content	Expanded symbolic - These 'expanded' symbolic representations of the various SIGMET code elements represent the interpretation of Table A6-1A of Annex 3. MWOs are encouraged to align their SIGMETs with the guidelines below.	Examples. These examples of various SIGMET code elements represent the interpretation A6-1A of Annex 3. MWOs are encouraged to align their SIGMETs with the examples below.
1.1	Location indicator of FIR/CTA (M) ¹	ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET refers	nnnn	YUCC ² YUDD ²
1.2	Identification (M)	Message identification and sequence number ³	SIGMET n SIGMET nn SIGMET nnn	SIGMET 1 SIGMET 01 SIGMET A01
1.3	Validity period (M)	Day-time groups indicating the period of validity in UTC	VALID nnnnnn/nnnnnn	VALID 010000/010400 VALID 221215/221600 VALID 101520/101800 VALID 251600/252200 VALID 152000/160000 VALID 192300/200300 VALID 122200/130400 (6 hour validity applicable to TC or VA only)
1.4	Location indicator of MWO (M)	Location indicator of MWO originating the message with a separating hyphen	nnnn-	YUDO- ² YUSO- ²
1.5	Name of the FIR/CTA	Location indicator and name of the FIR/CTA ⁴ for which the SIGMET is issued	nnnn nnnnnnnnnn FIR nnnn nnnnnnnnnn FIR/UIR nnnn nnnnnnnnnn CTA	YUCC AMSWELL FIR ² YUDD SHANLON FIR/UIR ² YUDD SHANLON FIR ² YUCC AMSWELL CTA ²

Ref No.	Element as specified in Chapter 5 and Appendix 6	Detailed Content	Expanded symbolic - These 'expanded' symbolic representations of the various SIGMET code elements represent the interpretation of Table A6-1A of Annex 3. MWOs are encouraged to align their SIGMETs with the guidelines below.	Examples. These examples of various SIGMET code elements represent the interpretation A6-1A of Annex 3. MWOs are encouraged to align their SIGMETs with the examples below.
2.1	Phenomenon (M) ⁵	Description of phenomenon causing the issuance of SIGMET	OBSC ⁶ TS OBSC ⁶ TSGR ⁷ EMBD ⁸ TS EMBD ⁸ TSGR ⁷ FRQ ⁹ TS FRQ ⁹ TSGR ⁷ SQL ¹⁰ TS SQL ¹⁰ TSGR ⁷ TC nnnnnnnnnn PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] CB TC NN ¹¹ PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] CB SEV TURB ¹² SEV ICE ¹³ SEV ICE (FZRA) ¹³ SEV MTW ¹⁴ HVY DS HVY SS VA ERUPTION PSN Nnn[nn] or Snn[nn] Ennn[nn] or Wnnn[nn] VA CLD VA ERUPTION MT nnnnnnnnnn PSN Nnn[nn] or Snn[nn] Ennn[nn] or Wnnn[nn] VA CLD VA CLD RDOACT CLD	OBSC TS OBSC TSGR EMBD TS EMBD TSGR FRQ TS FRQ TSGR SQL TS SQL TSGR TC GLORIA PSN N2215 W07500 CB TC NN PSN S26 E150 CB SEV TURB SEV ICE SEV ICE (FZRA) SEV MTW HVY DS HVY SS VA ERUPTION PSN N27 W017 VA CLD VA ERUPTION PSN S1200 E01730 VA CLD VA ERUPTION MT ASHVAL ² PSN S15 E073 VA CLD VA ERUPTION MT VALASH ² PSN N2030 E02015 VA CLD VA CLD RDOACT CLD
2.2	Observed or forecast phenomenon (M)	Indication whether the information is observed and expected to continue, or forecast	OBS OBS AT nnnnZ FCST FCST AT nnnnZ	OBS OBS AT 1210Z FCST FCST AT 1815Z

Ref No.	Element as specified in Chapter 5 and Appendix 6	Detailed Content	Expanded symbolic - These 'expanded' symbolic representations of the various SIGMET code elements represent the interpretation of Table A6-1A of Annex 3. MWOs are encouraged to align their SIGMETs with the guidelines below.	Examples. These examples of various SIGMET code elements represent the interpretation A6-1A of Annex 3. MWOs are encouraged to align their SIGMETs with the examples below.
2.3	Location (C) ¹⁹	Location (referring to latitude and longitude (in degrees and minutes))	1) An area of the FIR defined by a polygon. The end point shall be a repeat of the start point. Minimum 4 coordinates (including the last point as a repeat of the first), and not normally more than 7 coordinates. WI^{20, 21} Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] or 2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and endpoints on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). [N][NE][E][SE][S][SW][W][NW] OF LINE²⁰ Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] or 2b) In a sector of the FIR defined as being between two specified lines, or between two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). [N][NE][E][SE][S][SW][W][NW] OF LINE²⁰ Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] AND [N][NE][E][SE][S][SW][W][NW] OF LINE Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] 2c) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant);	1) An area of the FIR defined by a polygon. The end point shall be a repeat of the start point. Minimum 4 coordinates (including the last point as a repeat of the first), and not normally more than 7 coordinates. WI N6030 E02550 - N6055 E02500 - N6050 E02630 - N6030 E02550 WI N30 W067 - N32 W070 - N35 W068 - N30 W067 or 2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and endpoints on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). NE OF LINE N2515 W08700 - N2000 W08330 S OF LINE S14 E150 - S14 E155 or 2b) In a sector of the FIR defined as being between two specified lines, or between two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). SW OF LINE N50 W020 - N45 E010 AND NE OF LINE N45 W020 - N40 E010

		N OF Nnn[nn] AND W OF Wnnn[nn] <i>or</i> N OF Nnn[nn] AND E OF Wnnn[nn] <i>or</i> S OF Nnn[nn] AND W OF Wnnn[nn] <i>or</i> S OF Nnn[nn] AND E OF Wnnn[nn] <i>or</i> N OF Snn[nn] AND W OF Ennn[nn] <i>or</i> N OF Snn[nn] AND E OF Ennn[nn] <i>or</i> S OF Snn[nn] AND W OF Ennn[nn] <i>or</i> S OF Snn[nn] AND E OF Ennn[nn] <i>or</i> <i>or</i> 2d) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment); N OF Nnn[nn] <i>or</i> S OF Nnn[nn] <i>or</i> N OF Snn[nn] <i>or</i> S OF Snn[nn] <i>or</i> W OF Wnnn[nn] <i>or</i> E OF Wnnn[nn] <i>or</i> W OF Ennn[nn] <i>or</i> E OF Ennn[nn] <i>or</i> 3) Defined by a 'corridor' of specified width, centred upon a line, of up to three connected segments, described by; APRX nnKM WID LINE²⁰ BTN Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] [– Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] [– Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] APRX nnNM WID LINE²⁰ BTN Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] [– Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] [– Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] <i>or</i> 4) At a specific point within the FIR;	2c) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant); S OF N3200 AND E OF E02000 S OF S3215 AND W OF E10130 S OF N12 AND W OF E040 N OF N35 AND E OF E078 <i>or</i> 2d) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment); N OF S2230 S OF S43 E OF E01700 E OF W005 <i>or</i> 3) Defined by a 'corridor' of specified width, centred upon a line, of up to three connected segments, described by; APRX 50KM WID LINE BTN N64 W017 – N60 W010 – N57 E010 – N60 E015 APRX 50NM WID LINE BTN S1530 W09500 – S1815 W10130 – S2000 W10300 <i>or</i> 4) At a specific point within the FIR;

			Nnn[nn] Wnnn[nn] <i>or</i> Nnn[nn] Ennn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Snn[nn] Ennn[nn] <i>or</i> 5 tropical cyclone; <i>or</i> 6) A reference to the whole FIR, FIR/UIR, or CTA ENTIRE FIR ENTIRE FIR/UIR ENTIRE CTA	N5530 W02230 S12 E177 <i>or</i> 5 tropical cyclone; <i>or</i> 6) A reference to the whole FIR, FIR/UIR, or CTA ENTIRE FIR¹⁸ ENTIRE FIR/UIR ENTIRE CTA¹⁸
2.4	Level (C) ¹⁹	Flight level or altitude ²³	1) Generic height/range descriptors to be used when 'Location' descriptors above are used. FLnnn nnnnFT nnnnnFT nnnnM SFC/FLnnn SFC/nnnnM SFC/nnnnFT SFC/nnnnnFT FLnnn/nnn TOP FLnnn ABV FLnnn TOP ABV FLnnn nnnn/nnnnM [n]nnnn/[n]nnnnFT nnnnM/FLnnn [n]nnnnFT/FLnnn <i>or</i>²² TOP BLW FLnnn	1) Generic height/range descriptors to be used when 'Location' descriptors above are used. FL180 7000FT 10000FT 600M 1200M SFC/FL070 SFC/9000FT SFC/10000FT SFC/2500M FL050/080 FL310/450 TOP FL390 ABV FL280 TOP ABV FL100 3000M 2000/3000M 8000FT 6000/12000FT 11000/14000FT 2000M/FL150 8000FT/FL190 10000FT/FL250 <i>or</i>²² TOP BLW FL450

			²² TOP ABV FLnnn	²² TOP ABV FL360
2.5	Movement or expected movement (C) ^{19, 24}	Movement or expected movement (direction and speed) with reference to one of the sixteen points of compass, or stationary	MOV[N][NNE][NE][ENE][E][ESE][SE][SSE][S][SSW][SW][WSW] [W][WNW][NW][NNW] nnKMH or MOV[N][NNE][NE][ENE][E][ESE][SE][SSE][S][SSW][SW][WSW] [W][WNW][NW][NNW] nnKT or STNR	MOV E 40KMH MOV E 20KT MOV SE STNR
2.6	Changes in intensity ¹⁹	Expected changes in intensity (C)	INTSF or WKN or NC	WKN INTSF NC
2.7	Forecast time (C) ²⁴	Indication of the forecast time of the phenomena	FCST AT nnnnZ	FCST AT 2200Z FCST AT 0000Z
2.7	Forecast position (C) ^{19, 24, 25}	Forecast position of volcanic ash cloud or the centre of the TC or other hazardous phenomena ²⁵ at the end of the validity period of the SIGMET message (C)	1) An area of the FIR defined by a polygon. The end point shall be a repeat of the start point. Minimum 4 coordinates (including the last point as a repeat of the first), and not normally more than 7 coordinates. WI ^{20, 21} Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] or 2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and endpoints on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). [N][NE][E][SE][S][SW][W][NW] OF LINE ²⁰ Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or	1) An area of the FIR defined by a polygon. The end point shall be a repeat of the start point. Minimum 4 coordinates (including the last point as a repeat of the first), and not normally more than 7 coordinates. WI N6030 E02550 - N6055 E02500 - N6050 E02630 - N6030 E02550 WI N30 W067 - N32 W070 - N35 W068 - N30 W067 or 2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and endpoints on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). NE OF LINE N2515 W08700 - N2000 W08330 S OF LINE S14 E150 - S14 E155

		Ennn[nn] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] or 2b) In a sector of the FIR defined as being between two specified lines, or between two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). [N][NE][E][SE][S][SW][W][NW] OF LINE²⁰ Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] AND [N][NE][E][SE][S][SW][W][NW] OF LINE Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] - Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [- Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] 2c) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant); N OF Nnn[nn] AND W OF Wnnn[nn] or N OF Nnn[nn] AND E OF Wnnn[nn] or S OF Nnn[nn] AND W OF Wnnn[nn] or S OF Nnn[nn] AND E OF Wnnn[nn] or N OF Snn[nn] AND W OF Ennn[nn] or N OF Snn[nn] AND E OF Ennn[nn] or S OF Snn[nn] AND W OF Ennn[nn] or S OF Snn[nn] AND E OF Ennn[nn] or or 2d) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment); N OF Nnn[nn] or S OF Nnn[nn] or N OF Snn[nn] or S OF Snn[nn] or W OF Wnnn[nn] or E OF Wnnn[nn] or W OF Ennn[nn] or E OF Ennn[nn]	or 2b) In a sector of the FIR defined as being between two specified lines, or between two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). SW OF LINE N50 W020 - N45 E010 AND NE OF LINE N45 W020 - N40 E010 2c) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant); S OF N3200 AND E OF E02000 S OF S3215 AND W OF E10130 S OF N12 AND W OF E040 N OF N35 AND E OF E078 or 2d) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment); N OF S2230 S OF S43 E OF E01700 E OF W005

			<i>or</i> 3) Defined by a 'corridor' of specified width, centred upon a line, of up to three connected segments, described by; APRX nnKM WID LINE²⁰ BTN Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] - Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] [- Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] [- Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] APRX nnNM WID LINE²⁰ BTN Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] - Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] [- Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] [- Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] <i>or</i> 4) At a specific point within the FIR; Nnn[nn] Wnnn[nn] <i>or</i> Nnn[nn] Ennn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Snn[nn] Ennn[nn] <i>or</i> 5 tropical cyclone; TC CENTRE PSN Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] <i>or</i> 6) A reference to the whole FIR, FIR/UIR, or CTA ENTIRE FIR ENTIRE FIR/UIR ENTIRE CTA <i>or</i> 7) No volcanic ash expected²⁶	<i>or</i> 3) Defined by a 'corridor' of specified width, centred upon the line described; APRX 50KM WID LINE BTN N64 W017 - N60 W010 - N57 E010 - N60 E015 APRX 50NM WID LINE BTN S1530 W09500 - S1815 W10130 - S2000 W10300 <i>or</i> 4) At a specific point within the FIR; N5530 W02230 S12 E177 <i>or</i> 5 tropical cyclone; TC CENTRE PSN N1230 W04530 <i>or</i> 6) A reference to the whole FIR, FIR/UIR, or CTA ENTIRE FIR¹⁸ ENTIRE FIR/UIR ENTIRE CTA¹⁸ 7) No volcanic ash expected NO VA EXP

			NO VA EXP	
	Repetition of elements (C) ²⁷	Repetition of elements included in a SIGMET message for volcanic ash cloud or tropical cyclone	[AND] ²⁷	AND
	Cancellation of SIGMET (C) ²⁸	Cancellation of SIGMET referring to its identification	CNL SIGMET n nnnnnn/nnnnnn CNL SIGMET nn nnnnnn/nnnnnn CNL SIGMET nnn nnnnnn/nnnnnn <i>or</i> CNL SIGMET n nnnnnn/nnnnnn VA MOV TO nnnn FIR ¹⁸ CNL SIGMET nn nnnnnn/nnnnnn VA MOV TO nnnn FIR ¹⁸ CNL SIGMET nnn 251030/251430 VA MOV TO YUDO FIR	CNL SIGMET 2 102000/110000 CNL SIGMET 12 101200/101600 CNL SIGMET A12 031600/032000 CNL SIGMET 3 251030/251630 VA MOV TO YUDO FIR CNL SIGMET 06 191200/191800 VA MOV TO YUDO FIR CNL SIGMET B10 030600/031200 VA MOV TO YUDO FIR

Table A-1: Expanded SIGMET template

Footnotes to table: (note, in order to ensure consistency between this document and ICAO Annex 3, Table 6-1A, any footnote in Table 6-1A that refers to AIRMET only is identified as such below.

1. See 4.1. **“Recommendation.”**— *In cases where the airspace is divided into a flight information region (FIR) and an upper flight information region (UIR), the SIGMET should be identified by the location indicator of the air traffic services unit serving the FIR. Note.— The SIGMET message applies to the whole airspace within the lateral limits of the FIR, i.e. to the FIR and to the UIR. The particular areas and/or flight levels affected by the meteorological phenomena causing the issuance of the SIGMET are given in the text of the message.”*
2. Fictitious location.
3. In accordance with 1.1.3 “The sequence number referred to in the template in Table A6-1A shall correspond with the number of SIGMET messages issued for the flight information region since 0001 UTC on the day concerned. The meteorological watch offices whose area of responsibility encompasses more than one FIR and/or control area (CTA) shall issue separate SIGMET messages for each FIR and/or CTA within their area of responsibility.”
4. AIRMET only – not SIGMET
5. As per 1.1.4 “In accordance with the template in Table A6-1A, only one of the following phenomena shall be included in a SIGMET message, using the abbreviations as indicated below [list of SIGMET phenomena follows in section 1.1.4 – see section]”
6. In accordance with 4.2.1 a) “*obscured (OBSC) if it is obscured by haze or smoke or cannot be readily seen due to darkness*”.
7. In accordance with 4.2.4 “*Hail (GR) should be used as a further description of the thunderstorm, as necessary*”
8. accordance with 4.2.1 b) “*embedded (EMBD) if it is embedded within cloud layers and cannot be readily recognized*”
9. In accordance with 4.2.2 **“Recommendation.”**— An area of thunderstorms should be considered frequent (FRQ) if within that area there is little or no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75 per cent of the area affected, or forecast to be affected, by the phenomenon (at a fixed time or during the period of validity)”
10. In accordance with 4.2.3 **“Recommendation.”**— Squall line (SQL) should indicate a thunderstorm along a line with little or no space between individual clouds.”
11. Used for unnamed tropical cyclones.
12. In accordance with 4.2.5 and 4.2.6 **“Recommendation.”**— Severe turbulence (TURB) should refer only to: low-level turbulence associated with strong surface winds; rotor streaming; or turbulence whether in cloud or not in cloud (CAT). Turbulence should not be used in connection with convective clouds.” and “Turbulence shall be considered: a) severe whenever the peak value of the cube root of EDR exceeds 0.7”
13. In accordance with 4.2.7 **“Recommendation.”**— Severe icing (ICE) should refer to icing in other than convective clouds. Freezing rain (FZRA) should refer to severe icing conditions caused by freezing rain”.
14. In accordance with 4.2.8 **“Recommendation.”**— A mountain wave (MTW) should be considered: a) severe whenever an accompanying downdraft of 3.0 m/s (600 ft/min) or more and/or severe turbulence is observed or forecast; and b) *moderate whenever an accompanying downdraft of 1.75–3.0 m/s (350–600 ft/min) and/or moderate turbulence is observed or forecast.*”
15. AIRMET only – not SIGMET
16. AIRMET only – not SIGMET

17. AIRMET only – not SIGMET
18. AIRMET only – not SIGMET
19. In the case of the same phenomenon covering more than one area within the FIR, these elements can be repeated, as necessary.
20. A straight line is to be used between two points drawn on a map in the Mercator projection or between two points which crosses lines of longitude at a constant angle.
21. The number of coordinates should be kept to a minimum and should not normally exceed seven.
22. Only for SIGMET messages for tropical cyclones.
23. Only for SIGMET messages for volcanic ash cloud and tropical cyclones.
24. The elements “forecast time” and “forecast position” are not to be used in conjunction with the element “movement or expected movement”.
25. The levels of the phenomena remain fixed throughout the forecast period.
26. Only for SIGMET messages for volcanic ash.
27. To be used for two volcanic ash clouds or two centres of tropical cyclones simultaneously affecting the FIR concerned.
28. End of the message (as the SIGMET message is being cancelled).

Additional notes (not specifically identified in footnotes to Table 6-1A:

In accordance with 4.2.9 “Sandstorm/duststorm should be considered: a) heavy whenever the visibility is below 200 m and the sky is obscured; and b) moderate whenever the visibility is: 1) below 200 m and the sky is not obscured; or 2) between 200 m and 600 m.” (no footnote in Annex 3, but this is applicable reference)

— — — — —

APPENDIX B

SIGMET EXAMPLES

*Note. — The figures used in this appendix are intended simply to clarify the intent of the SIGMET message in abbreviated plain language, and therefore how each SIGMET should be **constructed** by MWOs and also **interpreted** by users. The figures used are not intended to give guidance on how a SIGMET in graphical format should be produced.*

Examples of 'WS' SIGMET. See the sections for SIGMET for volcanic ash only (WV) and SIGMET for tropical cyclone only (WC) for examples specific to those phenomena.

Contents

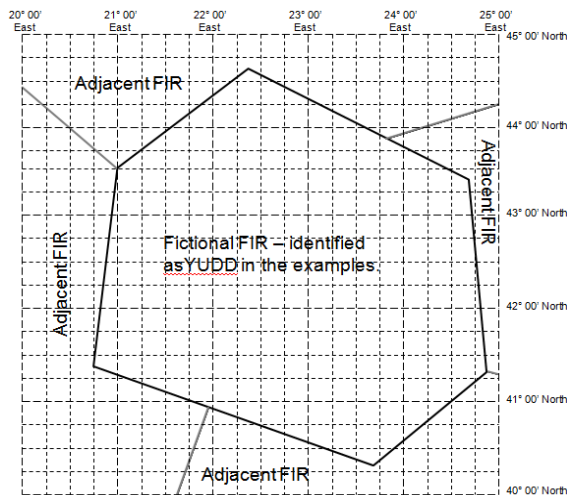
General

- 1) An area of the FIR defined by a polygon.
Use of polygons with complex FIR boundaries.
- 2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and end points on the FIR boundary
- 2b) In a sector of the FIR defined as being *between* two specified lines, or *between* two series of up to three connected lines, each with start and endpoints on the FIR boundary
- 2c) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment)
- 2d) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment)
- 3) Defined by a 'corridor' of specified width, centred upon the line described;
- 4) At a specific point within the FIR
- 5) Covering entire FIR.
- 6 Additional examples using volcanic ash references applicable to volcanic ash SIGMET only
- 7) Additional examples using volcanic ash references applicable to multiple areas in SIGMET for volcanic ash.
- 8) Additional example using volcanic illustrating use of "WI nnnKM (or nnnNM) OF TC CENTRE " Tropical Cyclone SIGMET Only
- 9) Additional example using volcanic ash references applicable to multiple areas in SIGMET for tropical cyclone.

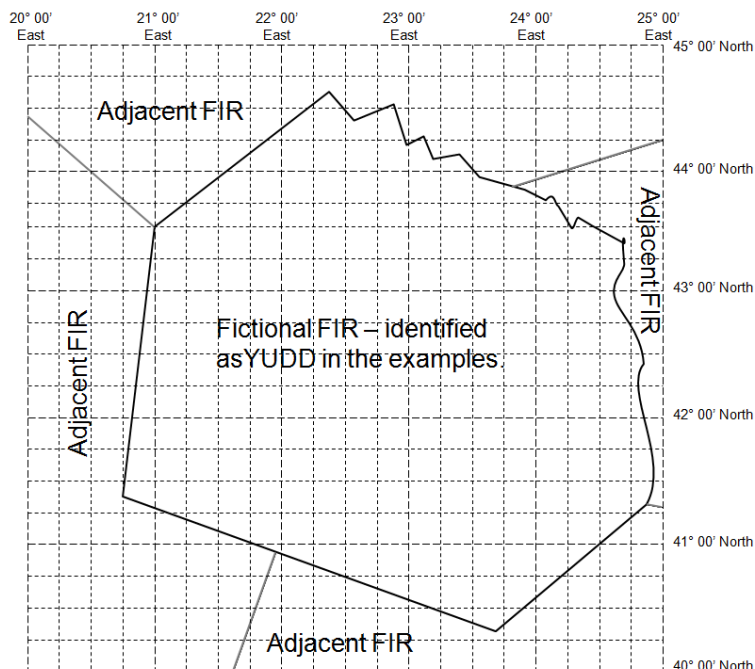
General

Explanation of fictional FIR.

In each of the examples below, a fictional FIR area is indicated, with portions of adjacent fictional FIRs also indicated. The FIR areas are overlaid on a coordinate grid, in order that the example plain language SIGMETs can be explicitly related to the intended meaning.



For some cases, examples are given where the FIR has boundaries that are complex (country borders for example, especially when defined by rivers)



Fictional FIR 'Shanlon = YUDD' is used for the examples.

Repetition of start point as last coordinate.

In accordance with practices and procedures laid down for other aeronautical bulletins (i.e. NOTAM), it is recommended that the last point of a polygon is a repeat of the first point of the polygon. This will ensure that the polygon has been closed, and that no points have been accidentally omitted.

'Direction' of encoding of the points of a polygon

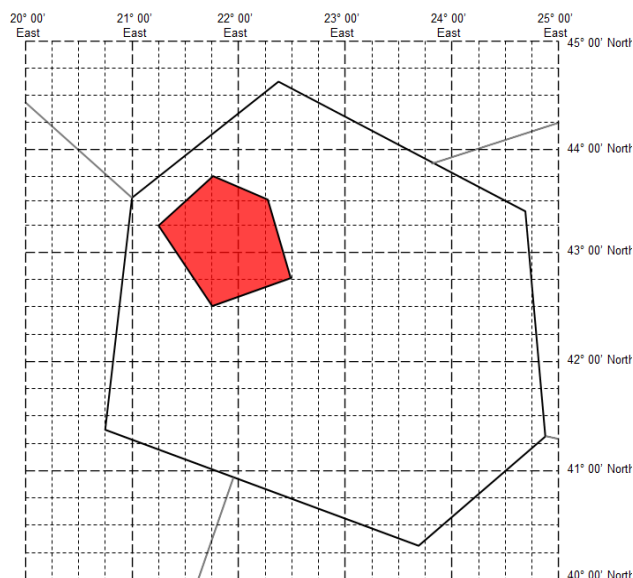
In accordance with practices and procedures laid down for other aeronautical bulletins and international practice (e.g. BUFR encoding of WAFS significant weather (SIGWX) forecasts), it is recommended that the points of a polygon are provided in a 'clockwise' sense. This assists automated systems in determining the 'inside' of polygons.

Use of 'Expected Movement' and 'Forecast Position'/'Forecast Time'.

With applicability of Amendment 77, the 'Expected Movement' element of SIGMET should not be used if the 'Forecast Position'/'Forecast Time' element is being used, and vice versa. This is to prevent duplication at best and inconsistencies at worst.

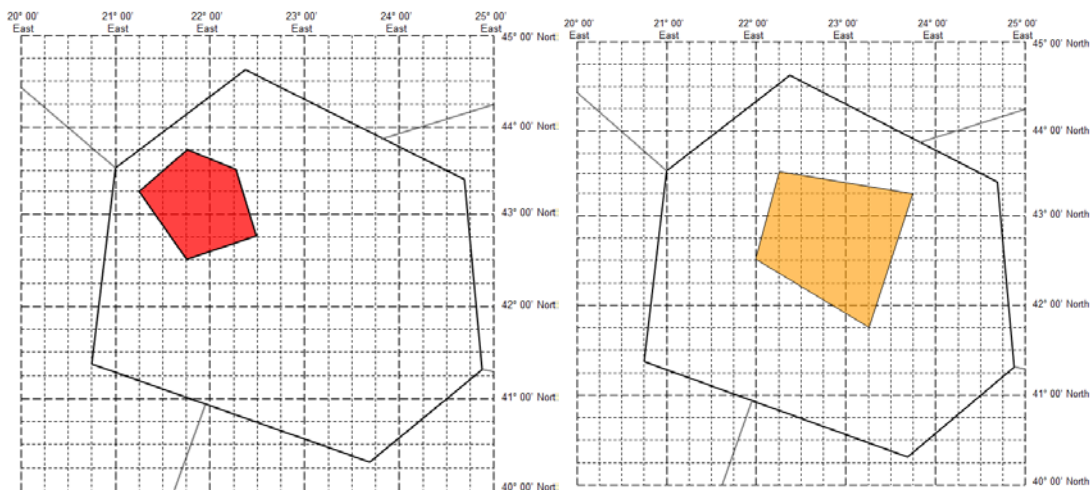
1) An area of the FIR defined by a polygon. The end point should be a repeat of the start point.

When the SIGMET does not include a 'forecast position' section.



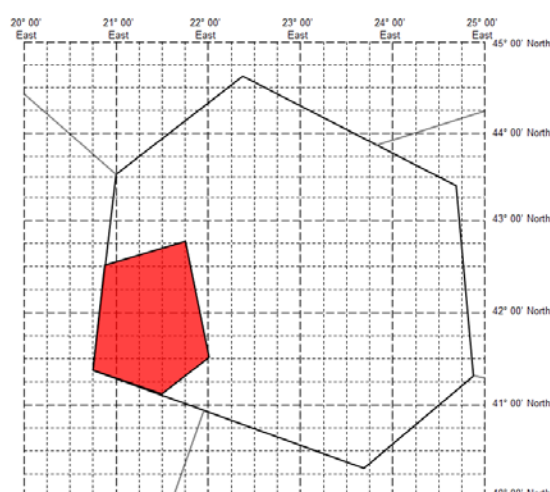
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4230 E02145 - N4315 E02115 -
N4345 E02145 - N4330 E02215 - N4245 E02230 - N4230 E02145 FL250/370
MOV ESE 20KT INTSF=

With an explicit forecast position:



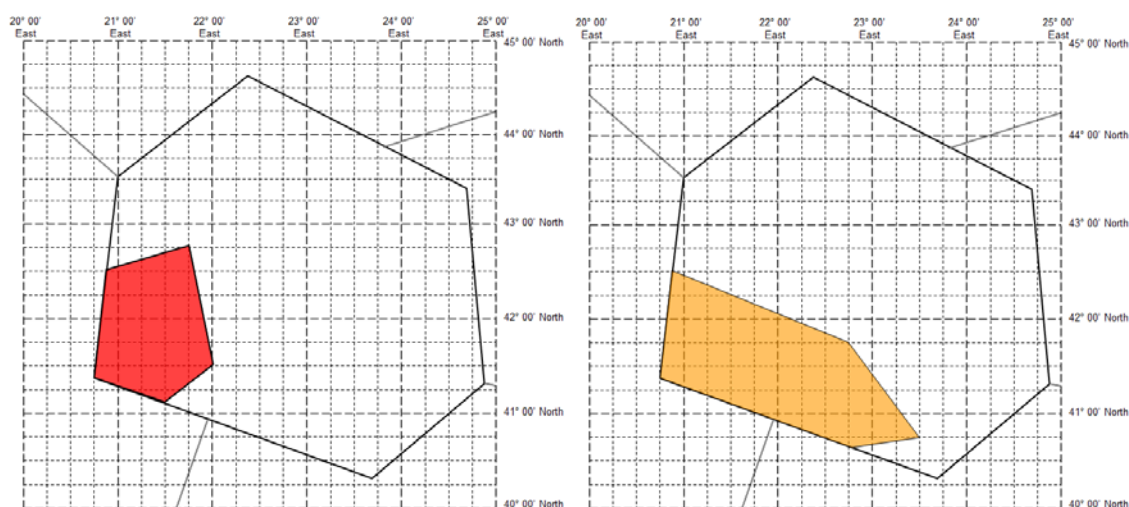
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4230 E02145 - N4315 E02115 -
N4345 E02145 - N4330 E02215 - N4245 E02230 - N4230 E02145 FL250/370
INTSF FCST AT 1600Z WI N4145 E02315 - N4230 E02200 - N4330 E02215 -
N4315 E02345 - N4145 E02315=

When the SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4230 E02052 - N4245 E02145 -
N4130 E02200 - N4107 E02130 - N4123 E02045 - N4230 E02052 FL250/370
MOV SE 30KT WKN=

With an explicit forecast position:



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4230 E02052 - N4245 E02145 -
N4130 E02200 - N4107 E02130 - N4123 E02045- N4230 E02052 FL250/370 WKN
FCST AT 1600Z WI N4230 E02052 - N4145 E02245 - N4045 E02330 - N4040
E02248 - N4123 E02045- N4230 E02052 =

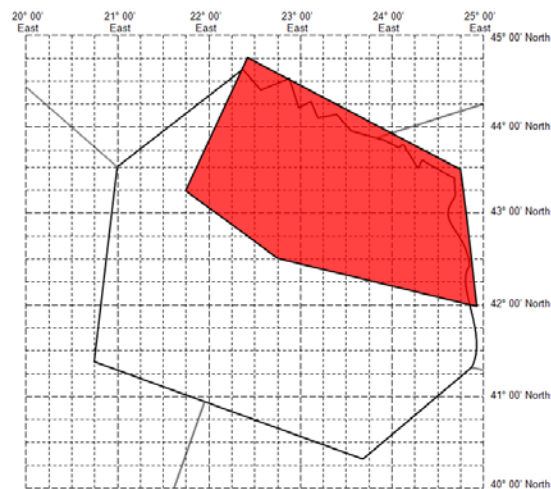
Use of polygons with complex FIR boundaries.

Annex 3 (19th Edition, July 2016) specifies that the points of a polygon '... should be kept to a minimum and should not normally exceed seven'. However, some FIR boundaries are complex, and it would be unrealistic to expect that a polygon would be defined that followed such boundaries precisely. As such, some States have determined that the polygon points be chosen in relation to the complex boundary such that the FIR boundary approximates, but is wholly encompassed by, the polygon, and that any additional area beyond the FIR boundary be the minimum that can be reasonably and practically described.

Caution should however be exercised in those instances where international aerodromes are located in close proximity to such a complex FIR boundary.

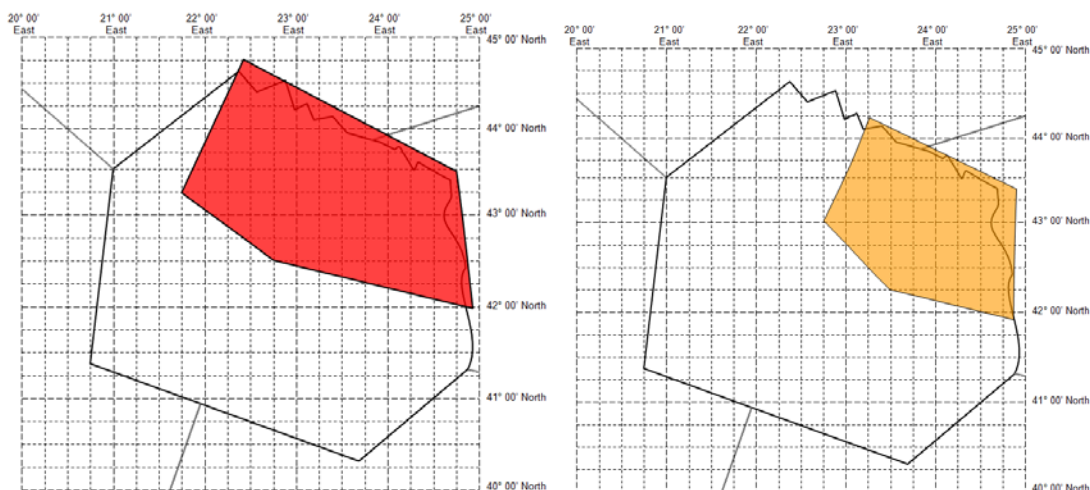
In the examples below, it would not be practical to follow the northeastern boundary of the FIR exactly. The point close to N4330 E02245 is obviously a 'major' turning point along the FIR boundary, but the other, numerous and complex turning points can only be approximated when constrained to seven points.

When the SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4315 E02145 - N4445 E02245 -
N4330 E02445 - N4200 E02455 - N4230 E02245- N4315 E02145 FL250/370 MOV
SE 20KT WKN=

With an explicit forecast position:

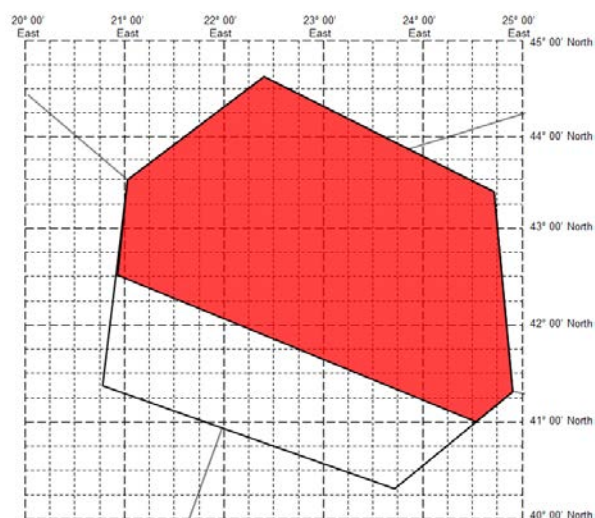


YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4315 E02145 - N4445 E02245 -
N4330 E02445 - N4200 E02455 - N4230 E02245- N4315 E02145 FL250/370 WKN
FCST AT 1600Z WI N4300 E02245 - N4415 E02315 - N4322 E02452 - N4155
E02445 - N4215 E02330- N4300 E02245=

2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and end points on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at that point).

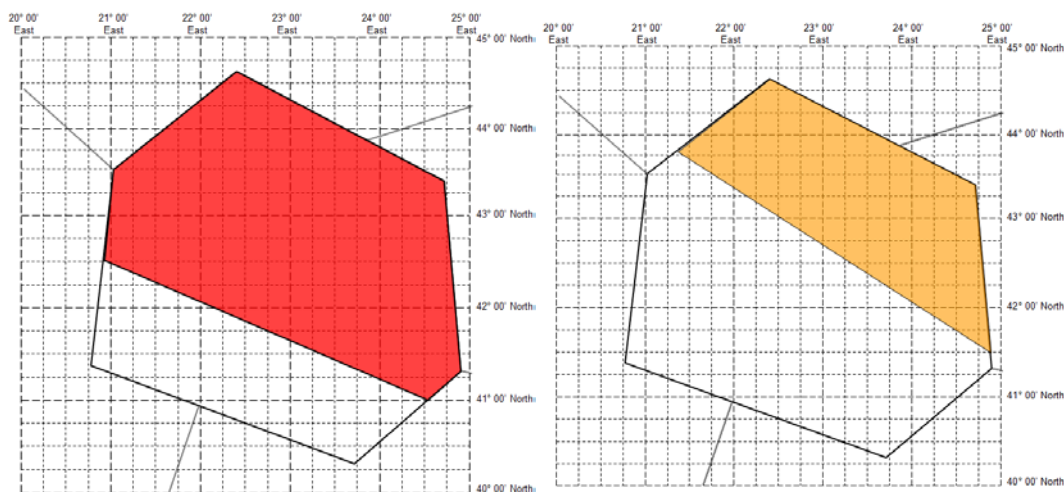
The specified points shall be on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at that point)

When the SIGMET does not include a 'forecast position' section.



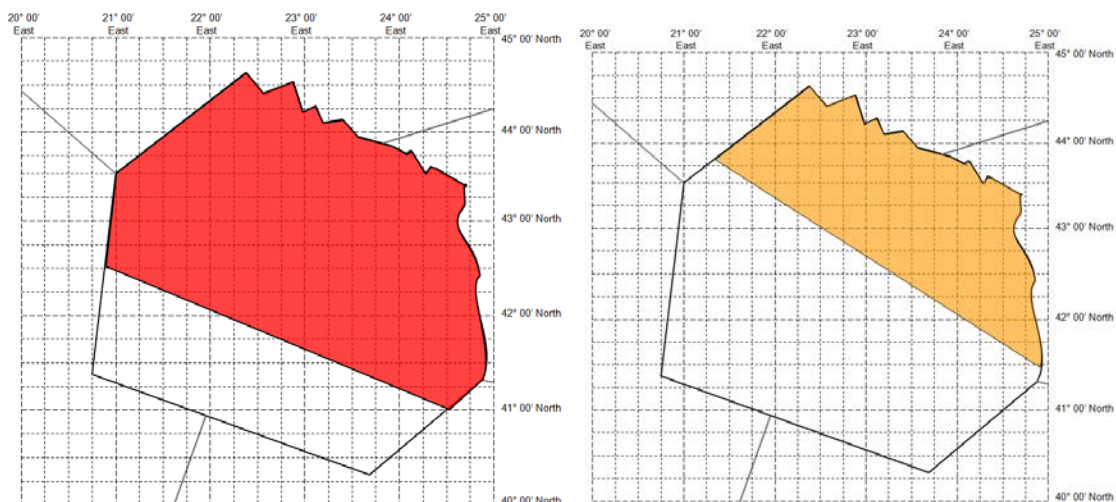
YUDD SIGMET 2 VALID 101200/101600 YUS0-
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4230 E02052 - N4100 E02430
FL250/370 MOV NE 15KT WKN=

With an explicit forecast position:



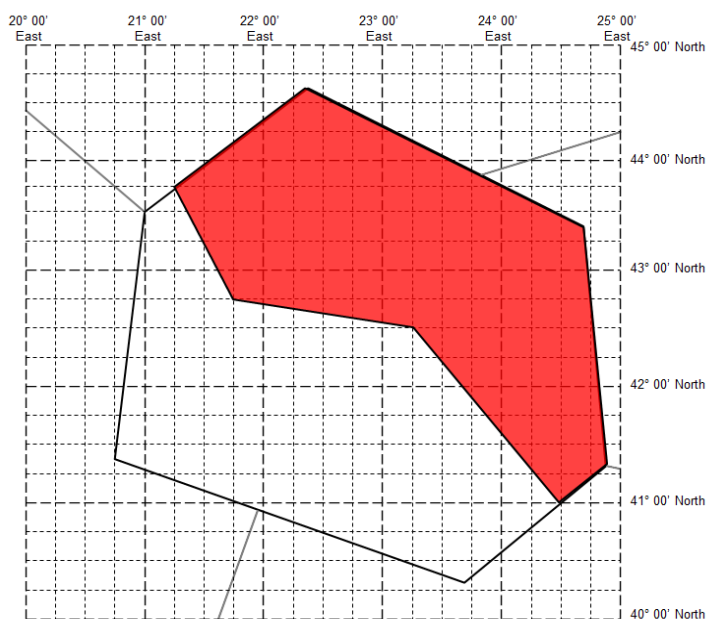
YUDD SIGMET 2 VALID 101200/101600 YUS0-
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4230 E02052 - N4100 E02430
FL250/370 WKN FCST AT 1600Z NE OF LINE N4346 E02122 - N4130 E02452=

A separate example is provided below illustrating a case where the northeastern boundary is complex.



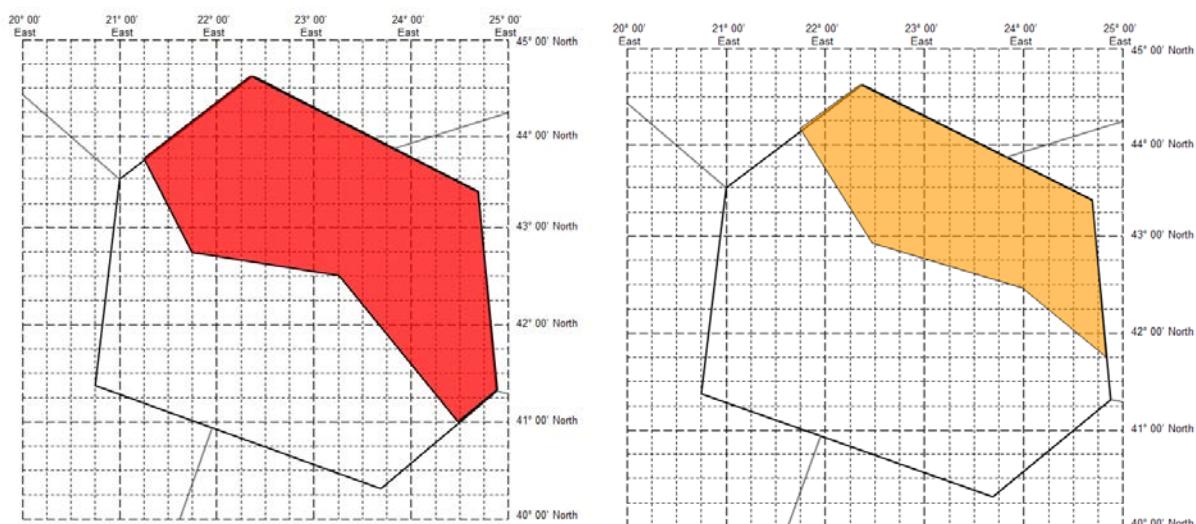
YUDD SIGMET 2 VALID 101200/101600 YUSO-
 YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4230 E02052 - N4100 E02430
 FL250/370 WKN FCST AT 1600Z NE OF LINE N4346 E02122 - N4130 E02457=

For a series of connected lines when the SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
 YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4345 E02115 - N4245 E02145
 - N4230 E2315 - N4100 E2430 FL250/370 WKN MOV NE 20KT=

With an explicit forecast position:

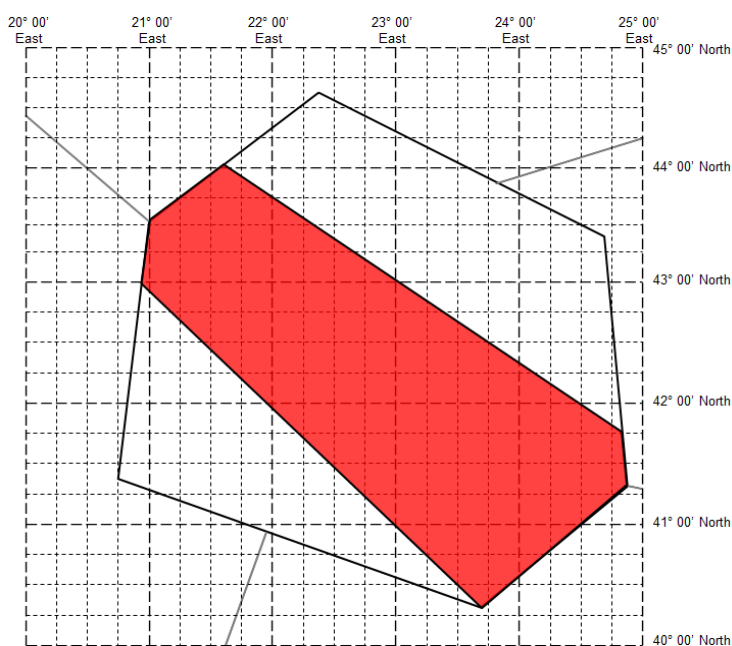


YUDD SIGMET 2 VALID 101200/101600 YUSO-
 YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4345 E02115 - N4245 E02145
 - N4230 E2315 - N4100 E2430 FL250/370 WKN FCST AT 1600Z NE OF LINE
 N4411 E02145 - N4255 E02228 - N4228 E2400 - N4130 E2450=

2b) In a sector of the FIR defined as being *between* two specified lines, or *between* two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points).

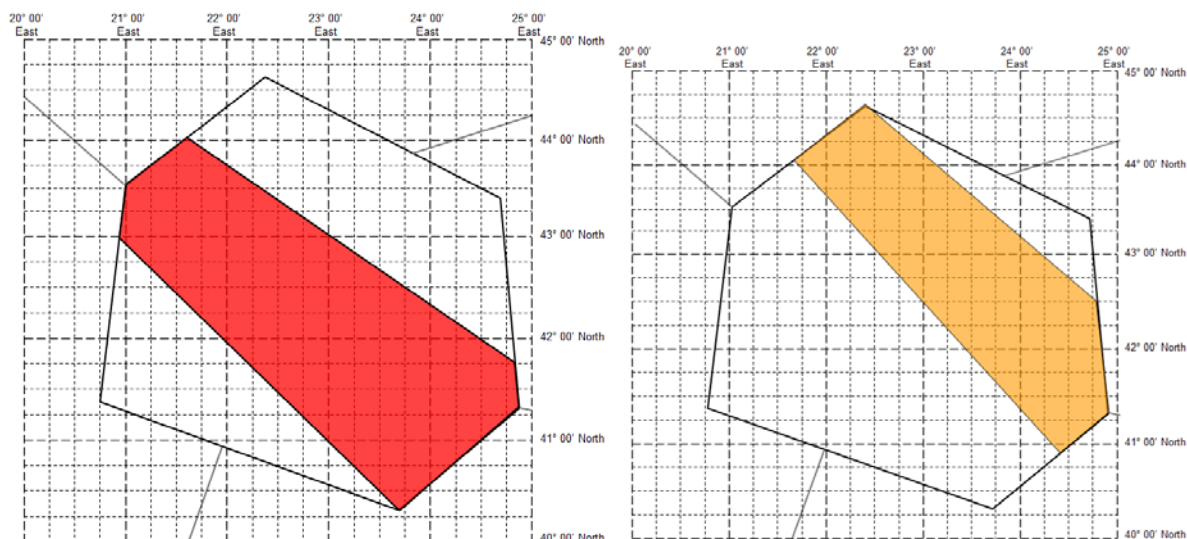
The specified points shall be on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at that point)

When the SIGMET does not include a ‘forecast position’ section.



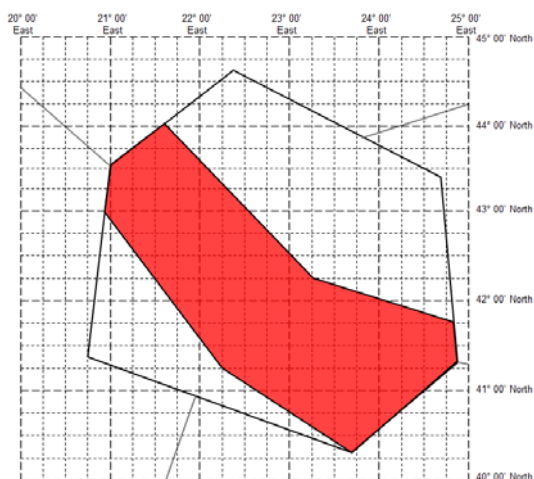
YUDD SIGMET 2 VALID 101200/101600 YUSO-
 YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4300 E02057 - N4020 E02340
 AND SW OF LINE N4402 E02142 - N4145 E02450 FL250/370 WKN MOV NE 20KT=

With an explicit forecast position:



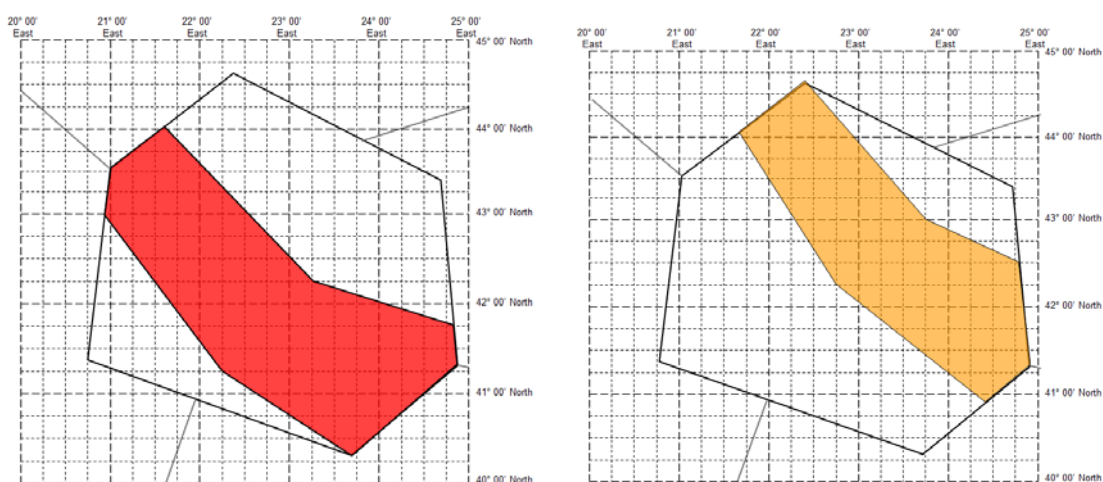
YUDD SIGMET 2 VALID 101200/101600 YUSO-
 YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4300 E02057 - N4020 E02340
 AND SW OF LINE N4402 E02142 - N4145 E02450 FL250/370 WKN FCST AT 1600Z
 NE OF LINE N4403 E02140 - N4055 E02422 AND SW OF LINE N4437 E02222 -
 N4230 E02447=

For a series of connected lines when the SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
 YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4300 E02057 - N4115 E02215
 - N4020 E02340 AND SW OF LINE N4402 E02142 - N4215 E02315 - N4145
 E02450 FL250/370 WKN MOV NE 20KT=

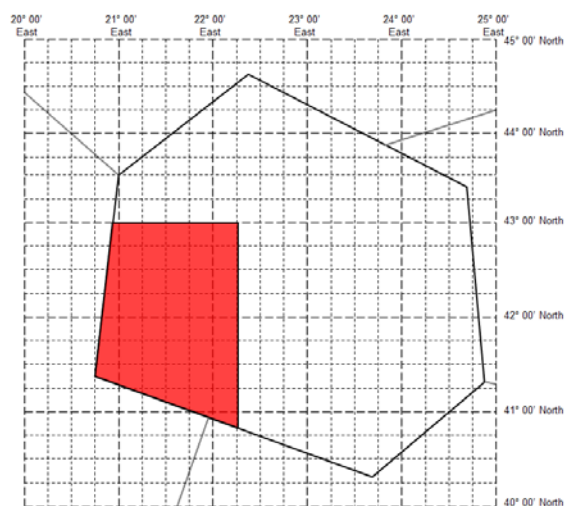
With an explicit forecast position:



YUDD SIGMET 2 VALID 101200/101600 YUSO-
 YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4300 E02057 - N4115 E02215
 - N4020 E02340 AND SW OF LINE N4402 E02142 - N4215 E02315 - N4145
 E02450 FL250/370 WKN FCST AT 1600Z NE OF LINE N4403 E02140 N4215 E02245
 - N4055 E02422 AND SW OF LINE N4437 E02222 - N4300 E02345- N4230
 E02447=

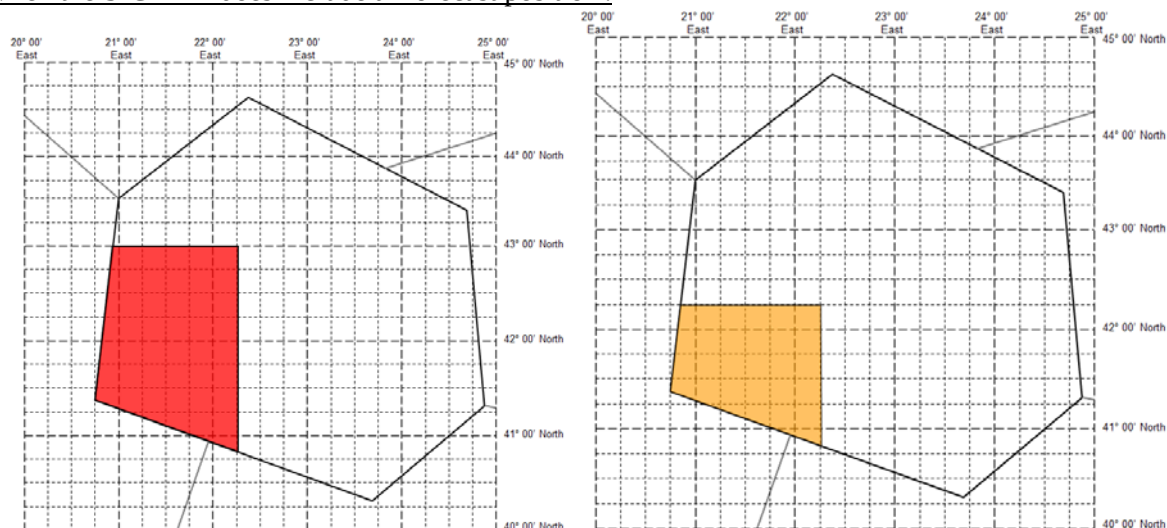
2c) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant)

When the SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
 YUDD SHANLON FIR/UIR SEV TURB FCST S OF N4300 AND W OF E02215 FL250/370
 MOV S 12KT WKN=

When the SIGMET does include a 'forecast position'.

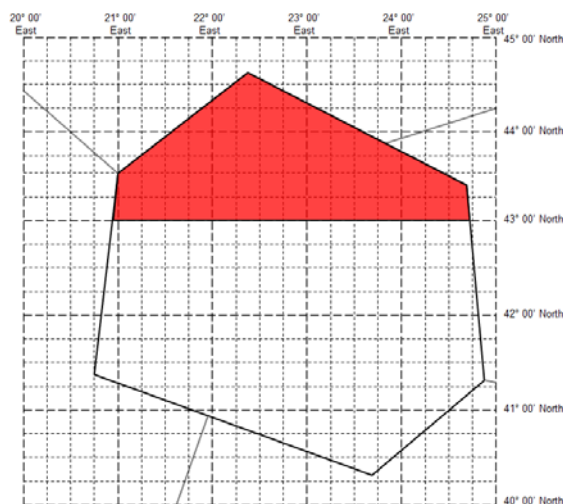


With an explicit forecast position:

YUDD SIGMET 2 VALID 101200/101600 YUS0-
YUDD SHANLON FIR/UIR SEV TURB FCST S OF N4300 AND W OF E02215 FL250/370
WKN FCST AT 1600Z S OF N4215 AND W OF E02215=

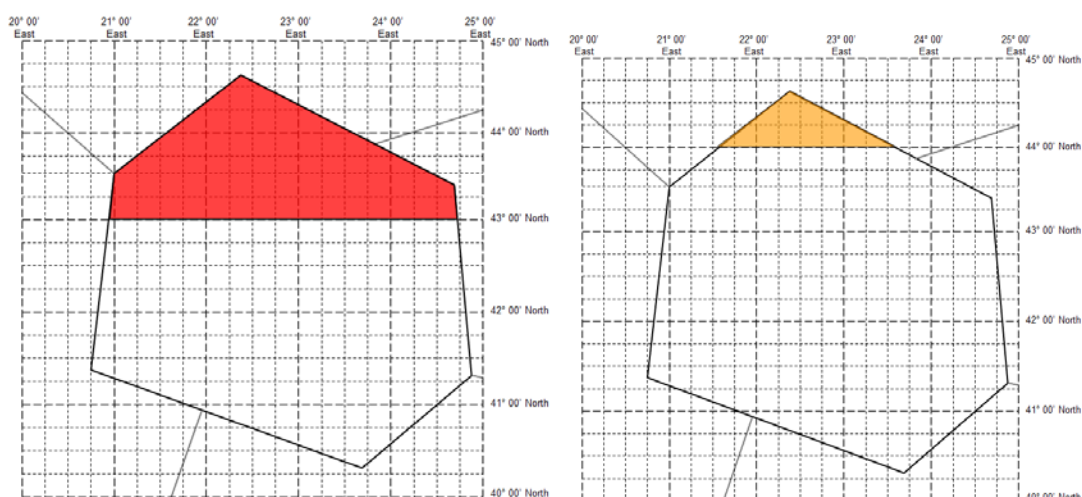
2d) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment)

When the SIGMET does not include a 'forecast position' section.

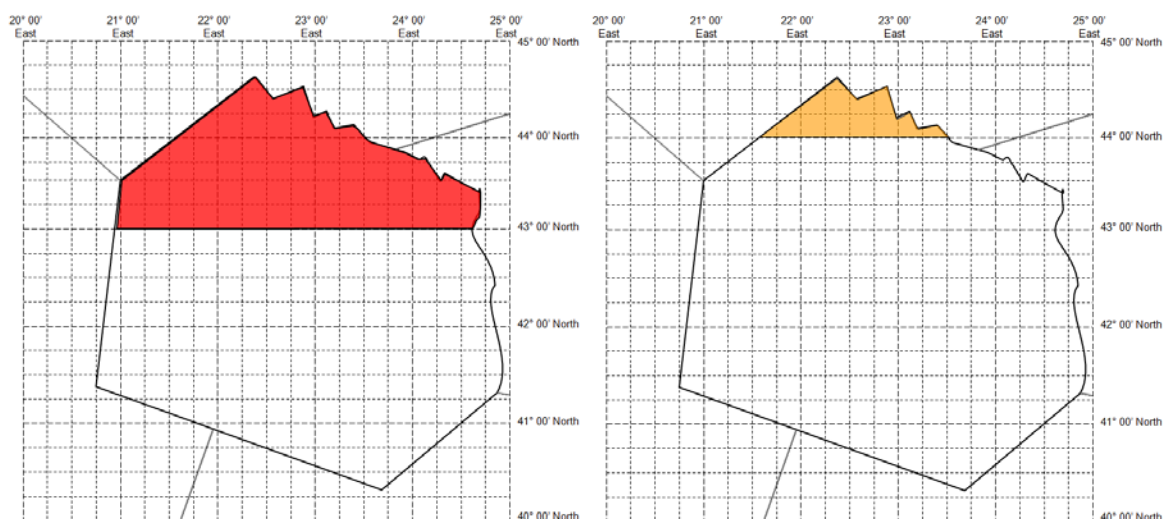


YUDD SIGMET 2 VALID 101200/101600 YUS0-
YUDD SHANLON FIR/UIR SEV TURB FCST N OF N43 FL250/370 MOV N 15KT WKN=

When the SIGMET does include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUS0-
YUDD SHANLON FIR/UIR SEV TURB FCST N OF N43³ FL250/370 WKN FCST AT
1600Z N OF N44=

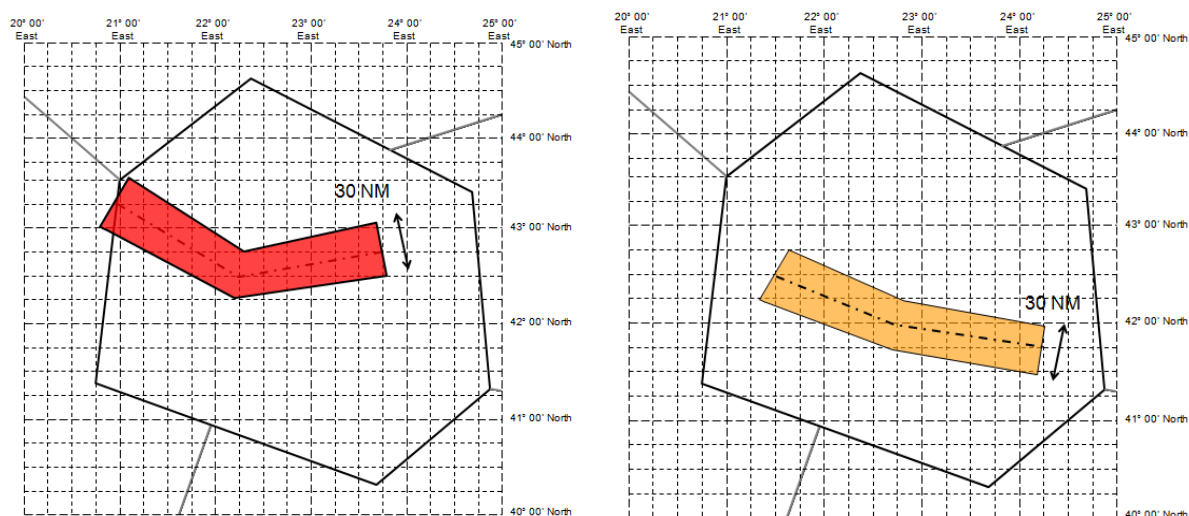


YUDD SIGMET 2 VALID 101200/101600 YUS0-
YUDD SHANLON FIR/UIR SEV TURB FCST N OF N43⁴ FL250/370 WKN FCST AT
1600Z N OF N44=

³ It would be equally valid to use 'N4300'.

⁴ It would be equally valid to use 'N4300'.

3) Defined by a 'corridor' of specified width, centred upon the line described;

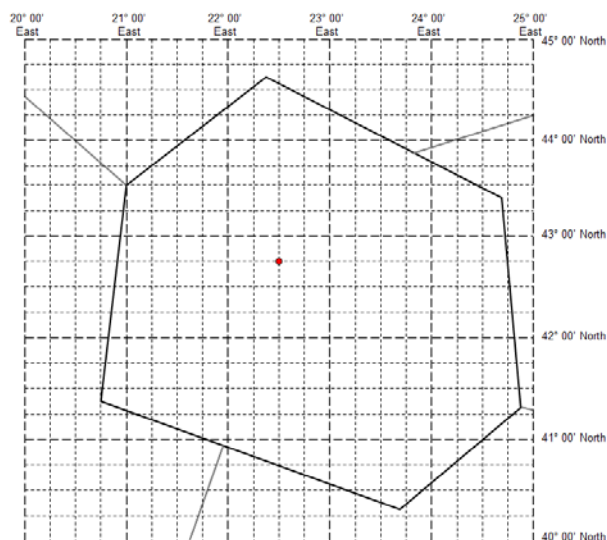


YUDD SIGMET 2 VALID 101200/101600 YUS0-
 YUDD SHANLON FIR/UIR SEV TURB FCST APRX 30NM WID LINE BTN N4315 E02100
 - N4230 E02215 - N4245 E02345 FL250/370 WKN FCST AT 1600Z APRX 30NM
 WID LINE BTN N4230 E02130 - N4200 E02245 - N4145 E02415=

Note: The nature of this option means that, as at N4315 E02100, it is inferred that there is some encroachment into the neighbouring FIR.

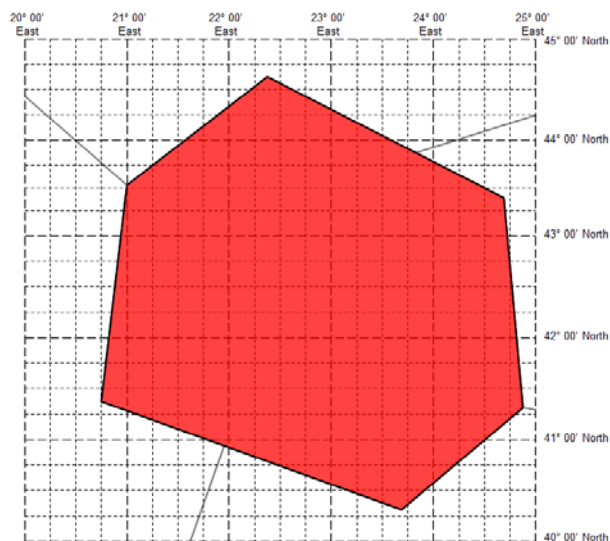
4) At a specific point within the FIR;

When the SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB OBS N4245 E02230 FL250/370 STNR WKN=

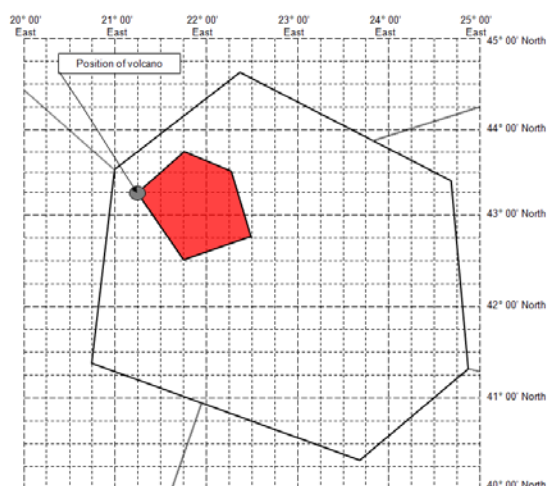
5) Covering entire FIR.



YUDD SIGMET 2 VALID 101200/101600 YUSO -
YUDD SHANLON FIR/UIR VA CLD FCST AT 1200Z ENTIRE FIR FL250/370 STNR
WKN=

6) Additional examples using volcanic ash references applicable to volcanic ash SIGMET only

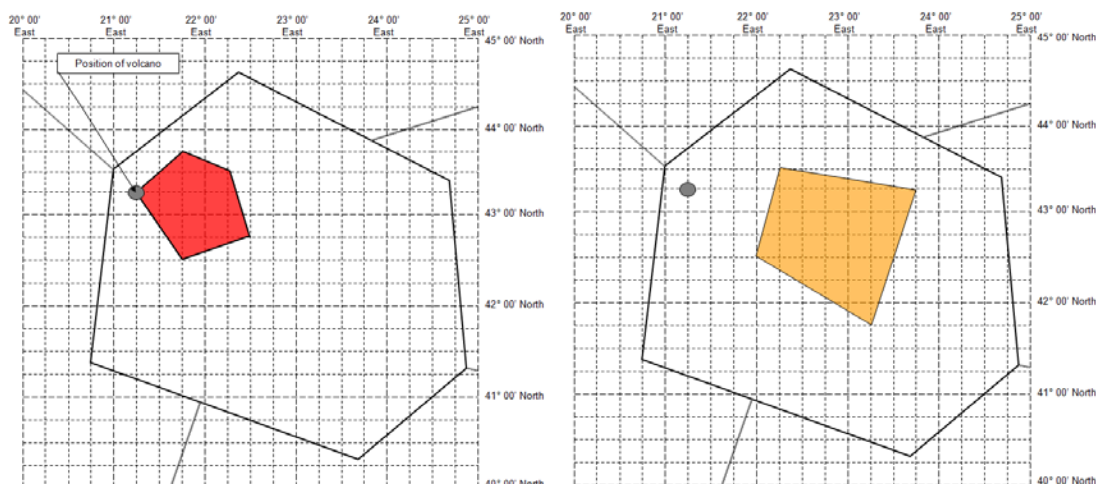
When the VA SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUS0-
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT
1200Z WI N4315 E02115 - N4345 E02145 - N4330 E02215 - N4245 E02230 -
N4230 E02145 - N4315 E02115 FL250/370 MOV ESE 20KT NC=

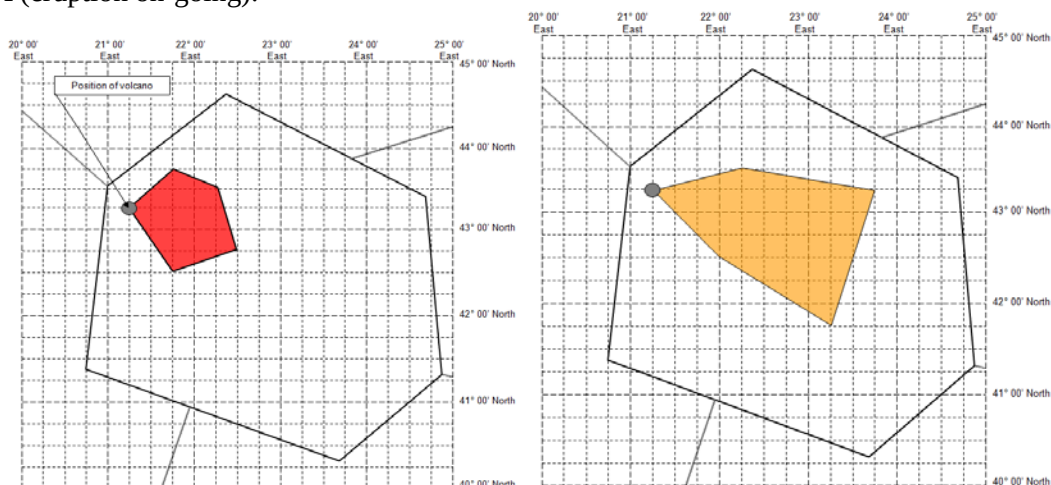
When the SIGMET does include a ‘forecast position’ section (no rate of movement).

For VA (eruption ceased, ash cloud persists downwind):



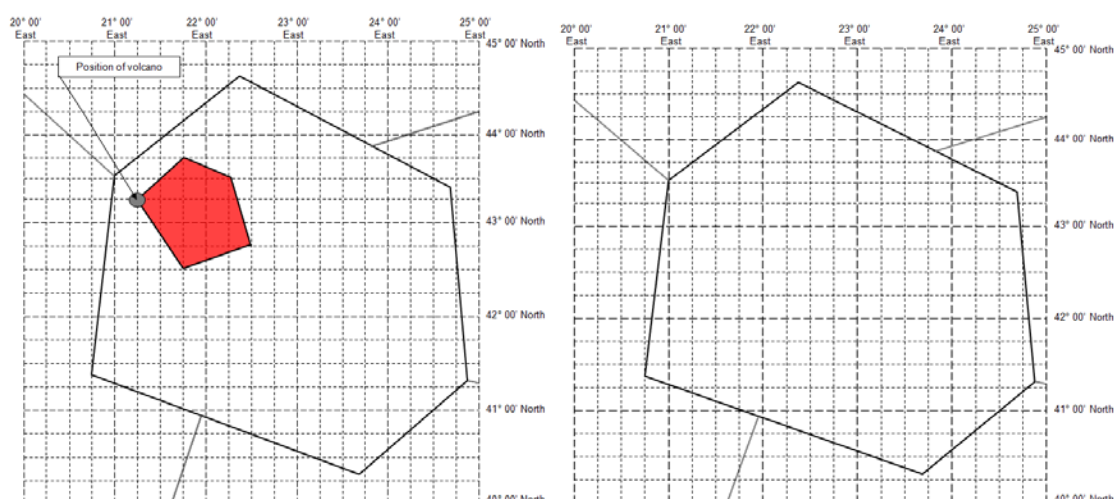
YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS
AT 1200Z WI N4315 E02115 - N4345 E02145 N4330 E02215 - N4245 E02230 -
N4230 E02145 - N4315 E02115 FL250/370 NC FCST AT 1800Z WI N4315 E02215
- N4315 E02345 - N4145 E02315 - N4230 E02200 - N4330 E02215=

For VA (eruption on-going):



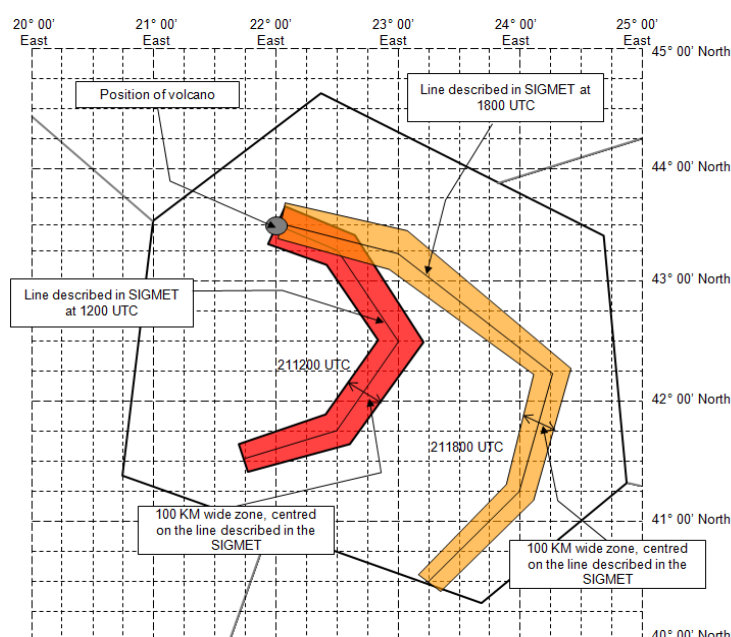
YUDD SIGMET 2 VALID 101200/101800 YUSO -
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT
1200Z WI N4315 E02115 - N4345 E02145 - N4330 E02215 - N4245 E02230 -
N4230 E02145 - N4315 E2115 FL250/370 NC FCST AT 1800Z WI N4315 E02115
- N4330 E02215 - N4315 E02345 - N4145 E02315 - N4230 E02200 - N4315
E02115=

For VA (eruption ceasing, ash dispersing):



YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT
1200Z WI N4315 E02115 - N4345 E02145 - N4330 E02215 - N4245 E02230 -
N4230 E02145 - N4315 E02115 FL250/370 WKN FCST AT 1800Z NO VA EXP=

For VA (eruption on-going), defining the area affected as a corridor of specified width;

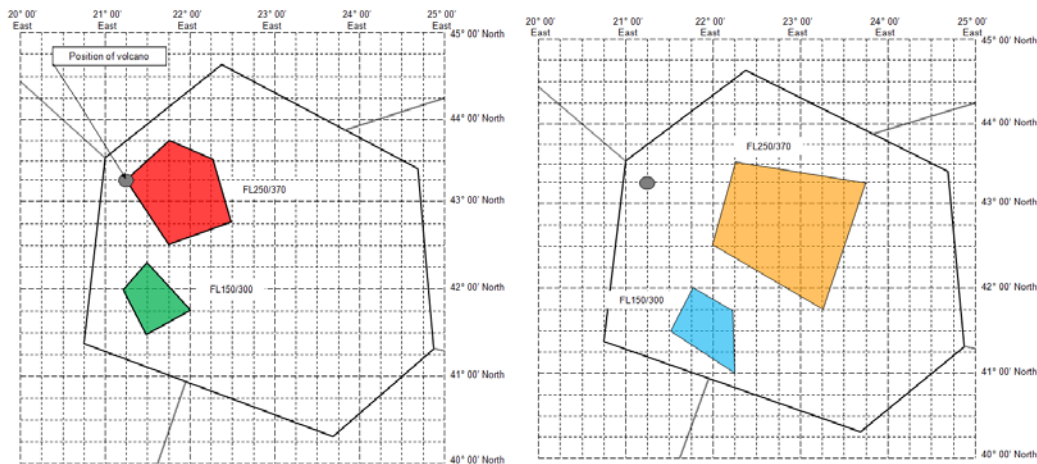


YUDD SIGMET 2 VALID 211200/211800 YUSO -
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL PSN N4330 E02200 VA CLD
FCST AT 1200Z APRX 100KM WID LINE BTN N4330 E02200 - N4315 E02230 -
N4230 E02300 - N4145 E02230 - N4130 E02145 FL310/450 NC FCST AT 1800Z
APRX 100KM WID LINE BTN N4330 E02200 - N4315 E02300 - N4215 E02415 -
N4115 E02400 - N4030 E02315=

7) Additional examples using volcanic ash references applicable to multiple areas in SIGMET for volcanic ash.

The only way to include a second instance of a volcanic ash cloud in a SIGMET message is to use the 'AND' option after the 'Forecast position' section.

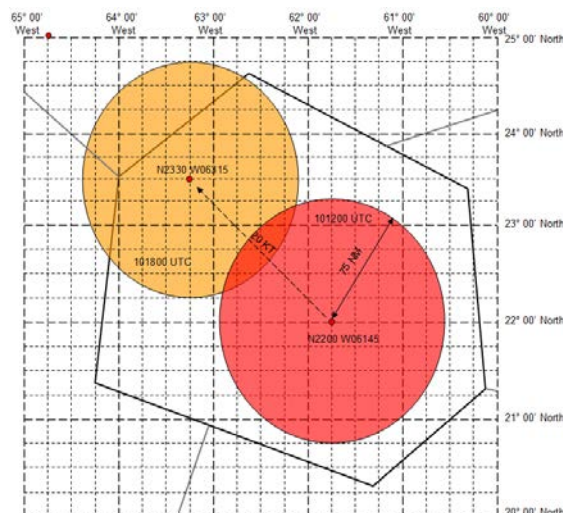
In the example below, two areas of volcanic ash cloud (at different levels) are forecast to move as described. The normal courier font refers to the northernmost areas of ash, and the italicised font refers to the southernmost areas of ash during the period. 'AND' is highlighted in **bold** to identify the separation of the two features.



YUDD SIGMET 2 VALID 101200/101800 YUSO -
 YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT
 1200Z WI N4315 E02115 - N4345 E02145 N4330 E02215 - N4245 E02230 -
 N4230 E02145 - N4315 E02115 FL250/370 NC FCST AT 1800Z WI N4330 E02215
 - N4315 E02345 - N4145 E02315 - N4230 E02200 - N4330 E02215 **AND** N4200
 E02115 - N4217 E02130 - N4145 E02200 - N4130 E02130 - N4200 E02100
 FL150/300 NC FCST AT 1800Z WI N4200 E02145 - N4145 E02215 - N4100
 E02215 - N4130 E02130 - N4200 E02145=

The above only works if there are two instances of ash at the start and end of the period. If the number of ash areas is different at the start and end, it is recommended that separate SIGMETs be issued as necessary.

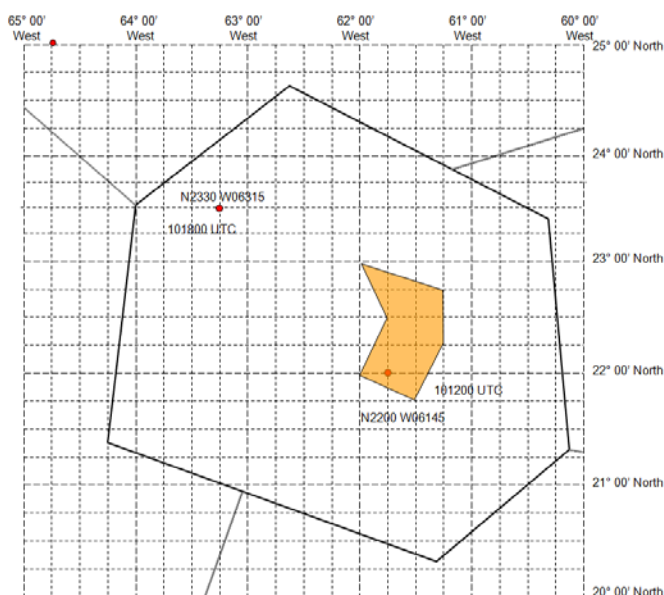
8) Additional example using volcanic illustrating use of "WI nnnKM (or nnnNM) OF TC CENTRE " Tropical Cyclone SIGMET Only



YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR TC GLORIA PSN N2200 W06145 CB OBS AT 1200Z WI 75NM OF
TC CENTRE TOP BLW FL500 MOV NW 20KT WKN=

YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR TC GLORIA PSN N2200 W06145 CB OBS AT 1200Z WI 75NM OF
TC CENTRE TOP BLW FL500 WKN FCST AT 1800Z TC CENTRE PSN N2330 W06315=

It is acceptable to use the other 'Location' options to describe the area affected by the CB of a Tropical Cyclone:

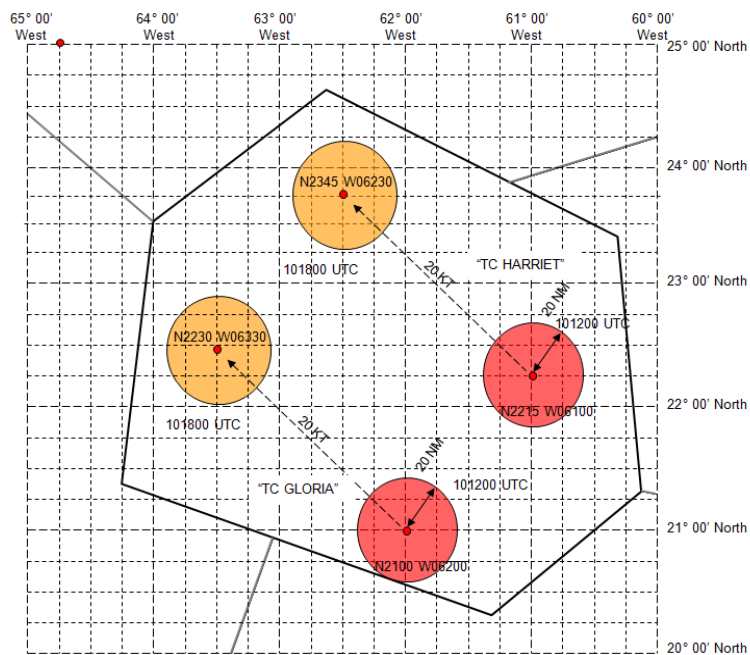


YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR TC GLORIA PSN N2200 W06145 CB OBS AT 1200Z WI N2200
W06200 - N2230 W06215 - N2300 W06200 - N2245 W06245 - N2215 W06245 -
N2145 W06230 -N2200 W06200 TOP BLW FL500 WKN FCST AT 1800Z TC CENTRE
PSN N2330 W06315=

9) Additional example using volcanic ash references applicable to multiple areas in SIGMET for tropical cyclone.

The only way to include a second instance of a tropical cyclone in a SIGMET is to use the 'AND' option following the 'Forecast position' section.

The example below demonstrates how two separate TCs, and the CB within a specified radius of those TCs, can be described. The normal courier font refers to TC Gloria, and the italicised font refers to TC Harriet. 'AND' is highlighted in **bold** to identify the separation between information for the two features.



YUDD SIGMET 2 VALID 101200/101800 YUSO-
 YUDD SHANLON FIR TC GLORIA PSN N2100 W06200 CB OBS AT 1200Z WI 20NM OF
 TC CENTRE TOP FL500 MOV NW 20KT WKN FCST AT 1800Z TC CENTRE N2230
 W06330 **AND** TC HARRIET FCST AT 1200Z N2215 W06100 CB TOP FL400 WI 20NM
 OF CENTRE MOV NW 20KT WKN FCST AT 1800Z TC CENTRE N2345 W06230=

APPENDIX C

SIGMET TEST PROCEDURES

CHAPTER 1 — REGIONAL SIGMET TEST PROCEDURES

1. Introduction

1.1. The Meteorology Divisional Meeting (2002) formulated Recommendation 1/12 b), *Implementation of SIGMET requirements*, which called, *inter alia*, for the relevant planning and implementation regional groups (PIRGs) to conduct periodic tests of the issuance and reception of SIGMET messages, especially those for volcanic ash.

1.2. This document describes the procedures for conducting regional SIGMET tests. The test procedures encompass all the three types of SIGMET, as follows:

- SIGMET for volcanic ash (WV SIGMET);
- SIGMET for tropical cyclone (WC SIGMET); and
- SIGMET for other weather phenomena (WS SIGMET).

1.3. The requirements for dissemination of SIGMET are specified in Annex 3, Appendix 6, 1.2 and in this guide on pages 3-17 and 3-18.

1.4. Tropical cyclone and volcanic ash cloud SIGMETs will be referred to hereafter as **WC** SIGMET (due to the **T₁T₂** section of the WMO AHL being set to **WC**) and **WV** SIGMET (due to the **T₁T₂** section of the WMO AHL being set to **WV**) respectively. All other SIGMET types will be referred to by **WS** (due to the **T₁T₂** section of the WMO AHL being set to **WS**).

2. Purpose and scope of regional SIGMET tests

2.1. The purpose of the regional SIGMET tests is to check the awareness of participating MWOs of the ICAO requirements for the issuance of SIGMET and the compliance of the States' procedures for preparation and dissemination of SIGMET bulletins with the relevant ICAO Standards and Recommended Practices (SARPs) and regional procedures.

2.2. Note, an MWO is at liberty to issue SIGMET test messages for local reasons (i.e. testing of local systems/routing etc.). Whilst such tests may not involve other MWOs or agencies directly, it is recommended that the general principles of this guide be followed with regard to local, ad hoc testing.

2.3. Hereafter, references to 'SIGMET tests' or 'tests' should be understood to refer to regional SIGMET tests.

2.4. The scope of the tests is to check also the interaction (where appropriate, depending on regional requirements) between the tropical cyclone advisory centres (TCAC) and volcanic ash advisory centres (VAAC), and the MWOs in their areas of responsibility. Therefore, where the issuance of **WC** and **WV** SIGMET is being tested, the TEST SIGMET messages initiated by the MWO should normally be triggered by a test advisory issued by the respective TCAC or VAAC.

2.5. The regional OPMET data banks (RODB) will monitor the dissemination by filing all TEST SIGMETs and advisories and the corresponding reception times. The monitoring results for **WC**, **WV** and **WS** SIGMET will be provided in the form of summaries to the SIGMET test focal points given in section 3.4.1.3 with a copy to the Regional Office concerned

2.6. A consolidated summary report will be prepared by both the SIGMET test focal points and submitted to the ICAO regional office concerned. The report will include recommendations for improvement of the SIGMET exchange and availability. The results of the tests should be reported to the appropriate regional OPMET bulletin exchange/data management group and MET Sub-group meetings.

2.7. Participating States, for which discrepancies of the procedures or other findings are identified by the tests, will be advised by the ICAO Regional Office and requested to take necessary corrective action.

3. SIGMET test procedures

3.1. Procedures for WC and WV SIGMET tests

3.1.1. Participating units

3.1.1.1. Tropical Cyclone Advisory Centres (TCAC): New Delhi

3.1.1.2. Volcanic Ash Advisory Centres (VAAC): Toulouse

3.1.1.3. Regional OPMET Data Banks (RODB): ROC Jeddah and back-up ROC Bahrain

3.1.1.4. Meteorological Watch Offices (MWO): Reference MID eANP Volume II, Table MET II-1

3.1.1.5 World Area Forecast Centres (WAFCs): London Washington

3.1.2. WV/WC SIGMET test messages

3.1.2.1. On the specified date for the test <<Time (UTC) to be agreed appropriate to Region>> the participating VAAC and TCAC should issue a TEST VA or TC advisory. The structure of the TEST advisories should follow the standard format given in Annex 3 with indication that it is a test message as shown on page C-6.

3.1.2.2. MWOs, upon receipt of the TEST VA or TC advisory, should issue a TEST SIGMET for volcanic ash (**WV**) or tropical cyclone (**WC**), respectively, and send it to all participating RODBs. The WMO AHL, the first line of the SIGMET, and the FIR reference in the second line of the SIGMET should be valid entries. The remainder of the body of the message should contain only the specified text informing recipients in plain language that the message is a test. TEST SIGMETs should normally have short validity periods (10 minutes), but where appropriate TEST SIGMET may be issued with validity periods up to the maximum allowed (4 hours for **WS**, 6 hours for **WC** and **WV**).

3.1.2.3. If the MWO does not receive the TEST VA or TCA advisory within 30 minutes of the commencement time of the test then they should still issue a TEST SIGMET indicating that the VAA or TCA was not received. See C-7 for an example of the test message.

3.1.2.4. To avoid over-writing of a valid SIGMET, a TEST SIGMET for VA or TC should not be sent in the case where there is a valid SIGMET of the same type for the MWO's area of responsibility. However, in this case the responsible MWO should notify the WV/WC SIGMET test focal point as given in 3.4.1.3 so that they can be excluded from the analysis.

3.2. Procedures for WS SIGMET tests

Note. — The WS SIGMET is initiated by the MWO at the designated time in 3.2.2. It is not initiated by an advisory as in the WC and WV SIGMET tests.

3.2.1. Participating units

Each Regional Office should develop its own list of participating units, using the template below:

3.2.1.1. **Regional OPMET Data Banks (RODB):**
ROC Jeddah and back-up ROC Bahrain

3.2.1.2. **Meteorological Watch Offices (MWO):**
Reference MID eANP Volume II, Table MET II-1

3.2.2. WS SIGMET Test Message

3.2.2.1. The MWOs should issue a TEST SIGMET during the 10-minute period between <<Time (UTC) to be agreed appropriate to Region>>.

3.2.2.2. The WMO AHL, the first line of the SIGMET, and the FIR reference in the second line of the SIGMET should be valid. The remainder of the body of the message should contain only the specified text informing recipients in plain language that the message is a test. TEST SIGMETs should normally have short validity periods (10 minutes), but where appropriate TEST SIGMET may be issued with validity periods up to the maximum allowed (4 hours for **WS**, 6 hours for **WC** and **WV**).

3.3. Common procedures

3.3.1. Special procedure to avoid overwriting of a valid WV/WC/WS SIGMET

3.3.1.1. It is vital to ensure that TEST SIGMET is unique so that it is not confused with operational SIGMET and avoid overwriting a valid operational SIGMET in an automated system. In order to prevent this it is suggested that the test SIGMET sequence number should be Z99.

For example, a SIGMET test is scheduled for 0200 UTC on the 29th. The TEST SIGMET is issued as follows:

WSAU01 YBRF 290200
YBBB SIGMET Z99 VALID 290200/290210 YBRF-

YBBB BRISBANE FIR TEST SIGMET PLEASE DISREGARD=

3.3.2. The test date and time

3.3.2.1. ICAO Regional Office will set a date and time for each SIGMET test after consultation with the participating VAACs, TCACs and RODBs. The information about the agreed date and time will be sent to all States concerned by a State letter and copied to the States' SIGMET Tests Focal Points.

3.3.2.2. Tests for different types of SIGMET should preferably be conducted on separate dates.

3.3.2.3. SIGMET tests for **WC**, **WV** and **WS** should be conducted at least yearly.

3.3.3. Dissemination of test SIGMETs and advisories

3.3.3.1. All TEST TC/VA advisories should be sent by the TCACs and VAACs to the participating units, as specified in the Regional Air Navigation Plan. The relevant AFTN addresses should be identified as part of the Region specific documentation.

3.3.3.2. All TEST SIGMETs should be sent by the MWOs to the participating units, as specified in the Regional Air Navigation Plan identified by each Regional Office. The relevant AFTN addresses should be identified as part of the Region specific documentation.

3.3.3.3. RODBs that are nominated as IROGs will relay the test bulletins to their corresponding IROG.

3.3.3.4. SIGMET tests should be terminated within 2 hours of the test start time. Exceptionally, where the test requires SIGMETs to be valid for up to 4 hours, then tests may be extended to a maximum of 4 hours for WS SIGMET and 6 hours for WC and WV SIGMET.

3.3.4. Coordination with the ATS units

3.3.4.1. MWOs should inform the associated ATS units of the forthcoming SIGMET tests by a suitable advanced notice.

3.4. **Processing of the test messages and results**

3.4.1. The RODBs should file all incoming TEST advisories and SIGMETs and perform an analysis of the availability, timeliness of arrival and the correctness of the WMO bulletin headings. A SIGMET TEST Summary Table, as shown on pages C-8 and C-9 of this guide, should be prepared by each ROdB and sent to the regional SIGMET test focal point given in section 3.4.3, with a copy to the ICAO Regional Office.

3.4.2. The SIGMET test focal points should prepare the final report of the test and present to the ICAO Regional Office. A summary report should be submitted to the next regional OPMET bulletin exchange/data management group and MET Sub-group meetings.

3.4.3. The current SIGMET test focal points for the MID Region are as follows:

MID Region

State	Contact	Numbers	e-mail

Bahrain	Anwar Yusuf Al-Mulla Operation Supervisor Meteorological Directorate Civil Aviation Affairs Ministry of Transportation P.O. Box 586	+973 17 321109 (tel) +973 17 320630 (fax)	aalmulla@caa.gov.bh
	Basim Salman Al Asfoor Head of Research and Information Meteorological Directorate Civil Aviation Affairs Ministry of Transportation P.O. Box 586	+973 17 329043 (tel) +973 17 320630 (fax)	balasfoor@caa.gov.bh
Egypt			
Iran, Islamic Republic of	Ahad Vazifeh Director of Forecasting Center in Meteorological Organization	+98 21 66070023(tel) +98 21 66070007(fax) +98 91 23851049 (mb)	vazife@gmail.com
Iraq	Sallam S. Nadhim Iraqi Meteorological Organization & Seismology Dept. : Weather Forecasting		Sallam_omery@yahoo.com (for backup use – info@meteoseism.gov.iq)
Jordan	Eng. Sahim AL-Shraideh		Sahim_Faisal@yahoo.com
Kuwait			
Lebanon			
Libya	Mr. Mokhtar R. ALGhaia Senior Forecaster National Meteorological Centre/Forecasting Department	+218-92-6009697 mob +218-215-621772 fax	alghaiag@yahoo.com
Oman			
Qatar			
Saudi Arabia			
Sudan			
Syrian Arab Republic			
United Arab Emirates	Ahmed Al Obeidli Sr. Air Navigation Inspector – CNS –AIRS General Civil Aviation Authority P.O. Box: 6558 Abu Dhabi United Arab Emirates	00971 240 54410 (tel)	aobaidli@gcaa.gov.ae
Yemen			

SIGMET TEST PROCEDURES

Format of TEST Advisories and SIGMETs

1. Format of TEST Volcanic Ash Advisory

VA ADVISORY
DTG: YYYMMDD/1000Z
VAAC: TOULOUSE
VOLCANO: TEST
PSN: UNKNOWN
AREA: TOULOUSE VAAC AREA
SUMMIT ELEV: UNKNOWN
ADVISORY NR: YYYY/nn
INFO SOURCE: NIL
AVIATION COLOUR CODE: NIL
ERUPTION DETAILS: NIL
OBS VA DTG: DD/GGggZ
OBS VA CLD: ASH NOT IDENTIFIABLE FROM SATELLITE DATA
FCST VA CLD +6 HR: DD/0800Z SFC/FL600 NO ASH EXP
FCST VA CLD +12 HR: DD/1400Z SFC/FL600 NO ASH EXP
FCST VA CLD +18 HR: DD/2000Z SFC/FL600 NO ASH EXP
RMK: THIS IS A TEST VA ADVISORY. MWO SHOULD NOW ISSUE A TEST SIGMET FOR VA, . PLEASE REFER TO THE LETTER FROM MID REGIONAL OFFICE DATED xxxxxxxxxxxx.
NXT ADVISORY: NO FURTHER ADVISORIES=

2. Format of TEST Tropical Cyclone Advisory

TC ADVISORY
DTG: YYYMMDD/0800Z
TCAC: NEW DELHI
TC: TEST
NR: nn (actual number)
PSN: NIL
MOV: NIL
C: NIL
MAX WIND: NIL
FCST PSN +06HR: NIL
FCST MAX WIND +06HR: NIL
FCST PSN +12HR: NIL
FCST MAX WIND +12HR: NIL
FCST PSN +18HR: NIL
FCST MAX WIND +18HR: NIL
FCST PSN +24HR: NIL
FCST MAX WIND +24HR: NIL
RMK: THIS IS A TEST TC ADVISORY. MWO SHOULD NOW ISSUE A TEST SIGMET FOR TC. PLEASE REFER TO THE LETTER FROM MID REGIONAL OFFICE DATED xxxxxxxxxxxx.
NXT MSG: NIL=

3. Format of TEST SIGMET for Volcanic Ash

WVXXii CCCC YYGGgg
CCCC SIGMET Z99 VALID YYGGgg/YYGGgg CCCC-
CCCC <<NAME>> FIR THIS IS A TEST SIGMET, PLEASE DISREGARD.
TEST VA ADVISORY NUMBER xx RECEIVED FM TOULOUSE VAAC AT YYGGggZ=

or

WVXXii CCCC YYGGgg
CCCC SIGMET Z99 VALID YYGGgg/YYGGgg CCCC-
CCCC <<NAME>> FIR THIS IS A TEST SIGMET, PLEASE DISREGARD.
TEST VA ADVISORY NOT RECIEVED FM TOULOUSE VAAC=

Example:

WVJP31 RJTD 170205
RJJJ SIGMET Z99 VALID 170205/170215 RJTD-
RJJJ FUKUOKA FIR THIS IS A TEST SIGMET, PLEASE DISREGARD.
TEST VA ADVISORY NUMBER 1 RECEIVED FM TOKYO VAAC AT 170200Z=

WVJP31 RJTD 170235
RJJJ SIGMET Z99 VALID 170205/170215 RJTD-
RJJJ FUKUOKA FIR THIS IS A TEST SIGMET, PLEASE DISREGARD.
TEST VA ADVISORY NOT RECEIVED FM TOKYO VAAC=

4. Format of TEST SIGMET for Tropical Cyclone

WCXXii CCCC YYGGgg
CCCC SIGMET Z99 VALID YYGGgg/YYGGgg CCCC-
CCCC <<NAME>> FIR THIS IS A TEST SIGMET, PLEASE DISREGARD.
TEST TC ADVISORY NUMBER xx RECEIVED FM NEW DELHI TCAC AT YYGGggZ=

WCXXii CCCC YYGGgg
CCCC SIGMET Z99 VALID YYGGgg/YYGGgg CCCC-
CCCC <<NAME>> FIR THIS IS A TEST SIGMET, PLEASE DISREGARD.
TEST TC ADVISORY NOT RECEIVED FM NEW DELHI TCAC=

Example:

WCJP31 RJTD 100205
RJJJ SIGMET Z99 VALID 100205/100215 RJTD-
RJJJ FUKUOKA FIR THIS IS A TEST SIGMET, PLEASE DISREGARD.
TEST TC ADVISORY NUMBER 1 RECEIVER FM TOKYO TCAC AT 180200Z=

WCJP31 RJTD 100235

RJJJ SIGMET Z99 VALID 100205/100215 RJTD-
 RJJJ FUKUOKA FIR THIS IS A TEST SIGMET, PLEASE DISREGARD.
 TEST TC ADVISORY NOT RECEIVED **FM TOKYO TCAC** =

5. Format of TEST SIGMET for other weather phenomena

WSXXii CCCC YYGGgg
 CCCC SIGMET Z99 VALID YYGGgg/YYGGgg CCCC-
 CCCC <<NAME>> FIR THIS IS A TEST SIGMET, PLEASE DISREGARD=

Example:

WSJP31 RJTD 240205
 RJJJ SIGMET Z99 VALID 240205/240215 RJTD-
 RJJJ FUKUOKA FIR THIS IS A TEST SIGMET, PLEASE DISREGARD=

CHAPTER 2 — SAMPLE TABLE TO USED BY REGIONAL OPMET DATA BANKS

Name of RODB Tokyo
 Date of Test 2011/11/17
 Target (VA or TC) VA

VA Advisories (FV)

<i>TTAAii</i>	<i>CCCC</i>	<i>YYGGgg</i>	<i>Received Time(UTC)</i>	<i>Comments/Remarks</i>
FVAK23	PAWU	170159	01:59:29	
FVAU01	ADRM	170201	02:01:53	
FVFE01	RJTD	170200	02:00:09	
FVPS01	NZKL	170207	02:08:27	
FVXX02	LFPW	170202	02:02:41	
FVXX25	KNES	170200	02:02:01	

VA SIGMET (WV)

<i>TTAAii</i>	<i>CCCC</i>	<i>YYGGgg</i>	<i>MWO</i>	<i>FIR</i>	<i>Received Time(UTC)</i>	<i>Comments/Remarks</i>
WVAK01	PAWU	170200	PAWU	PAZA	02:00:11	
WVAU01	ADRM	170201	YDRM	YBBB	02:02:04	
WVCI31	RCTP	170205	RCTP	RCAA	02:04:58	
WVCI33	ZBAA	170205	ZBAA	ZBPE	02:05:26	
WVCI34	ZSSS	170205	ZSSS	ZSHA	02:02:34	
WVCI35	ZJHK	170201	ZJHK	ZJSA	02:03:34	
WVCI36	ZUUU	170205	ZUUU	ZPKM	02:11:04	
WVCI37	ZLXY	170205	ZLXY	ZLHW	02:07:44	
WVCI38	ZYTX	170205	ZYTX	ZYSH	02:01:50	
WVCI39	ZWWW	170202	ZWWW	ZWUQ	02:02:40	
WVCI45	ZHHH	170204	ZHHH	ZHWH	02:08:52	
WVFI01	NFFN	170000	NFFN	NFFF	02:15:46	
WVIN31	VOMM	170201	VOMM	VOMF	02:09:57	
WVJP31	RJTD	170205	RJTD	RJJJ	02:06:24	

WVKP31	ZUUU	170206	ZUUU	VDPP	02:12:23
WVLA31	VLVT	170200	VLVT	VLVT	02:01:03
WVMS31	WMKK	170205	WMKK	WBFC	02:04:28
WVPA01	PHFO	170201	PHFO	KZAK	02:02:09
WVPH31	RPLL	170210	RPLL	RPHI	02:08:43
WVPN01	KKCI	170200	KKCI	KZAK	02:00:11
WVRA31	RUCH	170205	RUCH	UIAA	02:08:01
WVRA31	RUHB	170206	RUHB	UHHH	02:07:57
WVRA31	RUMG	170205	RUMG	UHMM	02:08:59
WVRA31	RUPV	170200	RUPV	UHMP	02:09:13
WVRA31	RUSH	170205	RUSH	UHSS	02:04:22
WVRA31	RUVV	170202	RUVV	UHWV	02:03:13
WVRA32	RUPV	170200	RUPV	UHMA	02:06:01
WVRA32	RUYK	170207	RUYK	UELL	02:07:28
WVRA33	RUHB	170202	RUHB	UHBB	02:02:49
WVSR20	WSSS	170205	WSSS	WSJC	02:05:38
WVSS20	VHHH	170202	VHHH	VHHK	02:03:05
WVTH31	VTBS	170211	VTBS	VTBB	02:13:53
WVVS31	VVGL	170200	VVGL	VVNB	02:05:06
WVVS31	VVGL	170208	VVGL	VVTS	02:14:38

— END —

APPENDIX D

SIGMET WMO HEADERS - MID

State	MWO name (Doc 7910)	MWO Loc. Ind.	WS AHL LS AHL	WV AHL LV AHL	WC AHL LY AHL	FIR Name (Doc 7910)	FIR Loc. Ind.	ATSU serving the FIR
BAHRAIN	BAHRAIN INTERNATIONAL	OBBI	WSBN31 OBBI LSBN31 OBBI	WVBN31 OBBI LVB31 OBBI	WCBN31 OBBI LYBN31 OBBI	BAHRAIN	OBBI	OBBI
EGYPT	CAIRO/INTL	HECA	WSEG31 HECA LSEG31 HECA	WVEG31 HECA LVEG31 HECA	N/A	CAIRO	HECC	HECC
IRAN	TEHRAN/MEHRABAD INTL	OIII	WSIR31 OIII LSIR31 OIII	WVIR31 OIII LVIR31 OIII	WCIR31 OIII LYIR31 OIII	TEHRAN	OIII	OIII
IRAQ	BAGHDAD INTERNATIONAL AIRPORT	ORBI	WSIQ01 ORBI LSIQ01 ORBI	WVIQ01 ORBI LVIQ01 ORBI	N/A	BAGHDAD	ORBI	ORBI
JORDAN	AMMAN/QUEEN ALIA	OJAI	WSJD01 OJAI LSJD01 OJAI	WVJD01 OJAI LVJD01 OJAI	N/A	AMMAN	OJAI	OJAI
KUWAIT	KUWAIT/INTL AIRPORT	OKBK	WSKW10 OKBK LSKW10 OKBK	WVKW10 OKBK LVKW10 OKBK	WCKW10 OKBK LYKW10 OKBK	KUWAIT	OKBK	OKBK
LEBANON	BEIRUT/BEIRUT INTL	OLBA	WSLB31 OLBA LSLB31 OLBA	WVLB31 OLBA LVLB31 OLBA	N/A	BEIRUT	OLBA	OLBA
LYBIA	Libya MWO	HLMC*	WSLY31 HLMC LSLY31 HLMC	WVLY31 HLMC LVLY31 HLMC	N/A	TRIPOLI	HLMC	HLMC
OMAN	MUSCAT/MUSCAT INTL	OOMS	WSOM31 OOMS LSOM31 OOMS	WVOM31 OOMS LVOM31 OOMS	WCOM31 OOMS LYOM31 OOMS	MUSCAT	OOMS	OOMS
QATAR	HAMAD INTERNATIONAL, QATAR	OTHH	WSQT21 OTHH LSQT21 OTHH	WVQT21 OTHH LVQT21 OTHH	WCQT21 OTHH LYQT21 OTHH	DOHA	OTHH	OTHH
SAUDI ARABIA	JEDDAH/KING ABDULAZIZ INTL	OEJN	WSSD20 OEJD LSSD20 OEJD	WVSD20 OEJD LVSD20 OEJD	WCSD20 OEJD LYSD20 OEJD	JEDDAH	OEJD	OEJD

State	MWO name (Doc 7910)	MWO Loc. Ind.	WS AHL LS AHL	WV AHL LV AHL	WC AHL LY AHL	FIR Name (Doc 7910)	FIR Loc. Ind.	ATSU serving the FIR
SUDAN	KHARTOUM	HSSS	WSSU31 HSSS LSSU31 HSSS	WVSU31 HSSS LVSU31 HSSS	N/A	KHARTOUM	HSSS	HSSS
SYRIA	DAMASCUS/INTL	OSDI	WSSY31 OSDI LSSY31 OSDI	WVSY31 OSDI LVSY31 OSDI	N/A	DAMASCUS	OSTT	OSDI
UNITED ARAB EMIRATES	ABU DHABI INTERNATIONAL	OMAA	WSER20 OMAA LSER20 OMAA	WVER20 OMAA LVER20 OMAA	WCER20 OMAA LYER20 OMAA	EMIRATES	OMAE	OMAE
YEMEN	SANAA/INTL	OYSN	WSYE31 OYSN LSYE31 OYSN	WVYE31 OYSN LVYE31 OYSN	WCYE31 OYSN LYYE31 OYSN	SANAA	OYSC	OYSN

Note: The AHL for each of the WS, WV and WC SIGMETs (highlighted above) is to be confirmed by the relevant State.

**not defined in ICAO Doc 7910*

APPENDIX E

SPECIAL AIR-REPORT WMO HEADERS - MID

Under Construction – yellow highlight not confirmed

State	Special Air-Report	Special Air-Report on Volcanic Ash
Bahrain	UABN61 OBBI	UABN71 OBBI
Egypt	UAEG61 HECA	UAEG71 HECA
Iran, Islamic Republic of	UAIR61 OIII	UAIR71 OIII
Iraq	UAIQ61 ORBI	UAIQ71 ORBI
Jordan	UAJD61 OJAM	UAJD71 OJAM
Kuwait	UAKW61 OKBK	UAKW71 OKBK
Lebanon	UALB61 OLBA	UALB71 OLBA
Libya	UALY61 HLMC	UALY71 HLMC
Oman	UAOM61 OOMS	UAOM71 OOMS
Qatar	UAQT61 OTHH	UAQT71 OTHH
Saudi Arabia	UASD61 OEJD	UASD71 OEJD
Sudan	UASU61 HSSS	UASU71 HSSS
Syrian Arab Republic	UASY61 OSDI	UASY71 OSDI
United Arab Emirates	UAER61 OMAA	UAER71 OMAA
Yemen	UAYE61 OYSN	UAYE71 OYSN

APPENDIX F

SIGMET EXAMPLES - MID

ISOL EMBD TS

WSKW31 OKBK 030900

OKBK SIGMET 1 VALID 030900/031300 OKBK-

OKAC KUWAIT FIR EMBD TS OBS AT 0850Z N OF N30 TOP FL3000 MOV E 15KT NC=

CANCELLATION SIGMET

WSKW31 OKBK 031030

OKBK SIGMET 2 VALID 031030/031300 OKBK-

OKAC KUWAIT FIR CNL SIGMET 1 030900/031300 NC=

SEV TURB

WSKW31 OKBK 030800

OKBK SIGMET 1 VALID 030900/031300 OKBK-

OKAC KUWAIT FIR SEV TURB FCST AT 0850Z N OF N30 FL300/340 MOV E 15KT NC=

HVY DS

WSKW31 OKBK 030900

OKBK SIGMET 1 VALID 030900/031300 OKBK-

OKAC KUWAIT FIR HVY DS OBS AT 0850Z N OF N30 MOV SE 30KT NC=

CANCELLATION SIGMET

WSKW31 OKBK 031030

OKBK SIGMET 2 VALID 031030/031300 OKBK-

OKAC KUWAIT FIR CNL SIGMET 1 030900/031300 NC=

HVY SS

WSKW31 OKBK 030800

OKBK SIGMET 1 VALID 030900/031300 OKBK-

OKAC KUWAIT FIR HVY SS FCST AT 0900Z N OF N30 MOV SE 30KT NC=

CANCELLATION SIGMET

WSKW31 OKBK 031030

OKBK SIGMET 2 VALID 031030/031300 OKBK-

OKAC KUWAIT FIR CNL SIGMET 1 030900/031300 NC=

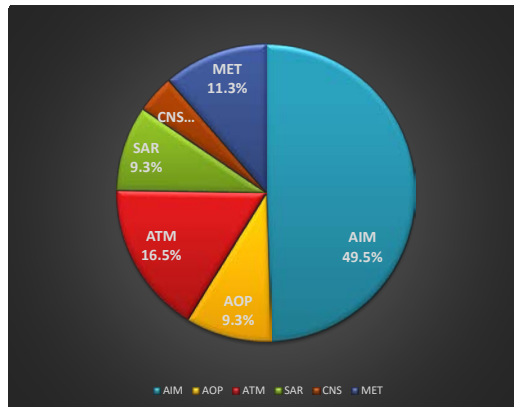
APPENDIX 6.8A

AIR NAVIGATION DEFICIENCIES IN THE THE MID REGION

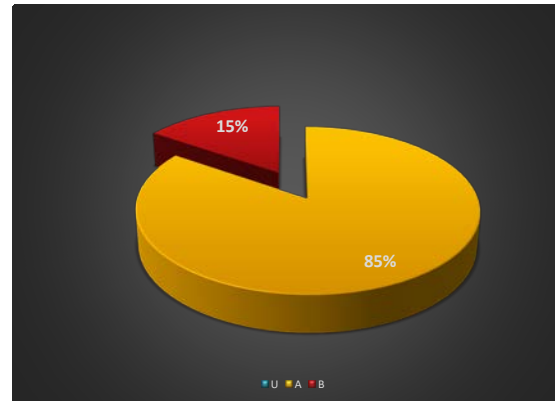
STATE	AIM							Total AIM	AOP							Total AOP	ATM							Total ATM	SAR							Total SAR	CNS							Total CNS	MET							Total MET	
	Priority			Rational					Priority			Rational					Priority			Rational					Priority			Rational					Priority			Rational					Priority			Rational					
	U	A	B	F	H	S	O		U	A	B	F	H	S	O		U	A	B	F	H	S	O		U	A	B	F	H	S	O		U	A	B	F	H	S	O		U	A	B	F	H	S	O		
Bahrain							0							0																																0			
Egypt		2					2							0																																0			
Iran		3					3			1		1	1	1				1				1	1	1																						0			
Iraq		6	1	5	5	1	6			1		1	1	1		1		1	3			3	1	4					1										1	0					1	0			
Jordan		2	1	3	3			3						0		1					1																									0			
Kuwait								0						0																																0			
Lebanon		3	1		2		2	4		1		1	1	1		1					1		1		1		1																			0			
Libya		4	1					5		1			1	1		1		2			1	1	2	2			2	2	2		1		1									0	2			2			
Oman		3						3						0													2	2	2																	0	0		
Qatar								0						0		1							1																						0	0			
Saudi Arabia		2						2						0		1						1		1																						0			
Sudan		2						2		1		1	1	1		1		1			1	1	1	1																						0			
Syria		8	1	6	7	1		2		3		3	3			3		1	2			1	2	1	3					2														0	3			3	3
UAE		0						0						0		0	1					1	0	1																						0			
Yemen		7	1	4	2			4		1		1	1			0							0		2				2									1	1		3		1	1	1		3		
Total	0	42	6	18	19	2	31	48	0	9	0	9	9	1	1	9	0	9	7	0	4	12	9	16	0	9	0	0	2	2	9	9	0	2	2	0	0	0	4	4	0	11	0	1	1	1	8	11	

TOTAL DEFICIENCIES:97

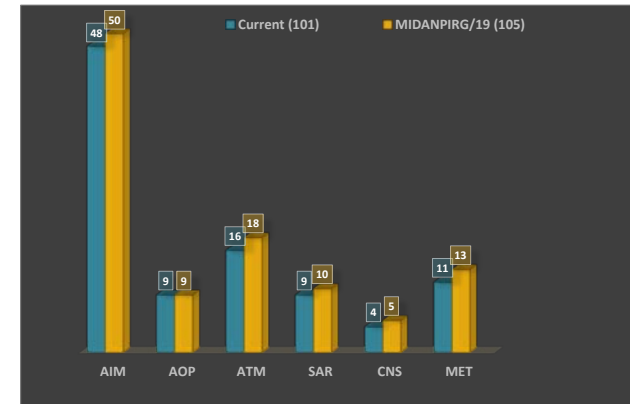
Distribution of Air Navigation deficiencies by field in %

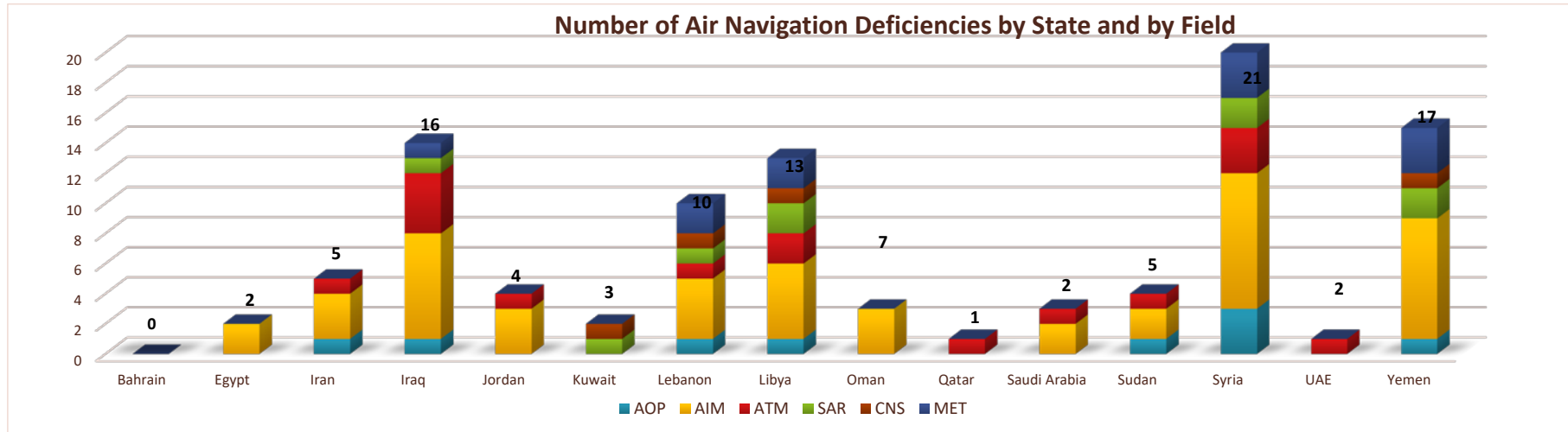


Distribution of Air navigation deficiencies by priority in %



Reported Deficiencies by field (MIDANPIRG/19 & MIDANPIRG/18)





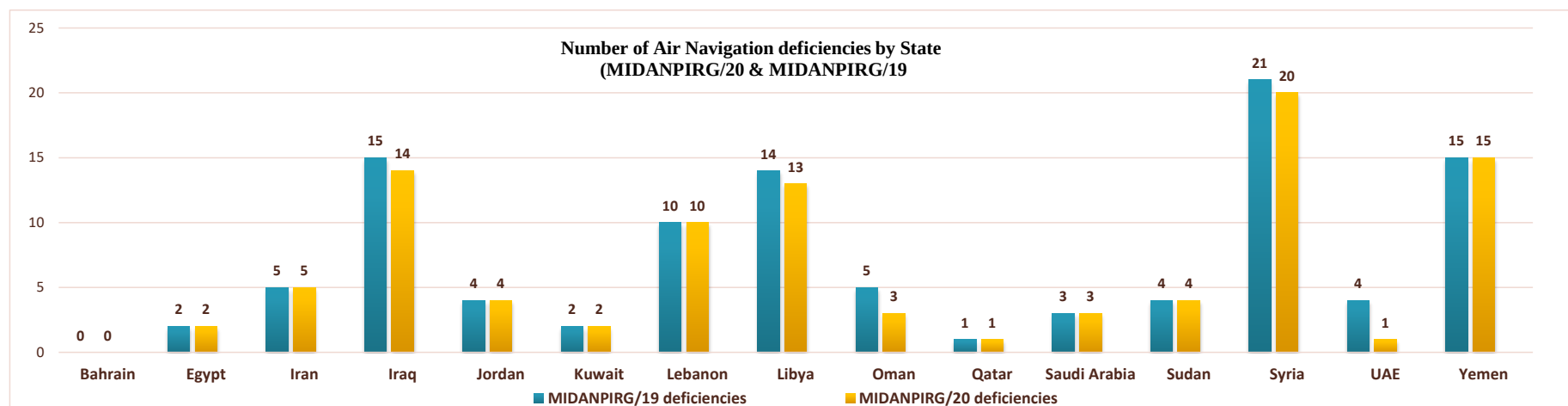
Deficiencies to be approved by MIDANPIRG/20

	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen	Total
AOP	0	0	1	1	0	0	1	1	0	0	0	1	3	0	1	9
AIM	0	2	3	7	3	0	4	5	3	0	2	2	9	0	8	48
ATM	0	0	1	4	1	0	1	2	0	1	1	1	3	1	0	16
SAR	0	0	0	1	0	1	1	2	0	0	0	0	2	0	2	9
CNS	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	4
MET	0	0	0	1	0	0	2	2	0	0	0	0	3	0	3	11
TOTAL	0	2	5	14	4	2	10	13	3	1	3	4	20	1	15	97

Deficiencies approved by MIDANPIRG/19

	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen	Total
AOP	0	0	1	1	0	0	1	1	0	0	0	1	3	0	1	9
AIM	0	2	3	6	3	0	4	6	3	0	2	2	9	2	8	50
ATM	0	0	1	4	1	0	1	2	0	1	1	1	4	2	0	18
SAR	0	0	0	2	0	1	1	2	0	0	0	0	2	0	2	10
CNS	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	5
MET	0	0	0	2	0	0	2	2	1	0	0	0	3	0	3	13
TOTAL	0	2	5	15	4	2	10	14	5	1	3	4	21	4	15	105

	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen	Total
MIDANPIRG/19 deficiencies	0	2	5	15	4	2	10	14	5	1	3	4	21	4	15	105
MIDANPIRG/20 deficiencies	0	2	5	14	4	2	10	13	3	1	3	4	20	1	15	97



ATTACHMENT A

State/ Org	Contact	Title
Bahrain	Mr. Abdullah Hassan Al-qadhi	Director Aviation Safety & Security
	Mrs. Maysa Hazeem	Director Air Traffic Management
Egypt	Mr. Usama Atta Mahroos AbdelSaid	Head Sector of ATC
	Mr. Ehab Raslan Mohamed AbdelGalil	General Manager of Research and Development
	Mr. Abdel Aziz Mahmoud	
	Mr. Abdelaziz Mahmoud abdelaziz abouelmal	head of air navigation central administration
	Capt. Mohamed Sala Abdel Aziz	G.M of safety department
	Mr. Mohamed Essam Ahmed	ANS inspector
	Ms. Aya Ashraf Mostafa	CNS inspector
	Ms. Manar mostafa mohamed	Aerodrome inspector
Iran	Mr. Jaber Azhari	Head of Data Analyzing Team
	Mr. Seyed Hamid Reza Sanei	Assistant Director of ANS and Aerodrome
	Mr. Mohammad Mahanpoor	Aerodrome Expert
	Mr. Abolfazl Akbari	ATM Expert
	Mr. Ghasem Alipour	ATM Expert
	Mr. Mohammad Adel Nazari	Air Traffic Controller
	Mr. Jamal Abbasi	
Iraq	Mr. Shirwan Aziz Abdullah	Air Traffic Control Manager
	Mr. Sherzad Ahmad Abbass	CNS Manager
	Mr. Ali Abdul Sahib Nasrullah	CNS Deputy Directr (GCANS)
	Mr. Karrar Thamer Ahmed	CNS Manager
	Mr. Marwan Ayad Khalid	Operations Manager
	Mr. Maher Ihyal Muttlaq	ATC Manager
	Mr. Ali M. Hameed Al-Saood	AIP Manager (GCANS)
Jordan	Mr. Mahmoud Marji Faour Allahem	Director of Air Traffic Management (DATM)
	Dr. Mohammad Mahdi Hushki	QA@IA Director/NCMC
Oman	Mr. Saleh Abdullah Al-Harthy	A/Director General Air Navigation
	Mr. Mubarak Saleh Al Gheilani	Superintendent ATS
	Mr. Hilal Ali Al-Maqbali	Acing ATC Director/Chief of Quality and Safety
	Mr.Husam Ahmed Al-Yafai	ANS Director
	Mr. Sulaiman Ali Al-Hinai	Pilot / Flight Safety
	Ms. Aisha Said Bait Saloomi	CAA
	Mr. Ali Khamis Al-tobi	RAFO
	Mr. Salah Salim Bait Sulaiman	CAA

State/ Org	Contact	Title
	Mr. Imad Ahmed Al Raidan	Technical Support Specialist-ATM
	Mr. Badar Nasser Al Jaradi	Aerodrome Safety Inspector
	Mr. Nasser Salim Al-Mazouri	Chief of Muscat ACC
	Mr. Mohamood Talib Al-Shekaili	Director of Quality
	Mr. Nizar El Mrabti	Program Manager
	Mr. Nasser Altuwaiya	ATC Watch Supervisor
	Mrs. Hanaa Sultan Al Maskari	Chief ATM HR
	Mr. Amer Suhail Ghawas	ANS- Engineer
	Mr. Abdullah Aqeel Al-Ibrahim	NAV
	Eng. Mohammed Ba Abood	ATM SYS Supervison
	Mr. Ahmed Bakhit Tabouk	CAA
	Mr. Said Saif Al-Kyumi	ATSM
	Mr. Merai Jameleddine	Aerodrome Inspector & AGA FP
	Mr. Khaled M. Reda Eltanany	CNS Safety Inspector
	Mr. Abdulredha Y. Al Balushi	ANS Inspector
	Mr. Ramzi Smirani	Ground Operations Inspector
	Dr. Mohammad M. S. Al Husban	Airworthiness Inspector
	Mr. Ahmed Abdelwahab Elmarady	CNS Safety Inspector
	Mr. Imed Dakhli	Air Navigation Safety Inspector
	Mr. Javad Danaei	ATS/SAR/MET Safety Inspector
	Mr. Majid Rezaei	AIS/Chart Safety Inspector
	Mr. Vilina Eka Lestari	CNS Safety Inspector
	Mr. Bouzid Issam	Safety Regulation Expert
	Mr. Salim Hamed Al Husaini	DG Civil Aviation Regulation
	Mrs. Rawya Nasser Al Adawi	Safety Regulations Director
	Mr. Yevinda Amarasekara	Aerodrome Inspector
	Mr. Werner Kleynhans	PANS-OPS Inspector
	Mr. Ali El Chaar	Aviation Environment Protection Expert - Consultant
	Mr. Mahdi Hedayat Khouazani	Safety Regulation Expert
	Capt. Majid Saif Albarhi	Director of Oman Transport Safety Bureau
	Mr. Ziyana Ali Saoud Al Saeed	Head of Air Accident Investigation Section
	Eng. Anwar Khalfan Almatani	Aviation Safety Specialist
	Capt. Ammar Alkendi	Aircraft Accident Investigator
	Mr. Naif Nasser Al Daghari	Safety Regulation Dept

State/ Org	Contact	Title
	Mr. Neil Fernandes	Senior Specialist of Aviation Safety
	Mr. Said Abdul Karim Al Mandhari	Air Traffic Controller
Qatar	Dr. Ramy Saad	ANS Inspector
	Mr. Majed Al Atawi	Director Air Safety Department
	Mr. Saleh Alnisf	Head of IMS
	Mr. Mohammed Almuhamadi	Head of Training
Saudi Arabia	Mr. Alqahtani Hajed Hajed	
	Mr. Abdullah Mohammed Albathi	
	Mr. Abdullah F. Alanazi	Safety Performance Manager
	Mr. Mohammed Musaad Almatrafi	Airports Safety Inspector
	Mr. Waleed Yousef Alsulaim	Air Navigation Meteorology Section Head
	Mr. Abdullah Mohammed Albathi	
	Mr. Ali S Aldyab	GM of Aerodrome Safety
	Mr. Mazen M. Alshihri	Airspace Management Manager
	Mr. Ali Alshehri	
	Mr. Alaa Mohammed Al Turki	Engineering Services Executive Director
	Mr. Mohammad Al Juhani	Flight Procedure Manager
Syria	Mr. Ammar Tawil	Deputy OF AIR Traffic Management Director
	Mr. Mahmoud Krayem	Flight OPS engineer
	Mr. Hasan Alkhaimi	Deputy CNS Director at Syrian Civil Aviation Authority (SCAA)
	Mr. Hassan Hamoud	AIR Traffic Management Director
	Mr. Ahmad Salameh	Deputy Flight Safety Director
	Mr. Nadim Salim	CNS Director / Syrian Civil Aviation Authority (SCAA)
	Mr. Walid Hanan	Operation Control Manager
	Mr. Saad Abd Al Mohsen	Advisor Flight Operations
UAE	Mr. Ahmed Al Jallaf	Assistant Director General Air Navigation Services
	Mr. Muayyed AL Teneiji	DATM
	Mr. Abdalla Al Rashdi	DAIM
	Mr. Hamad Rashid Al Belushi	Senior Expert – Air Traffic Management
	Mr. Aqeel Ahmed Al Zarouni	Acting Assistant Aviation Safety Affairs
	Mr. Ahmed Salim AlSaabri	Senior Manager-Strategic Safety & Performance
	Mr. Rashed Al Shehhi	Manager - ANS Engineering
	Mr. Mohammad Faisal Al Dossari	Senior Director Air Navigation & Aerodromes

State/ Org	Contact	Title
		Department
	Mr. Ahmed Saleh Al Shehhi	Acting Senior Manager - Airspace
	Mr. Sultan Abdul Aziz M. Lootah	Specialist – Air Traffic Service
	Dr. Nasser A.Juma Al Boloushi	Vice President Air Navigation Services
	Mr. Talal Al Hammadi	Vice President – Air Traffic Developments
	Mr. Thani Al Thani	Head of ATC – DXB Tower
	Mr. Ali Salem Saeed Alzahmi	
	Mr. Saeed Abdalaa Ahghawi	
	Mr. Salem Rashed Ali Al Sereidi	
	Mr. Fuhaid Al Manssoori	Manager Operational Training
Yemen	Eng. Mohammed Nasher Taher	Deputy Chairman
	Mr. Abdulmalik Saeed Ahmed	Advisor of Chairman
	Mr. Younis Saeed Ahmed	D.G. of Air Navigation
	Eng. Abdullah Nasser Salem	D.G. of Airworthiness
USA (FAA)	Mr. Mohammad T. Kushan	Senior Representative
	Mr. Travis Fiebelkorn	Senior Aviation Administration
	Mr. Amer M. Younossi	Aircraft Certification Senior Representative
	Mr Carl N. Johnson	Flight Standards Senior Representative
ACAO	Mr. Hicham Bennani	Safety & Air Navigation Expert
BOEING	Mrs. Nancy Vachon	Senior Regulatory Affairs Specialist
	Mr. Ahsan Naseer	Manager Aviation Safety Strategy
	Mr. Akachi Iroezi	Director, Global Safety and Regulatory Affairs
CANSO	Mr. Javier Alejandro Vanegas	Director Latin America and Caribbean Affairs
GCC	Brig. Ali Ahmed Albuainain	Head of Joint Defence Affairs
	Mr. Hilal bin Talib Al-Busaidi	Coordinator Officer
IATA	Mr. Jehad Faqir	Head of Regional Safety-Africa and Middle East
	Mrs. Sharron Caunt	Regional Director Safety and Flight Operation (Africa and Middle East)
	Mr. Mohamed Ali Al Riyami	Assistant Manager Navigation
	Mr. Kristan Marett	Oman Air
IFALPA	Capt. Arnaud du Bédât	Senior Technical Officer
MIDRMA	Mr. Fareed Al Alawi	MIDRMA Manager

A-5

State/ Org	Contact	Title
ICAO MID	Mr. Mohamed Abubaker Farea	Regional Director
	Mr. Mashhor Alblowi	Regional Officer, Flight Safety RO/FLS
	Mrs. Muna Alnadaf	Regional Officer, Communication, Navigation and Surveillance (RO/CNS)
	Mr. Mohamed Chakib	Regional Officer, Safety Implementation (RO/SAF-IMP)
	Mr. Mohamed Iheb Hamdi	Regional Officer, Aerodromes and Ground Aids (RO/AGA)
	Mr. Radhouan Aissaoui	Regional Officer, Information Management (RO/IM)
	Mr. Ahmed Amireh	Regional Officer, Air Traffic Management and Search and Rescue (RO/ATM/SAR)
	Mr. Ahmad Kavehfarouz	Regional Office, Air Traffic Management (RO/ATM)
	Mrs. Manal Wissa	Programme Analysis Associate
	Mr. Mohamed Hamed	Marketing Assistant
PARIS Office	Mr. Christopher Fenton Keohan	Regional Officer, Air Navigation Systems Implementation (Meteorology, OSG/EUR-NAT)
ICAO HQ	Mr. Martin Maurino	Technical Officer, Global Aviation Safety, ANB/ANS/OPS
	Mr. Elie El Khoury	Technical Officer, Airspace Management and Optimization, ANB/ANS/ATM

- END -