



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**REPORT OF THE SIXTH MEETING OF
THE MIDANPIRG STEERING GROUP**

MSG/6

(Cairo, Egypt, 3 – 5 December 2018)

The views expressed in this Report should be taken as those of the MIDANPIRG Steering Group and not of the Organization. This Report will, however, be submitted to the MIDANPIRG 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

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PART I - HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The Sixth meeting of the MIDANPIRG Steering Group (MSG/6) was held at the Meeting Room of the ICAO Middle East Regional Office in Cairo, Egypt, 3 - 5 December 2018.

2. OPENING

2.1 The meeting was opened by Mr. Mohamed Khalifa Rahma, ICAO Regional Director, Middle East Office, who welcomed the participants to Cairo and wished them a successful and fruitful meeting.

2.2 Mr. Rahma highlighted the importance of the MSG/6 meeting, since the MIDANPIRG/17, which was initially planned to be held in November 2018, was postponed to April 2019; thus the meeting is expected to approve many Conclusions and Decisions emanating from the subsidiary bodies, on behalf of MIDANPIRG.

2.3 Mr. Rahma highlighted the most important subjects to be addressed by the MSG/6 meeting as part of its agenda, in particular, the endorsement of the Second Edition of the MID Air Navigation Report, the review and update of the MID Region Air Navigation Strategy and the review and endorsement of the outcomes of the MIDANPIRG subsidiary bodies related to specific air navigation issues.

2.4 Finally, Mr. Rahma thanked all participants for their attendance wishing them successful and productive meeting.

3. ATTENDANCE

3.1 The meeting was attended by a total of twenty six (26) participants from six (6) States (Bahrain, Egypt, Iran, Qatar, Saudi Arabia and United Arab Emirates) and three (3) Organizations (ACAO, EUROCONTROL and IFAIMA). The list of participants is at **Attachment A**.

4. OFFICERS AND SECRETARIAT

4.1 In the absence of the MIDANPIRG Chairman, Mr. Adel Boresli from Kuwait, the First Vice Chairman, Mr. Ahmed Al Jallaf, Assistant Director General Air Navigation, General Civil Aviation Authority, UAE, chaired the meeting.

4.2 Mr. Mohamed Smaoui, ICAO Middle East Deputy Regional Director was the Secretary of the Meeting, assisted by:

Mr. Elie El Khoury	-	Regional Officer, Air Traffic Management and Search and Rescue (ATM/SAR)
Mr. Abbas Niknejad	-	Regional Officer, Aeronautical Information Management/Air Traffic Management (AIM/ATM)
Ms. Muna Al-Naddaf	-	Regional Officer, Communications, Navigation and Surveillance (CNS)
Mr. Mohamed I. Hamdi	-	Regional Officer, Aerodrome and Ground Aids (AGA)
Mr. Mohamed Chakib	-	Regional Officer, Safety Implementation (SAF-IMP)

5. LANGUAGE

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

6. AGENDA

6.1 The following Agenda was adopted:

Agenda Item 1: Adoption of the Provisional Agenda

Agenda Item 2: Follow-up on the outcome of MIDANPIRG/16

Agenda Item 3: Global and Regional Developments

Agenda Item 4: Air Navigation Safety Matters

Agenda Item 5: Air Navigation Planning and Implementation

5.1 State of Air Transport in the MID Region (aviation statistics for 2017)

5.2 MID Region Air Navigation priorities and targets

5.3 Specific Air Navigation issues

Agenda Item 6: Air Navigation Deficiencies

Agenda Item 7: MIDANPIRG Working Arrangements

Agenda Item 8: Future Work Programme

Agenda Item 9: Any other Business

7. CONCLUSIONS AND DECISIONS – DEFINITION

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

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

8. LIST OF CONCLUSIONS AND DECISIONS

MSG DECISION 6/1: FOLLOW-UP ON THE AN-CONF/13 RECOMMENDATIONS

MSG CONCLUSION 6/2: AMENDMENT TO THE MID eANP VOLUME III

MSG CONCLUSION 6/3: SECOND EDITION OF THE MID REGION AIR NAVIGATION REPORT (2017)

<i>MSG CONCLUSION 6/4:</i>	<i>MID REGION AIR NAVIGATION REPORT (2018)</i>
<i>MSG CONCLUSION 6/5:</i>	<i>MID REGION AIR NAVIGATION STRATEGY</i>
<i>MSG CONCLUSION 6/6:</i>	<i>SURVEY ON ACDM IMPLEMENTATION</i>
<i>MSG CONCLUSION 6/7:</i>	<i>ACDM IMPLEMENTATION</i>
<i>MSG CONCLUSION 6/8:</i>	<i>IMPLEMENTATION OF THE 16TH EDITION OF ANNEX 15 AND THE PANS AIM</i>
<i>MSG CONCLUSION 6/9:</i>	<i>REMOVAL OF PREFIX “U” FROM ROUTE DESIGNATORS</i>
<i>MSG DECISION 6/10:</i>	<i>5LNCs/ICARD REGIONAL REQUIREMENTS</i>
<i>MSG CONCLUSION 6/11:</i>	<i>ICARD ISSUES</i>
<i>MSG DECISION 6/12:</i>	<i>TERMS OF REFERENCE OF THE MID ROUTE DEVELOPMENT WORKING GROUP (MID RDWG)</i>
<i>MSG CONCLUSION 6/13:</i>	<i>MID REGION ATS ROUTE CATALOGUE</i>
<i>MSG DECISION 6/14:</i>	<i>MID ATM CONTINGENCY PLAN ACTION GROUP</i>
<i>MSG CONCLUSION 6/15:</i>	<i>DEFICIENCIES RELATED TO THE NON-SIGNATURE OF CONTINGENCY AGREEMENTS WITH STATES AT THE INTERFACE WITH ICAO MID REGION</i>
<i>MSG CONCLUSION 6/16:</i>	<i>REGIONAL REQUIREMENT FOR AIDC/OLDI IMPLEMENTATION</i>
<i>MSG CONCLUSION 6/17:</i>	<i>AMENDMENT OF THE MID SSR CMP AND MID EANP VOLUME II –TABLE ATM II-MID-2</i>
<i>MSG DECISION 6/18:</i>	<i>TERMS OF REFERENCE OF THE MID ATFM TASK FORCE</i>
<i>MSG DECISION 6/19:</i>	<i>TERMS OF REFERENCE OF THE FIFA WORLD CUP 2022 TASK FORCE</i>
<i>MSG CONCLUSION 6/20:</i>	<i>MID REGION PBN IMPLEMENTATION PLAN</i>
<i>MSG CONCLUSION 6/21:</i>	<i>NATIONAL PBN IMPLEMENTATION PLANS</i>
<i>MSG CONCLUSION 6/22:</i>	<i>MID FLIGHT PROCEDURE PROGRAMME (MID FPP)</i>
<i>MSG CONCLUSION 6/23:</i>	<i>MID REGION SEARCH AND RESCUE IMPLEMENTATION PLAN</i>
<i>MSG CONCLUSION 6/24:</i>	<i>SUPPORT ICAO POSITION TO WRC-19</i>
<i>MSG CONCLUSION 6/25:</i>	<i>FREQUENCY MANAGEMENT WORKSHOP</i>

<i>MSG CONCLUSION 6/26:</i>	<i>REGISTERED FREQUENCY UPDATE</i>
<i>MSG CONCLUSION 6/27:</i>	<i>FREQUENCY MANAGEMENT FOCAL POINTS</i>
<i>MSG CONCLUSION 6/28:</i>	<i>MID CRV REQUIREMENTS</i>
<i>MSG CONCLUSION 6/29:</i>	<i>IMPLEMENTATION OF FILE TRANSFER BODY PART (FTBP)</i>
<i>MSG CONCLUSION 6/30:</i>	<i>THE COMMUNICATION NETWORK FOR IWXXM DATA EXCHANGE</i>
<i>MSG CONCLUSION 6/31:</i>	<i>GUIDANCE ON GNSS IMPLEMENTATION</i>
<i>MSG CONCLUSION 6/32:</i>	<i>MID REGION SURVEILLANCE PLAN AND WORKSHOP</i>
<i>MSG CONCLUSION 6/33:</i>	<i>ATM DATA CYBER SECURITY (ADCS) PORTAL</i>
<i>MSG CONCLUSION 6/34:</i>	<i>CYBER SECURITY AND RESILIENCE SEMINAR</i>
<i>MSG CONCLUSION 6/35:</i>	<i>CYBER SECURITY SUBJECT MATTER EXPERT</i>
<i>MSG CONCLUSION 6/36:</i>	<i>IDENTIFICATION OF INTERNATIONAL AERODROMES FOR WIND SHEAR WARNINGS/ALERTS REQUIREMENT</i>
<i>MSG CONCLUSION 6/37:</i>	<i>MIDANPIRG WORKING ARRANGEMENTS</i>
<i>MSG CONCLUSION 6/38:</i>	<i>STATE LETTERS ONLINE MONITORING TOOL</i>
<i>DRAFT CONCLUSION 6/1:</i>	<i>AVIATION DATA & ANALYSES AND AIRPORTS & AIR NAVIGATION CHARGES SEMINARS/WORKSHOPS</i>
<i>DRAFT CONCLUSION 6/2:</i>	<i>KHARTOUM COM CENTRE</i>

PART II: REPORT ON AGENDA ITEMS**REPORT ON AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA**

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

REPORT ON AGENDA ITEM 2: FOLLOW-UP ON THE OUTCOME OF MIDANPIRG/16***Review of action taken by the ANC on MIDANPIRG/16 Report***

2.1 The subject was addressed in WP/2 presented by the Secretariat. The meeting recalled that MIDANPIRG/16 was held in Kuwait, 13 to 16 February 2017. The meeting noted that the ANC Working Group of the Whole for Strategic Review and Planning presented its review of the reports of the MIDANPIRG/16 and RASG-MID/6 meeting to the Air Navigation Commission (ANC) through AN.2017.WP/9167.

2.2 It was highlighted that the ANC noted that the MID Region 2016 Air Navigation Report includes the first regional report on the status of implementation of priority 1 Block 0 modules as well as an outlook for 2020. It was noted that some States had a significant gap between the current ASBU status and their forecast for 2020. Whilst noting that the 2020 forecasts are based on States' own estimates, which may be overly optimistic, the ANC liked the concept of the report and forecast. It was highlighted that best practices with regards to the reporting of the MID ASBU implementation and forecasts could be harmonised globally in order to facilitate the analysis of current and forecast ASBU implementation.

2.3 With regard to the challenges facing MIDANPIRG and the MID Region in general, the ANC noted that many of these concerns were similar to those of the Asia Pacific (APAC) and NAT-SPG regional reports discussed in the ANC's 206th session, such as SMS/SSP implementation, AIM implementation, SAR implementation, civil-military cooperation, insufficient State resources, and low State participation in PIRG and RASG working level meetings. In this respect, it was highlighted some of the common challenges between the Asia Pacific, Europe and MID Regions, might be addressed by the AIRARD Task Force.

Review status of MIDANPIRG/16 Conclusions and Decisions

2.4 The meeting reviewed the progress made on the implementation of MIDANPIRG/16 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 2A**. The meeting urged States that have not yet done so, to send their replies to the ICAO MID Office State Letters related to the MIDANPIRG/16 Conclusions such as Conclusion 16/5, 16/6, 16/9, 16/15, 16/22 and 16/31.

REPORT ON AGENDA ITEM 3: GLOBAL AND REGIONAL DEVELOPMENTS***Outcome of the Thirteenth Air Navigation Conference (AN-Conf/13)***

3.1 The subject was addressed in WP/3 presented by the Secretariat. The meeting recalled that the Thirteenth Air Navigation Conference (AN-Conf/13) was held in Montréal from 9 to 19 October 2018. The meeting was attended by a total of 1022 participants from 116 Contracting States and 37 observer delegations. The list of the participants and the full report of the Conference can be found on the AN-Conf/13 website at: www.icao.int/meetings/anconf13.

3.2 The meeting noted that the AN-Conf/13 endorsed fifty-two (52) Recommendations, addressing a wide variety of subjects, such as, Air Traffic Management (ATM), Communications, Navigation and Surveillance (CNS), Aeronautical Meteorology, Information Management, Aerodrome, Human Factors, Civil-Military Collaboration, Remotely Piloted Aircraft System (RPAS), Search and Rescue (SAR), Cyber resilience, new operations types, Global Aviation Safety Oversight System (GASOS), State Safety Programme (SSP), Safety Management, Universal Safety Oversight Audit Programme (USOAP), Continuous Monitoring Approach (CMA) and Regional Safety Oversight Organizations (RSOO).

3.3 The meeting reviewed the AN-Conf/13 Recommendations related to air navigation and agreed that the different MIDANPIRG subsidiary bodies should identify clearly the Recommendations related to their terms of reference and agree on the necessary follow-up actions. In addition, the meeting agreed that a Working Paper should be presented by the Secretariat to the MIDANPIRG/17 meeting to propose follow-up actions for assignment to States and the different actors/stakeholders. Accordingly, the meeting agreed to the following MSG Decision:

MSG DECISION 6/1: FOLLOW-UP ON THE AN-CONF/13 RECOMMENDATIONS

That,

- a) the Secretariat present a Working Paper to the MIDANPIRG/17 meeting to propose follow-up actions on relevant AN-Conf/13 Recommendations, for assignment to States and the different actors/stakeholders; and*
- b) the different MIDANPIRG subsidiary bodies should identify clearly the AN-Conf/13 Recommendations related to their terms of reference and agree on the necessary follow-up actions.*

3.4 In connection with the above, it was highlighted that the Joint ACAO/ICAO EUR/NAT and MID ASBU Symposium, which will be held in Marrakech, Morocco, 10-13 December 2018 will include Sessions on the Sixth Edition of the GANP (GANP 2019) and the different ASBU Threads (Technology, Information, Safety and Operational), as well as Panel Discussion on the implementation of Block 0 Modules and the planning for the implementation of Block 1 Modules. Accordingly, the meeting encouraged States to participate actively in this Symposium.

3.5 In the same vein, the meeting recalled that the ANSIG/3 meeting (Cairo, Egypt, 2 – 4 July 2018), through Draft Decision 3/2 established an ad-hoc Working Group to coordinate the development, submission and presentation of joint Working Papers to the AN-Conf/13, on subjects of mutual interest. The ad-hoc Working Group was composed of Egypt, Saudi Arabia, UAE (Rapporteur), ACAO and the ICAO MID Office. The meeting noted with concern that, despite some efforts, this initiative was not very successful, in comparison with the number of papers presented by the different groupings to the AN-Conf/13, such as AFCAC, EU, ECAC and EUROCONTROL. The meeting was informed also that the ACAO ANC/39 meeting (Rabat, Morocco, 29-30 November 2018) invited member States to prepare Draft

Working Papers to be presented under the ACAO umbrella to the Fortieth ICAO General Assembly (A40). These papers will be discussed during the ACAO ANC/40 meeting in April 2019.

3.6 Based on the above, the meeting encouraged States to coordinate through ACAO the submission of joint papers to the A40 addressing subject of mutual interest, such as GANP and ASBU implementation, the MID FPP, etc.

REPORT ON AGENDA ITEM 4: AIR NAVIGATION SAFETY MATTERS AND COORDINATION WITH RASG-MID

RASG-MID ACTIVITIES

4.1 The subject was addressed in WP/4 presented by the Secretariat. The meeting was apprised of the RASG-MID activities. The meeting noted that the MID Annual Safety Report (MID-ASR) Sixth Edition for the period (2012-2016) was endorsed by the RSC/6 meeting (Cairo, Egypt, 25-27 June 2018). The main Focus Areas in the MID Region identified by the RSC/6 meeting based on the 6th ASR are Runway Safety (RS), (mainly RE and ARC during landing); Loss of Control In-Flight (LOC-I) and System Component Failure (SCF). The meeting noted also that the Draft MID Annual Safety Report (MID-ASR) Seventh Edition for the period (2013-2017), was reviewed by the ASRT/3 meeting (Cairo, Egypt, 2-22 December 2018), which agreed to present it to the RASG-MID/7 meeting (Cairo, 18-19 April 2019) for endorsement. Based on the analyses contained in the 7th ASR, the main Focus Areas identified in the MID Region are: Runway Safety (RS); (mainly RE and ARC during landing), Loss of Control Inflight- (LOC-I); Controlled Flight Into Terrain- (CFIT); and Mid Air Collision- (MAC).

4.2 With respect to the Emerging Risks, the meeting noted that the followings were identified and included in the 6th and 7th ASRs: Security risks with impact on safety-SEC; Fire/Smoke-non impact- (F-NI); Runway Incursion- (RI); Birdstrike- (BIRD); Wake Turbulence; System Component Failures- (SCF-NP); and Wildlife (Wild).

4.3 It was highlighted that Runway Incursion and Birdstrike categories would be addressed by the RGS Working Group; and the Mid-Air Collision (MAC) and Turbulence Encounter (TURB) categories would be addressed by the Regional Aviation Safety Team (MID-RAST), under the RASG-MID Framework; and by the ATM SG under the MIDANPIRG Framework.

4.4 The meeting reviewed and noted the consolidated inputs received by the ICAO MID Office from six (6) States related to the number of accidents, incidents and serious incidents related to the identified emerging risks, as reflected in the **Table 1**:

#	Occurrence Category	2015			2016			2017		
		# Accidents	# Serious incidents	# Incidents	# Accidents	# Serious incidents	# Incidents	# Accidents	# Serious incidents	# Incidents
1	CFIT			5			1			5
2	Mid Air Collision (MAC)		35	66		20	66		16	102
3	Fire/Smoke (F-NI)		8	26		2	42		8	30
4	Runway Incursion- (RI)		5	15		2	19		9	17
5	SCF-NP		14	122		9	267		9	257
6	Turbulence Encounter (TURB)	2		326			351		1	325
7	BIRD			119			198			297
8	Wildlife (Wild)			3			7			3

Near Mid Air Collision

4.5 The meeting noted with concern the significant increase in the Near Mid Air Collision incidents (NMACs) and recalled that the ATM-SG/4 agreed on the establishment of an Action Group composed of the ATM SG Chairpersons, Secretariat and experts from Saudi Arabia, UAE and IATA to carry out further analysis of the reported occurrences, based on the safety analyses and recommendations emanating from the SMSs of concerned States, and provide feedback to the MID-ASRT. Accordingly, the meeting urged States to share their occurrences, safety data analysis, and the relevant safety recommendations.

Wake Turbulence

4.6 The meeting reviewed the data shared by IATA on Wake Turbulence at **Appendix 4A** and noticed a significant increase of turbulence encounter occurrences mentioned. In addition, the meeting noted that ATM-SG/4 agreed that the Turbulence Encounter category (TURB) would be breakdown (at the level of the ATM SG) to the monitoring of the component related to Wake Turbulence. Accordingly, the meeting urged States to share their occurrences, safety data analysis, and the relevant recommendations pertaining to wake turbulence.

4.7 The meeting noted that a Regional Safety Advisory (RSA) regarding the wake turbulence is being prepared by the ICAO MID Office and UAE for presentation to the RASG-MID/7 meeting for endorsement.

Strategy for the Enhancement of Cooperation in the Provision of AIG Services in the MENA Region

4.8 The meeting was apprised of the progress achieved in the implementation of the Strategy for the Enhancement of Cooperation in the Provision of AIG Services in the MENA Region at **Appendix 4B** and the Roadmap for AIG Regional Cooperation at **Appendix 4C**. The meeting urged those States that have not yet done so, to reply to the questionnaire on AIG Level 1 of Cooperation, before 15 January 2019, for review by the MID-SST/5 meeting (Cairo, 19-21 February 2019).

REPORT ON AGENDA ITEM 5: AIR NAVIGATION PLANNING AND IMPLEMENTATION**5.1 State of Air Transport in the MID Region (aviation statistics for 2017)**

5.1.1 The subject was addressed in WP/5 presented by the Secretariat. The meeting was apprised of the global state of air transport in 2017; in particular, it was noted that the Total number of passengers carried on scheduled services rose to 4.1 billions in 2017 with an increase of 7.2% compared to 2016 and the total number of departures reached 36.7 million in 2017, with an increase of 3.1% compared to 2016.

5.1.2 According to the latest ICAO long-term air traffic forecasts, the 4.1 billion airline passengers carried in 2017 are expected to grow to about 10.0 billion by 2040, and the number of departures is projected to rise to some 90 million in 2040.

5.1.3 With regard to the MID Region state of air transport in 2017 (scheduled services), the meeting noted that the Region has been the fastest growing region for passenger and cargo traffic since 2011, and airlines in the MID Region have posted double-digit passenger traffic growth every year since 2012 except for 2017 (growth rate of 6.5 per cent compared to 2016). It was also highlighted that International traffic of air carriers in the Middle East represented 95.9% of the airlines' total RPK in 2017.

5.1.4 With regard to the total number of departures, the total number of scheduled commercial departures in 2017 grew at a pace of 5.4 per cent to reach about 1.37 million departures, compared to 1.3 million departures in 2016.

5.1.5 With regard to the long-term forecasts (up-to 2042), the passenger traffic to, from and within the MID Region on the five major route groups concerned is expected to increase at an average annual rate of 5.2 per cent. In 2042, the Middle East-Central South West Asia Route Group is expected to become the largest traffic route group to/from Middle East with an average annual growth rate of 8.2 per cent per annum, followed by Europe-Middle East, North Asia and Pacific South East Asia-Middle East, Africa-Middle East and North America-Middle East Route Groups with growth rates of 2.9 per cent, 3.5 per cent, 4.7 per cent and 3.4 per cent, respectively, for the period concerned.

5.1.6 The meeting recalled that an ICAO Aviation Data and Analyses Seminar was held in Tehran, Iran, 20-23 February 2017; and the ICAO EUR/MID Aviation Data and Analyses Seminar was held in the ICAO EUR/NAT Office, Paris, France, 4 – 6 April 2018. The meeting noted with concern that the level of attendance to both Seminars was very low. The presentations delivered during the Seminars are available at: <https://www.icao.int/MID/Pages/2017/Aviation%20Data%20and%20Analysis%20Seminar.aspx>; and <https://www.icao.int/Meetings/aviationdataseminar/Pages/default.aspx>, respectively.

5.1.7 The meeting was informed also that a Joint ACAO/IATA/ICAO Workshop on Airports and Air Navigation Charges was successfully held in Rabat, Morocco, 27-28 November 2018.

5.1.8 The meeting noted that the ICAO Aviation Data and Analyses and the Airports and Air Navigation Charges Seminars/Workshops do not address only the air traffic statistics, forecasts and connectivity, but also provide a forum for all aviation stakeholders to foster dialogue on the development of an economically viable civil aviation system (airlines, airports, air navigation services providers, etc.) and enhancement of its economic efficiency and transparency, while facilitating access to funding for aviation infrastructure and other investment needs, technology

transfer and capacity building to support the growth of air transport and for the benefit of all stakeholders. These events aim also to promote the use of the ICAO tools related to aviation data analysis to facilitate data-driven decision-making.

5.1.9 Based on the above, the meeting agreed that the ICAO Aviation Data and Analyses and the Airports and Air Navigation Charges Seminars/Workshops should be organized on regular basis; and encouraged States to participate actively in these events. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 6/1: AVIATION DATA & ANALYSES AND AIRPORTS & AIR NAVIGATION CHARGES SEMINARS/WORKSHOPS

That, in order to foster dialogue on the development of an economically viable civil aviation system (airlines, airports, air navigation services providers, etc.) and enhance its economic efficiency and transparency:

- a) ICAO organize jointly with ACAO on regular basis the Aviation Data and Analyses and the Airports and Air Navigation Charges Seminars/Workshops; and*
- b) States are encouraged to participate actively in these events.*

5.2 MID Region Air Navigation priorities and targets

ASBU Implementation Monitoring

Update to the MID eANP Volume III

5.2.1 The subject was addressed in WP/6 presented by the Secretariat. The meeting agreed to the changes to the MID eANP Vol III, proposed by the AIM SG/4, ATM SG/4, CNS SG/8 and MET SG/7 meetings (Tables B0-ACDM, B0-DATM, B0-FICE, B0-FRTO, B0-NOPS, B0-ACAS, B0-SNET and B0-AMET), as reviewed by the ANSIG/3 meeting, at **Appendix 5.2A**. Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/2: AMENDMENT TO THE MID eANP VOLUME III

*That, the amendment to the MID eANP Volume III at **Appendix 5.2A** is approved.*

5.2.2 The meeting was informed that the RGS WG/5 agreed that the Table B0-SURF 3-1 should be reviewed and improved to support a good monitoring and reporting related to the status of implementation of A-SMGCS Level 1 and 2. This will be done by the RGS WG/6 meeting in November 2019.

Second Edition of the MID Air Navigation Report (2017)

5.2.3 The meeting recalled that the MIDANPIRG/16 meeting agreed that States should provide the ICAO MID Office with relevant data necessary for the development of the Second Edition of the MID Region Air Navigation Report (2017).

5.2.4 The meeting recalled that the ANSIG/3 meeting reviewed and updated the Second Edition of the MID Air Navigation Report (2017) consolidated by the Secretariat; and urged States to provide necessary inputs/updates to the ICAO MID Office, in order to present the Final version of the Report for endorsement by MSG/6.

5.2.5 The meeting reviewed and endorsed the Second Edition of the MID Region Air Navigation Report (2017) at **Appendix 5.2B**.

5.2.6 The meeting noted that the Methodology for the estimation of environmental benefits accrued from the implementation of priority 1 Block 0 Modules in the MID Region, developed by the Secretariat at **Appendix 5.2C**, has been used for the estimation and reporting of environmental benefits in the Second Edition of the MID Air Navigation Report (2017). Additional Details about the Methodology (explanation of assumptions, calculations, etc.) is at **Appendix 5.2D**.

5.2.7 The meeting noted that Bahrain, Egypt, Jordan, Lebanon, Qatar, Sudan and UAE made a good progress in the implementation of the priority 1 ASBU Block 0 Modules. From a regional perspective, the progress for the implementation of B0-SNET, B0-AMET and B0-ACAS is very good. However, the progress for the implementation of B0-ACDM, B0-CDO and B0-CCO is far below expectation.

5.2.8 Based on the above, the meeting agreed on the following MSG Conclusion:

MSG CONCLUSION 6/3: SECOND EDITION OF THE MID REGION AIR NAVIGATION REPORT (2017)

That, the Second Edition of the MID Region Air Navigation Report (2017) at Appendix 5.2B is endorsed.

Third Edition of the MID Region Air Navigation Report (2018)

5.2.9 The meeting agreed that the ICAO MID Office should start the development of the Third Edition of the MID Region Air Navigation Report (2018), beginning of 2019. Therefore, States should provide the ICAO MID Office, with necessary data by **15 February 2019**. Accordingly, the meeting agreed on the following MSG Conclusion:

MSG CONCLUSION 6/4: MID REGION AIR NAVIGATION REPORT (2018)

That, MID States be urged to provide the ICAO MID Office, with relevant data necessary for the development of the Third Edition of the MID Region Air Navigation Report (2018), by 15 February 2019.

MID Region Air Navigation Strategy

5.2.10 The subject was addressed in WP/7 presented by the Secretariat. The meeting noted that the MID Region Air Navigation Strategy (MID Doc 002) endorsed by MIDANPIRG/16, was further reviewed by the MIDANPIRG subsidiary bodies and some amendments have been proposed and supported by the ANSIG/3 meeting. Accordingly, the meeting agreed to the following changes:

- deletion of the elements “National AIM implementation plan/roadmap”, eTOD and Digital NOTAM from the list of Elements of B0-DATM in the MID Air Navigation Strategy; and inclusion of a new element related to the agreements with data originators;
- update of the parts related to B0-FRTO, B0-NOPS, B0-FICE and B0-SNET;
- deletion of the element “PBN plans” from B0-APTA; and
- addition of a new element related to OPMET to B0-AMET.

5.2.11 The meeting recalled that, considering the progress related to ADS-B and MLAT implementation in the MID Region, the CNS SG/8 meeting proposed to change the B0-ASUR from priority 2 to priority 1. However, the meeting agreed with the ANSIG/3 that, prior to changing the priority of B0-ASUR from 2 to 1, it was necessary for the CNS SG to agree on the elements, applicability area, performance indicators/supporting metrics and their associated targets. Similarly, the meeting agreed that the MET SG/8 meeting should consider the inclusion of the wind shear as an element of the B0-AMET in the MID Air Navigation Strategy with well identified applicability area (list of International Airports requiring implementation of wind shear systems).

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

MSG CONCLUSION 6/5: MID REGION AIR NAVIGATION STRATEGY

That, the revised MID Region Air Navigation Strategy (MID Doc 002, Edition December 2018) at Appendix 5.2E is endorsed.

5.3 Specific Air Navigation issues

AOP Matters

5.3.1 The subject was addressed in WP/9, presented by the Secretariat.

Airport Master Plan

5.3.2 The meeting underlined that the Airport Master Plan is a document that presents the short-term (1-5 years), intermediate-term (6-10 years) and long-term (10-20 year) development\goals of an airport and is typically evaluated and updated every 5 to 10 years. It was recalled that new ICAO provisions on airport planning have been proposed to be included in Annex 14, Volume I and PANS Aerodromes, to support the provision of airport capacity enhancements.

5.3.3 The meeting noted that the Airport Master Plan Task Force (AMPTF) had been established by the Aerodrome Design and Operations Panel (ADOP) and tasked with a complete rewrite of the obsolete guidance contained in Doc 9184, Airport Planning Manual, Part 1 - Master Planning.

A-CDM Implementation

5.3.4 The subject was addressed in WP/9, presented by the Secretariat. The meeting recalled that the ANSIG/3 meeting raised concern about the slow progress in the implementation of A-CDM and requested that an A-CDM Workshop be organized by the ICAO MID Office in 2019.

5.3.5 The meeting agreed that States should develop an action plan for the A-CDM implementation in line with the MID Air Navigation Strategy (according to the applicability area included in the MID Air Navigation Strategy).

5.3.6 Based on the above, the meeting agreed to the following MSG Conclusions to replace and supersede the MIDANPIRG/16 Conclusion 16/6:

MSG CONCLUSION 6/6: SURVEY ON ACDM IMPLEMENTATION

That,

- a) *concerned States (according to the B0-ACDM applicability area included in the MID Air Navigation Strategy) be urged to provide the ICAO MID Office with the contact details of their designated ACDM Focal Points; and*
- b) *a Survey on ACDM implementation be carried out for the monitoring of ACDM implementation, using the template at **Appendix 5.3A**.*

MSG CONCLUSION 6/7: ACDM IMPLEMENTATION

That,

- a) *an ACDM Implementation Workshop be organized by the ICAO MID Office jointly with ACAO in 2019; and*
- b) *States be urged to develop an action plan for A-CDM implementation in line with the MID Air Navigation Strategy.*

Aerodrome Certification

5.3.7 The meeting was apprised of the status of implementation of Aerodrome Certification as at **Appendix 5.3B**.

AIM Matters

5.3.8 The subject was addressed in WP/8, presented by the Secretariat.

16th Edition of Annex 15 and the new PANS AIM

5.3.9 The meeting recalled that, taking into consideration the major changes introduced by the Amendment 16 to the Annex 15 and the new PANS AIM, an Interregional EUR/MID Workshop on PANS AIM was successfully conducted at the ICAO EUR/NAT Office in Paris, France, from 10 to 12 July 2018. The objectives of the Workshop were to introduce the new PANS-AIM (Doc 10066) and latest Amendments to Annex 15; and address associated challenges and share best practices for a timely implementation of the new provisions, including the implementation of digital datasets.

5.3.10 The meeting noted that, in line with the Workshop Recommendations, the Secretariat has prepared analysis of changes (compliance checklist) of the 16th Edition of Annex 15, as at **Appendix 5.3C**. This spreadsheet would help States with transposition of the requirements and identification of differences with the Annex 15 SARPs. A similar compliance checklist will be developed/distributed as soon as the final/official version of the PANS AIM is available.

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

**MSG CONCLUSION 6/8: IMPLEMENTATION OF THE 16TH EDITION OF ANNEX 15
AND THE PANS AIM**

That, States be urged to:

- a) *take necessary actions on the implementation of the 16th Edition of Annex 15 and the PANS AIM, including:*

- updating AIS/AIM National Regulations;
- identification and notification of differences (EFOD and AIP GEN 1.7), if any;
- coordination with their AISPs to develop necessary operational procedures/practices in order to implement the provisions of Annex 15 and the PANS AIM;

b) provide feedback to the ICAO MID Office on the implementation of the 16th Edition of Annex 15 and the PANS AIM (Implementation Plan, difficulties/challenges, need for assistance, etc).

5.3.12 The meeting urged States to actively participate in the Regional Workshop on the implementation of 16th Edition of Annex 15 and PANS AIM, which is scheduled to be held in Cairo, concurrently with the AIM SG/5 meeting, 22-24 January 2019.

MID Region AIM Implementation Roadmap

5.3.13 The meeting recalled that the AIM SG/3 meeting updated the MID Region AIM Roadmap and agreed that some AIM Phase 3 steps should be included in the Roadmap.

5.3.14 The meeting noted that, with the introduction of new provisions of Annex 15 and the PANS AIM, there would be a need to adjust the Roadmap with those provisions, in particular the digital datasets. Accordingly, the meeting tasked the AIM SG to update the MID Region AIM Implementation Roadmap in order to include the provisions of the 16th Edition of Annex 15 and the PANS AIM.

ATM Matters

5.3.15 The subject was addressed in WP/10 presented by the Secretariat. The meeting was apprised of the outcome of the ATM SG/3, ATM SG/4 meetings as well as the outcome of the ANSIG/3 meeting related to ATM.

ATS Route Network

5.3.16 The meeting commended States and stakeholders for the excellent cooperation and their commitment to improve the ATS route network in the MID Region.

5.3.17 The meeting congratulated UAE and Sudan for the successful implementation of the new airspace restructuring project on 7 December 2017 within Emirates FIR and 26 April 2018 within Khartoum FIR.

5.3.18 The meeting recalled that the ATM SG/4 meeting recognized that the prefix “U” (Routes in Upper Airspace) has been misused, which is leading to confusion. In most cases, the limits of Upper ATS Routes are beyond the limits of the upper Airspaces, which are not clearly defined by some States.

5.3.19 The meeting, based on the outcome of the ATM SG/4 meeting, agreed that the prefix “U” be removed from route designators providing that the limits of the ATS routes be clearly published in the AIPs. The meeting recognized the need for the optimization of the route designators in the MID Region. Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/9: REMOVAL OF PREFIX “U” FROM ROUTE DESIGNATORS

That,

- a) *States take necessary measures to remove the prefix “U” from the route designators published in their AIPs to be completed by December 2020;*
- b) *a Proposal for Amendment to the MID eANP Volume II-Specific Regional Requirements - Table ATM II-MID-1 - MID Region ATS Routes be processed to remove the prefix ‘U’; and*
- c) *States support the MID Office to optimize the use of route designators in the MID Region.*

ICAO International Codes and Route Designators (ICARD)

5.3.20 The meeting recalled that the following issues related to ICARD/5LNCs were addressed by the ATM and AIM Sub-Groups:

- publication in National AIPs of 5LNCs, which have not been registered in ICARD;
- 5LNCs duplicates (5LNCs used in more than one State);
- sound-like proximity;
- 5LNCs registered in ICARD but not used;
- increasing demand of 5LNCs for terminal use (SIDs, STARs, IAPs);
- shortage of available 5LNCs for allocation;
- coordination of 5LNCs used as FIR BDRY with the neighboring States; and
- ICARD system/platform issues.

5.3.21 The meeting noted that ICAO has launched a new ICARD platform in March 2017 to resolve the issues faced with the old ICARD system. The new system is more user-friendly with improved database, menus and functions, including the MAP function.

5.3.22 The meeting, based on the outcomes of the AIM and ATM Sub-Groups meetings, underlined the need to use the alphanumeric codes for terminal airspace in accordance with PANS-OPS (Doc 8168) provisions and agreed to mandate the use of ICARD as the only mean for managing 5LNCs through the amendment of the MID eANP. Accordingly, the meeting agreed to the following MSG Decision and MSG Conclusion:

MSG DECISION 6/10: 5LNCs/ICARD REGIONAL REQUIREMENTS

That, the Secretariat process a Proposal for Amendment to the MID eANP Volume II-Specific Regional Requirements to mandate the use of ICARD as the only means for managing 5LNCs; and the alphanumeric codes for terminal airspace, in accordance with PANS-OPS (Doc 8168) provisions.

MSG CONCLUSION 6/11: ICARD ISSUES

That,

- a) *States be urged to take necessary actions on the resolution of the issues related to ICARD/5LNCs, including:*
 - i. *registration of all 5LNCs published in AIP into ICARD;*
 - ii. *5LNCs duplicates;*
 - iii. *Non-ICAO codes;*
 - iv. *sound-like proximity;*
 - v. *release of unused registered 5LNCs; and*
 - vi. *use of Alphanumeric codes for terminal airspace, in accordance with PANS-OPS (Doc 8168) provisions.*
- b) *Users (IATA, IFALPA, Jeppesen, etc.) are invited to report issues related to ICARD/5LNCs in the MID Region to the ICAO MID Office; and*
- c) *an air navigation deficiency be filed against those States that are not complying with Annex 11 and Doc 8168 provisions related to 5LNCs.*

MID Route Development Working Group (RDWG) Activities

5.3.23 The meeting recalled that MIDANPIRG/16, through Decision 16/17, established the MID RDWG. The meeting reviewed and endorsed the Terms of Reference (TORs) of the RDWG at **Appendix 5.3D**, which were developed by the ATM SG/3 meeting, through the following MSG Decision:

**MSG DECISION 6/12: TERMS OF REFERENCE OF THE MID ROUTE
DEVELOPMENT WORKING GROUP (MID RDWG)**

*That, the MID RDWG Terms of Reference at **Appendix 5.3D** are endorsed.*

5.3.24 The meeting commended the work of the RDWG in particular related to the development of the new MID Region ATS Route Catalogue, which was reviewed and endorsed by the ATM SG/4 meeting. Accordingly, the meeting agreed to the following MSG Conclusion emanating from the ATM SG/4 meeting:

MSG CONCLUSION 6/13: MID REGION ATS ROUTE CATALOGUE

That,

- a) *the MID Region ATS Route Catalogue at **Appendix 5.3E** is endorsed and be published on the ICAO MID and IATA MENA websites; and*
- b) *IATA is responsible to maintain the Catalogue up-to-date through the agreed process and the MID RDWG framework.*

5.3.25 Taking into consideration that several efforts are taking place to improve the ATS Route Network at national and cross-border levels, the meeting invited States to use the MID RDWG as a platform to facilitate bilateral and multilateral coordination.

Contingency Planning

5.3.26 The meeting commended States and Stakeholders for their commitment and excellent cooperation that ensured the success of the Contingency Coordination Team (CCT) framework.

5.3.27 The meeting noted that some of the world's largest carriers along with many international carriers operating within close proximity to each other at international hubs in the MID Region, during periods of disruption, including weather or ATC capacity limitations often lead to significant delays, diversion and unprecedented levels of airborne holding. This would require the development of a Demand Versus Capacity management program during periods of disruption to be published by States, as applicable.

5.3.28 The meeting recalled that the ATM SG/3 meeting through Draft Decision 3/4 established the MID ATM Contingency Plan Action Group to carry out a comprehensive review of the MID Region ATM Contingency Plan (MID Doc 003), taking into consideration the experience gained, the latest developments, and to include in the revised version measures and procedures enabling the CCTs to deal with airports and airspace disruptions due to weather or other factors in a timely and effective manner. The meeting agreed that the Action Group be composed of ATM experts from Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, UAE, AACO, IATA and ICAO.

5.3.29 Based on the above, the meeting agreed to the following MSG Decision:

MSG DECISION 6/14: MID ATM CONTINGENCY PLAN ACTION GROUP

That, the MID ATM Contingency Plan Action Group, composed of ATM experts from Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, UAE, AACO, IATA and ICAO, be established to carry out a comprehensive review of the MID Region ATM Contingency Plan (MID Doc 003).

5.3.30 Taking into consideration that the signature of contingency agreements is a regional requirement in the MID Region and it is not mandated in the adjacent Regions, the meeting agreed that the signature of the contingency agreements with ACCs of the States at the interfaces with the ICAO MID Region be considered as "recommended" and not mandatory. Therefore, the meeting agreed that the deficiencies reported against the States at the interfaces for non-signature of contingency agreements should be removed.

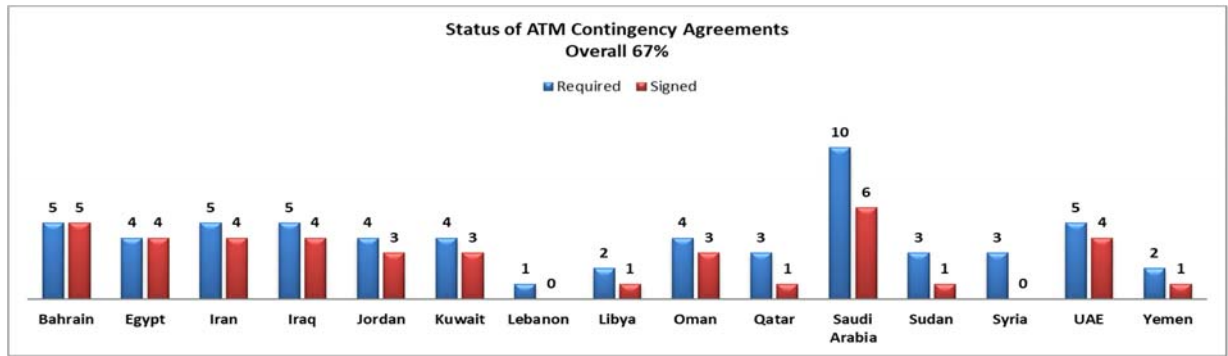
5.3.31 The meeting noted that the above requirement should be reflected in the MID eANP, Volume II Part IV under Specific Regional Requirements. Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/15: DEFICIENCIES RELATED TO THE NON-SIGNATURE OF CONTINGENCY AGREEMENTS WITH STATES AT THE INTERFACE WITH ICAO MID REGION

That,

- a) the MID eANP Volume II-Part IV (ATM) be amended to reflect the regional requirements related to the signature of ATM Contingency Agreements; and*
- b) the deficiencies related to the non-signature of contingency agreements with the States at the interfaces with the ICAO MID Region be removed.*

5.3.32 The meeting reviewed the status of signed contingency agreements between adjacent ACCs at **Appendix 5.3F**, which is reflected in the **Graph** below:



AIDC/OLDI

5.3.33 The meeting reviewed the status of implementation of AIDC/OLDI in the MID Region as at **Appendix 5.3G** and noted with concern that the level of implementation is still far beyond the acceptable level. The meeting noted that based on the Questionnaire circulated by the MID Office, the following challenges have been identified:

- adjacent State(s) not ready to implement AIDC/OLDI;
- no response from adjacent State(s);
- ATM system does not support AIDC/OLDI as reported by two (2) States; and
- technical problems; and
- no common protocol supported by all ATM systems in the MID Region (Incompatibilities issues).

5.3.34 The meeting noted with appreciation that Oman organized a 2-day AIDC/OLDI familiarization workshop, from 4 to 5 September 2018 to assist Jordan establishing AIDC/OLDI connections. In this respect, the meeting urged States to initiate communication for AIDC/OLDI connections taking into consideration other States' experiences and use the guidance provided in the MID Doc 006 available on the ICAO MID Website.

5.3.35 The meeting recognized that the implementation of AIDC/OLDI would improve significantly the coordination process and would reduce the amount of coordination failures between ACCs, which has been identified as a major long-standing issue by the MIDRMA Board. Consequently, the implementation of AIDC/OLDI would enhance safety and reduce ATC workload.

5.3.36 The meeting noted with appreciation that Bahrain and UAE implemented OLDI on 2 July 2017 and Muscat and UAE on 12 March 2018. Bahrain and UAE shared their experience highlighting the advantages and the benefits gained from the OLDI connections. UAE informed the meeting that a reduction in coordination failures by 60% between 2010 and 2017 was achieved which directly contributes to the enhancement of safety.

5.3.37 The meeting agreed with the applicability area for the AIDC/OLDI at **Appendix 5.3G**, as defined by the ATM SG/4 meeting. The meeting agreed that a requirement for AIDC/OLDI implementation (priority 1 interconnections) should be included in the MID eANP Volume II Part IV-ATM, under Specific Regional Requirements.

5.3.38 Based on the above, the meeting agreed to following MSG Conclusion emanating from ANSIG/3 meeting:

MSG CONCLUSION 6/16: REGIONAL REQUIREMENT FOR AIDC/OLDI IMPLEMENTATION

That, a Proposal for Amendment to the MID eANP Volumes II – Part IV-ATM related to the requirement for AIDC/OLDI implementation (priority 1 interconnections) be processed in accordance with the standard procedure for amendment.

SSR Codes Issues at the EUR/MID Interface

5.3.39 The meeting recalled that the Secondary Surveillance Radar (SSR) Code in the MID Region are managed through the MID SSR Code Management Plan (CMP), which was developed based on the study carried out by EUROCONTROL on the MID Regional traffic patterns for the month of June 2009. The meeting recognized the need to review the initial study from 2009 in the future, taking into consideration the expected traffic growth.

5.3.40 The meeting noted that the ICAO Paris Office and EUROCONTROL approached ICAO MID Office concerning the interference of SSR Codes used by States at the interface between the ICAO EUR and MID Regions, in particular the Codes Series used by Greece, Libya and Malta. In order to resolve the issue, the meeting agreed to change the Transit SSR Series allocated to Libya from A2001-2077 to A7100-7177. The meeting also agreed to allocate the Domestic Code Series 2300-2377 to Qatar.

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

MSG CONCLUSION 6/17: AMENDMENT OF THE MID SSR CMP AND MID eANP VOLUME II –TABLE ATM II-MID-2

That,

- a) ICAO process a Proposal for Amendment of the MID eANP Volume II-Table ATM II-MID-2 — MID SSR Code Allocation List, to reflect the changes at Appendix 5.3H; and*
- b) the revised version of MID SSR CMP (MID Doc 005) at Appendix 5.3I is endorsed.*

First Meetings of the Air Traffic Flow Management and FIFA World Cup 2022 Task Forces

5.3.42 The subject was addressed in WP/11 presented by the Secretariat. The meeting reviewed the outcomes of the First Meeting of the Air Traffic Flow Management Task Force (ATFM TF/1) and FIFA World Cup 2022 Task Force (FWC2022 TF/1), which were held back-to back in Muscat, Oman from 23 to 26 September 2018.

5.3.43 The meeting recalled that the ATFM TF was established by MIDANPIRG/16 (Kuwait, 13 – 16 February 2017) through MIDANPIRG Decision 16/16, based on the recommendation of the ATFM Seminar (Dubai, UAE, from 13 to 15 December 2016) to develop an ATFM Concept of Operations for the MID Region.

5.3.44 The meeting commended the contribution provided by India, USA, AEROTHAI, CANSO, EUROCONTROL, IATA, MAAR and MIDRMA to the ATFM TF/1 and FWC2022 TF/1 meetings, and for their commitment to support the MID Region in this endeavor.

5.3.45 Taking into consideration the challenges, the work and resources required, and other experiences, the meeting agreed with the ATFM TF/1 meeting that at this stage it would not be possible to develop an ATFM CONOPS without the assessment of the MID Region ATFM Capabilities. Accordingly, the meeting agreed to the roadmap for the development of the CONOPS developed by the ATFM TF/1 meeting.

5.3.46 The meeting noted that the MID Office circulated a Questionnaire based on the one used in ASIA Pacific and the Americas, which would be considered as basis for the actions that will be undertaken by the ATFM TF. The deadline for inputs was 30 November 2018. However, only Bahrain, Jordan, Qatar, Saudi Arabia, Sudan and UAE replied to the Questionnaire. Accordingly, the meeting urged States, if not yet done so, to complete the Questionnaire and return it back to the ICAO MID Office not later than **15 December 2018**.

5.3.47 The meeting noted that the ATFM TF/1 meeting established the ATFM Core Team composed of experts from; Bahrain, India, Oman, Qatar, Saudi Arabia, UAE, USA, AEROTHAI, ACAO, CANSO, EUROCONTROL, IATA and ICAO. The Core Team will follow-up on the agreed actions by the ATFM TF, would conduct Teleconferences with some States based on the responses to the Questionnaire and develop a Draft CONOPS for ATFM. The first meeting of the Core Team will be hosted by UAE in Abu Dhabi, 22-24 January 2019.

5.3.48 The meeting reviewed and endorsed the TORs of the ATFM TF at **Appendix 5.3J**, which were developed by the ATM SG/3 meeting and updated by the ATFM TF/1 meeting. Accordingly, the meeting agreed to the following MSG Decision:

**MSG DECISION 6/18: TERMS OF REFERENCE OF THE MID ATFM TASK
FORCE**

*That, the MID ATFM Task Force Terms of Reference at **Appendix 5.3J** are endorsed.*

5.3.49 The meeting recalled that MIDANPIRG/16 noted that Qatar will be hosting the World Cup tournament in 2022, which will have an impact on the airspace capacity in the MID Region. The meeting recognized the need for a collaborative action plan to accommodate the expected significant increase in air traffic, in a safe and efficient manner, with the participation of all concerned States and stakeholders, taking into consideration similar experiences, such as Brazil and South Africa World Cups, Athena Olympic Games, Hajj, etc. The meeting noted also that other major events are planned to be held in the Region, such as, the EXPO 2020 in UAE.

5.3.50 Based on the above, the MIDANPIRG/16 meeting established the World Cup 2022 Task Force to develop and follow-up the implementation of a collaborative action plan to accommodate the expected high increase in traffic, in a safe and efficient manner, taking into consideration similar experiences. The Task Force was also tasked to address other major events such as the EXPO 2020. With a view to avoid confusion with other events related to World Cups, the meeting agreed that naming of World Cup 2022 Task Force be changed to FIFA World Cup 2022 task Force (FWC2022 TF).

5.3.51 The FWC2022 TF/1 meeting was apprised of other similar experiences that took place in Europe, South Africa and USA. Qatar presented an update on the level of preparation highlighting some of the challenges that require the implementation of regional solution to enable the MID Region to accommodate safely and efficiently the increase of traffic during the World Cup 2022.

5.3.52 The FWC2022 TF/1 meeting recognized the need to establish regional collaborative mechanism to address the issues associated with excepted increase of traffic during the World Cup 2022 and other major events, which would have major impact on the traffic within and outside the MID Region.

5.3.53 The meeting agreed that the FWC2022 TF and ATFM TF should be working in the most effective and collaborative manner.

5.3.54 The meeting reviewed and endorsed the TORs of the FWC2022 TF at **Appendix 5.3K**, which were developed by the ATM SG/4 meeting and updated by the FWC2022 TF/1 meeting. Accordingly, the meeting agreed to the following MSG Decision:

**MSG DECISION 6/19: TERMS OF REFERENCE OF THE FIFA WORLD CUP
2022 TASK FORCE**

That,

a) the name of the World Cup 2022 TF be changed to FIFA World Cup 2022 TF (FWC2022 TF); and

*b) the FWC2022 TF Terms of Reference at **Appendix 5.3K** are endorsed.*

5.3.55 The meeting noted that Qatar offered to host the ATFM TF/2 back-to-back with the FWC2022 TF/2 meetings in Doha from 24 to 27 February 2018. Accordingly, the meeting encouraged States to support the work carried out by the ATFM TF and FWC2022 TF and actively participate in the ATFM TF/2 and FWC2022 TF/2 meetings.

Performance Based Navigation (PBN) Matters

5.3.56 The subject was addressed in WP/17 presented by the Secretariat. The meeting reviewed the outcome of the PBN SG/3 meeting (Cairo, Egypt, 11-13 February 2018) and the outcomes of the CNS SG/8, ATM SG/4 and ANSIG/3 meeting relevant to PBN.

MID Region PBN Implementation Plan

5.3.57 The meeting noted that the PBN SG/3 meeting (reviewed and updated the MID Region PBN Implementation Plan (MID Doc 007) parts related mainly to terminal airspace. Chapter 2 of the Plan (CNS Infrastructure) was reviewed and updated by the CNS SG/8 meeting. The ATM SG/4 meeting reviewed and updated the Plan parts related to en-route. The revised plan was circulated to States for their review and inputs in order for the Secretariat to present a consolidated version to the MSG/6 meeting for endorsement.

5.3.58 The meeting reviewed and endorsed the MID Region PBN Implementation Plan (MID Doc 007) - Edition December 2018 at **Appendix 5.3L** through the following MSG Conclusion:

MSG CONCLUSION 6/20: MID REGION PBN IMPLEMENTATION PLAN

*That the MID Region PBN Implementation Plan (MID Doc 007) - Edition December 2018 at **Appendix 5.3L** is endorsed and be published on the ICAO MID website.*

5.3.59 The meeting reiterated MSG Conclusion 4/11 and urged States to provide the ICAO MID Office with their updated National PBN Implementation Plans by end of each year.

5.3.60 Taking into consideration that the airspace users plan the equipage of their fleet based on the operation requirements as well as the air navigation services provided, it was recognized that the States' National PBN Plans would support the airspace users in their planning process. Accordingly, the meeting agreed that the States' National PBN Implementation Plan be published on the MID Office website to facilitate consultation and planning of airspace users.

5.3.61 Based on the above the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/21: NATIONAL PBN IMPLEMENTATION PLANS

That, the States' National PBN Implementation be published on the ICAO MID website to facilitate consultation and planning of the airspace users.

MID Flight Procedure Programme (MID FPP)

5.3.62 The meeting recognized that the MID FPP would be the ultimate solution to support States at national level in meeting their obligations related to PANS-OPS (regulatory and service provision) through an effective resource sharing approach under ICAO umbrella. It was noted that the envisaged date for start of operation of the Programme is January 2019.

5.3.63 It was highlighted that based on the outcome of the MID FPP Kick-off meeting (Cairo, Egypt, 22 – 24 January 2018), the MID Office circulated the consolidated draft MID FPP Project Document for States review through State Letter AN 6/33 – 18/144 dated 9 May 2018 at **Appendix 5.3M**. Only, Jordan and Lebanon provided feedback. The MID Office sent follow-up Letters on 15 November 2018 with a new deadline for comments **15 December 2018**.

5.3.64 The meeting noted with appreciation that the PBN OPS-Approval Course was conducted at the MID FPP premises in Beirut from 26-30 November 2018 free of charge as in-kind contribution from IATA to the MID FPP; twenty-two (22) experts from the Region benefited from the course.

5.3.65 The meeting recalled that in order to start the recruitment of the Manager for the MID FPP by ICAO TCB and formally start operation, it is required that five (5) States sign the MID FPP Project Document with ICAO and that USD300,000 be secured in the Programme's bank account at ICAO. Currently, USD100,000 were provided by Saudi Arabia and UAE and ICAO MID Office is working on some additional options for resource mobilization.

5.3.66 States have been invited to provide advance payments that will be deducted from their annual financial contributions for the coming years to expedite the launching of the project.

5.3.67 It was underlined that the MID FPP funding mechanism including the exact amount of the financial annual contributions will be agreed upon by the MID FPP Steering Committee. It was noted that States' advance financial contributions to the MID FPP will not be used without the MID FPP Steering Committee Decision.

5.3.68 Based on the above, the meeting urged States to join the MID FPP and benefit from its services. Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/22: MID FLIGHT PROCEDURE PROGRAMME (MID FPP)

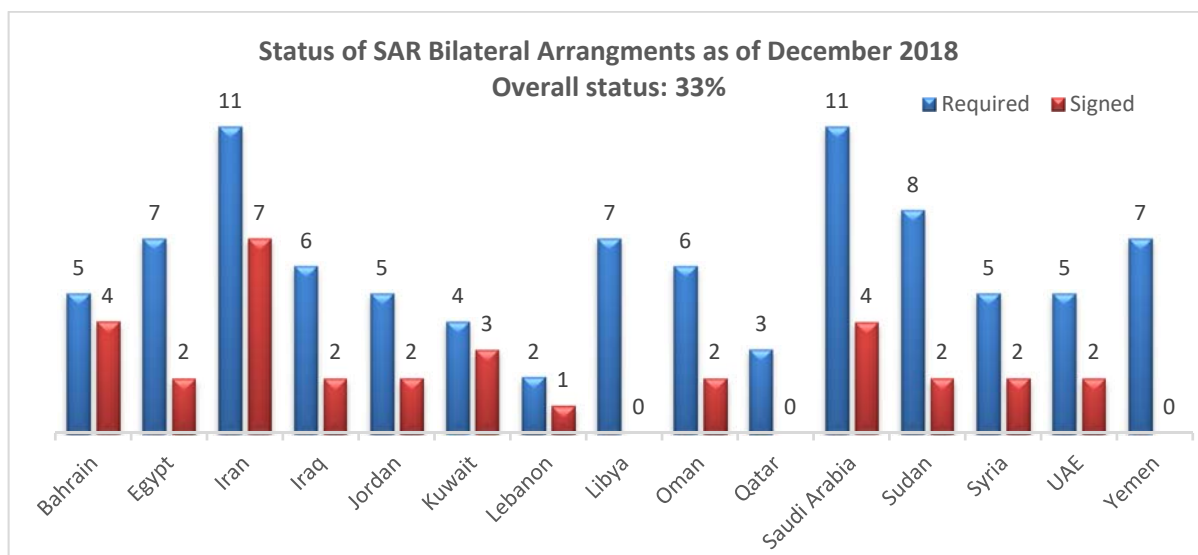
That, States that have not yet done so, be urged to respond to the MID Office State Letter related to the MID FPP, join and support the Programme to benefit from its services.

Search and Rescue (SAR) Matters

5.3.69 The meeting noted that SAR main USOAP-CMA findings in the MID Region are related to lack of:

- effective SAR oversight activities;
- English language proficiency for RCC radio operators;
- appropriate training programmes/plans of SAR experts;
- signature of SAR agreements;
- plans of operations for the conduct of SAR operations and SAR exercises;
- provision of required SAR services; and
- non-compliance with the carriage of Emergency Locator Transmitter (ELT) requirements.

5.3.70 The meeting reviewed and updated the status of SAR bilateral Arrangements as at **Appendix 5.3N**, which is also reflected in the following the **Graph** below:



Graph 2

5.3.71 The meeting recalled that MIDANPIRG/16 meeting urged States to implement the relevant recommendations emanating from the ICAO AFI/APAC/MID Regional and Inter-regional SAR Workshop (Mahe, Seychelles, 19 - 22 July 2016). Based on the success of the Workshop, it was agreed to organize the SAR Inter-Regional Workshop between the 4 ICAO Regions each 2 years and on rotation basis. In this respect, the meeting encouraged States (Regulators, ANSPs and Military) to participate in the Inter-Regional Workshop, which is tentatively planned to be held in Salalah, Oman, from 1 to 4 July 2019.

5.3.72 The meeting reviewed and endorsed the MID SAR Implementation Plan developed by the MID SAR Action Group (SAR AG) at **Appendix 5.30**, which includes guidance material to support States to comply with global and regional requirements for SAR provisions. The Plan includes also the Matrix that will be used for the analysis of the SAR status of implementation in the MID Region and Templates related to the conduct of SAREX.

5.3.73 The meeting commended the work of the Action Group and agreed to the following MSG Conclusion:

MSG CONCLUSION 6/23: MID REGION SEARCH AND RESCUE IMPLEMENTATION PLAN

*That, the MID Region Search and Rescue Implementation Plan at **Appendix 5.30** is endorsed as MID Doc 010 and to be published on the ICAO MID website.*

5.3.74 The meeting urged States to keep up-to-date their SAR Point of Contact (SPOC) contact details in their AIPs (GEN 3.6) and on the COSPAS-SARSAT website: <http://www.cospas-sarsat.int/en/contact-lists-mccs-and-spocs>

COMMUNICATIONS MATTERS

5.3.75 The subject was addressed in WP/12 presented by the Secretariat

World Radiocommunication Conference (WRC-19)

5.3.76 The meeting noted that the WRC-19 meeting will be held in Sharm El-Sheikh, 28 October to 22 November 2019. Furthermore, the meeting recalled that the ICAO Position for WRC-19 has been coordinated with all ICAO member States and approved by ICAO Council in June 2016.

5.3.77 The meeting urged States to work closely with their States Telecommunication Authorities to ensure that ICAO Position is suitably reflected in the national position of the State and in the regional position; and to support ICAO Position during the WRC-19 meeting. Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/24: SUPPORT ICAO POSITION TO WRC-19

That, States be urged to:

- a) work closely with the States Telecommunication Authorities to support the ICAO Position to the WRC-19;*
- b) make necessary arrangements for the designated Civil Aviation Personnel to participate actively in the preparatory work for WRC-19 at the national level; and*
- c) attend the preparatory regional spectrum management groups meetings and WRC-19 to support and protect aviation interests.*

Frequency Finder Tool

5.3.78 The meeting was apprised of the new VHF Navigation frequency assignment (ILS/VOR) Module being developed by ICAO HQ. Furthermore, the meeting noted that several States requested training on the Frequency finder tool.

5.3.79 Considering the introduction of the new NAV module and to keep States abreast of the use of the Frequency Finder Tool, the meeting recognized the need to organize a Frequency Management Workshop and agreed to the following MSG Conclusion:

MSG CONCLUSION 6/25: FREQUENCY MANAGEMENT WORKSHOP

That, ICAO consider the organization of a Workshop on the Frequency Finder Tool jointly with ACAO in 2020.

5.3.80 The meeting noted that the registered frequencies in the ICAO database (using the Frequency Finder Tool) is not up-to-date, and that could result in incompatible frequency assignments. Therefore, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/26: REGISTERED FREQUENCY UPDATE

That, for an optimized frequency assignment process and in order to ensure that assigned frequencies to MID States are not interfering, States that have not yet done so, be urged to:

- a) verify and update existing registered frequencies in the COM list;*
- b) add any missing frequencies with the full details, where applicable;*
- c) delete unused frequencies;*
- d) send the changes in excel format generated by the FF export function; and*
- e) provide the ICAO MID Office with feedback before **15 February 2019**.*

Harmful Interference

5.3.81 The meeting noted the occurrence of many frequency interferences incidents in the MID Region, and agreed that the removal of harmful interference requires coordination among States in close coordination with the ICAO MID Office. Therefore, the meeting agreed that States should assign focal points for the frequency management issues in order to improve the coordination and respond to the interference occurrences in a timely manner. Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/27: FREQUENCY MANAGEMENT FOCAL POINTS

*That, States, that have not yet done so, be invited to assign Frequency Management Focal Points by **15 February 2019**, for a better coordination of frequency management issues, including harmful interference.*

CRV Project

5.3.82 The meeting recalled that MIDANPIRG/16, though Conclusion 16/15, invited States to engage with the recommended CRV supplier (PCCW Limited) to establish individual service contracts. Therefore, eight (8) States (Bahrain, Iraq, Jordan, Kuwait, Lebanon, Qatar, Saudi Arabia and UAE) provided their network requirements through the completion of the high level questionnaire.

5.3.83 The meeting noted that States selected different packages for the same connections, and in order to request price revision from CRV service provider, the Secretariat prepared consolidated proposal with unified package for all MID States. In this vein, the meeting noted that six (6) States provided their requirements.

5.3.84 Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/28: MID CRV REQUIREMENTS

*That, in order to request price revision from the CRV's Service provider (PCCW Global) for the MID Region, States that have not done so, are urged to complete the MID CRV requirements at **Appendix 5.3P**, not later than **15 February 2019**.*

5.3.85 The meeting noted that the CRV service provider (PCCW) offered a bundle discount with around 10-15% less if Six (6) States place order in the same period. Also, it was highlighted that the CRV overall cost could be reduced if a high number of States join the project.

5.3.86 The meeting noted that the fifth meeting of the CRV Operation Group will be held in Hong-Kong, from 23 to 25 2019. that the CRV OG/5 will review the progress of the CRV project and regional implementation plan.

Missing Messages

5.3.87 The meeting noted that the CRV OG/5 meeting will address the missing messages issue; by reviewing the current AFTN/AMHS routing tables of the entry/exit points and the performance of inter-regional connections (Bahrain, Kuwait and Oman). Therefore, the meeting urged States to attend the CRV OG/5 and in particular the States concerned (Bahrain, Kuwait and Oman).

5.3.88 The meeting recalled that the missing messages issue have been raised in several ICAO meetings. Furthermore, the meeting noted that the following actions have been taken by the MID Office to resolve missing messages problem:

- a) requested the ICAO EUR/NAT Office to consider the establishment of new European Gateway (Rome) with the MID Region;
- b) invited Egypt and Lebanon to establish AMHS inter-regional connection with the current European gateways (Athens and Cyprus);
- c) coordinated with ICAO ESAF Office to establish new inter-regional AMHS connection between Cairo and South Africa; and
- d) invited Bahrain – UAE to migrate their bilateral CIDIN connection to AMHS.

5.3.89 The meeting was apprised of Sudan's request to consider Khartoum COM Centre as a Main COM Centre and gateway with the AFI Region. The meeting agreed that having additional entry/exit point between the AFI and MID Regions could offer more channel for the inter-regional communications. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 6/2: KHARTOUM COM CENTRE

That, in order to establish a third Gateway to the AFI Region, Khartoum COM Centre be changed to a main Centre.

ROC and IWXXM Implementation

5.3.90 The meeting recalled that Saudi Arabia and Bahrain will be the main and backup Regional OPMET Centres (ROC), respectively. It was highlighted that exchanging the IWXXM format in the current mixed environment (AFTN, Basic and Extended AMHS Connections) needs a lot of preparation and monitoring to ensure messages flow through consistent routes.

5.3.91 The meeting reviewed the communication requirements and agreed to the following MSG Conclusions:

MSG CONCLUSION 6/29: IMPLEMENTATION OF FILE TRANSFER BODY PART (FTBP)

That, States are urged to:

- a) implement FTBP capability at National COM Centres (AMHS is a pre-requisite);*
- b) implement P3/P7 with FTBP capability at the National OPMET Centre (NOC); and*
- c) set the maximum overall AMHS Message size to 4 MB.*

MSG CONCLUSION 6/30: THE COMMUNICATION NETWORK FOR IWXXM DATA EXCHANGE

That, the Main and Backup Regional OPMET Centres (Bahrain and Saudi Arabia) and the Main COM Centres in the MID Region be urged to join the CRV Project in order to enable the exchange of OPMET information in IWXXM format.

SITA Integration

5.3.92 The meeting noted that SITA integration is a pre-requisite to any AMHS inter-regional connection, in order to keep efficient and regular messages exchange. ICAO APAC, EUR/NAT and SAM Regions have completed the integration successfully. The ESAF and WACAF Regions are also progressing well.

5.3.93 The meeting was apprised of SITA Type X Transition Action Plan developed by the CNS SG/8 meeting. However, the transition could not be completed, as Egypt has not been ready for that.

5.3.94 Based on the above, the meeting urged Egypt to resolve the issue of SITA integration in order not to isolate the MID Region from AMHS upgrade with adjacent Regions. Furthermore, the meeting noted that a coordination meeting will be held between Egypt, EUROCONTROL, ICAO MID and SITA on 18 December 2018.

NAVIGATIONS MATTERS

5.3.95 The subject was addressed in WP/13 presented by the Secretariat.

5.3.96 The meeting reiterated that the GNSS is a vital component to the Air Navigation and that has been increasingly used by many Aviation applications.

5.3.97 The meeting recalled that the ICAO MID Office organized two GNSS Workshops jointly with ACAO. The need to consolidate all information about GNSS to guide MID States on GNSS implementation was recognized. Therefore, the Guidance on GNSS Implementation in the MID Region has been developed by the Secretariat and improved, taking into consideration States' inputs. Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/31: GUIDANCE ON GNSS IMPLEMENTATION

*That, the Guidance on GNSS Implementation in the MID Region at **Appendix 5.3Q** is endorsed and be published as ICAO MID Doc 011.*

5.3.98 The meeting noted that the draft RASG-MID Safety Advisory (RSA) on GNSS Vulnerabilities at **Appendix 5.3R** will be presented to the RASG-MID/7 meeting for endorsement.

SURVEILLANCE MATTERS

5.3.99 The subject was addressed in WP/14 presented by the Secretariat.

5.3.100 The meeting recalled that the Mode S Interrogator Code Allocation (MICA) process in the MID Region is managed by the EUROCONTROL MICA web application. Furthermore, it was highlighted that some MICA users are not familiar with the MICA procedures and process. Therefore, the meeting agreed that a Surveillance/MICA Workshop be organised in 2019.

5.3.101 The meeting recalled that MIDANPIRG/16, through Decision 16/23, tasked the CNS SG to develop the MID Region Surveillance plan. The Draft plan has been developed by the Secretariat and reviewed/amended during the CNS SG/8 meeting. Furthermore, the ATM SG/4 reviewed the Draft MID Region Surveillance plan and agreed that ADS-B out would be used to improve Surveillance coverage and availability.

5.3.102 The meeting reviewed the Draft MID Region Surveillance plan and agreed that the Plan should address also the space based ADS-B. The meeting agreed that Plan should be further improved taking into consideration the outcome of the Surveillance/MICA Workshop and the CNS SG/9 meeting. Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/32: MID REGION SURVEILLANCE PLAN AND WORKSHOP

That, with a view to provide MICA Operator with necessary knowledge to implement MICA processes efficiently, and in order to develop a comprehensive Surveillance Plan in the MID Region:

- a) a Surveillance/MICA Workshop with support of EUROCONTROL be organised in February 2019;*
- b) States be invited to participate actively in the Workshop;*
- c) the Draft MID Region Surveillance Plan be reviewed/updated during the Surveillance/MICA Workshop and presented to the CNS SG/9 meeting for further review, before presentation to the MIDANPIRG/17 meeting for endorsement.*

CYBER SECURITY

5.3.103 The subject was addressed in WP/15 presented by the Secretariat and PPT/1 presented by the UAE.

5.3.104 The meeting recalled that MIDANPIRG/16, through Decision 16/26, established the ATM DATA Security Action Group (ADSAG) to develop the MID Region ATM Data Security Plan. Considering the wide scope of the task, the meeting agreed that the CNS SG/9 might develop detailed Terms of Reference for the ADSAG or Action Plan for the development of the MID Region ATM Data Security Plan.

5.3.105 The meeting noted that the ADSAG agreed that the MID Region ATM Data Security Plan outline would be as follow:

- a) Security Regulations;
- b) Physical Security
- c) ICT Cyber Security baseline
- d) Disaster Recovery

5.3.106 The meeting recalled that the UAE took the lead for the MID Region to develop, in co-ordination with other States, a security baseline for the various systems in use. The Minimum Security Baseline documents (MSBs) were presented during the CNS SG/8 meeting. Furthermore, it was noted that the MSBs would be included in the MID Region ATM Data Security Plan as ICT Cyber Security Baseline.

5.3.107 It was highlighted that the ATM Cyber Security has a wide scope, and accordingly should cover the security aspects of all ANS systems and infrastructure.

5.3.108 The meeting noted that in order to strengthen the Regional collective ability to detect and defend against malicious activities, by sharing information about adversaries and their behaviours, the UAE developed and hosted the ATM Data Security Portal (ADCS). In this regard, the meeting commended UAE for taking such initiative.

5.3.109 UAE underlined that ADCS portal is not intended to be a comprehensive solution for cyber security but rather a platform where cyber events can be logged, information related to cyber-attacks shared and discussions held on various cyber topics on the forum. Furthermore, the meeting noted that ADCS access will be restricted to approved ANSP/industry users only, therefore, it was agreed that MID States assign ADCS focal points. Other users from the Region can register online; the official emails will be used for verifying Registration.

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

MSG CONCLUSION 6/33: ATM DATA CYBER SECURITY (ADCS) PORTAL

That;

- a) the ADCS Portal be used as a prototype platform for ATM cyber security; and
- b) States be encouraged to:
 - i. assign ADCS focal point(s) to register on the ADCS Portal;
 - ii. provide feedback to the ADCS Admin by **15 February 2019** for further enhancements; and
 - iii. share their experience related to cyber security, through the ADCS Portal.

5.3.111 The meeting agreed that in order to enrich cyber security awareness in the Region and strengthen the ability to prepare for, respond to and recover from a cyber-attack; a Cybersecurity & Resilience Seminar be organized jointly with ACAO in 2019. The Seminar will address; inter-alia, the Cyber Security Regulatory Framework; Cyber Risk Management; Infrastructure and information Security; Proactive cyber defence; Incident management and Resilience Techniques. Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/34: CYBER SECURITY AND RESILIENCE SEMINAR

That, in order to enrich the cyber security awareness and strengthen the cyber resilience in the MID Region, ICAO organise a Cyber Security and Resilience Seminar in 2019 jointly with ACAO.

5.3.112 The meeting realised the need for Cyber Security Subject Matter Expert (SME) in the MID States, as Security is one of the fast-evolving and complex area. Also, the meeting underlined that States should include Cyber Security training to their Training plan. Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/35: CYBER SECURITY SUBJECT MATTER EXPERT

That, in order to strengthen States' Cyber-resilience capabilities in the MID Region, States be invited to ensure that they have qualified/trained Cyber Security Subject Matter Experts.

MET Matters

5.3.113 The subject was addressed in WP/16, presented by the Secretariat.

IWXXM Implementation

5.3.114 The meeting recalled that, as a follow-up to the MET SG Draft Conclusion 7/1, an IWXXM survey was conducted on 10 April 2018 (State letter Ref.: ME3/2.3 – 18/114 refers), in order to gather and analyse information on States' action plans for IWXXM implementation. Replies have so far been received from Five (5) States (Egypt, Jordan, Libya, Oman and Sudan).

5.3.115 The meeting urged States, that have not yet done so, to complete the IWXXM survey and provide their feedback to the ICAO MID Office, not later than **15 February 2019**.

5.3.116 The meeting agreed that the “*Guidelines for the Implementation of OPMET data exchange using IWXXM*” be presented to MIDANPIRG/17 for endorsement and publication as MID Doc xxx (MET SG Draft Conclusion 7/2 refers). This document is maintained by the Meteorology Panel (METP) Working Group on Meteorological Information Exchange (WG-MIE).

MID ROCs Implementation

5.3.117 The meeting noted that the status of implementation of ROC Jeddah and back-up ROC Bahrain had no significant progress (Bahrain, Egypt, Iran and Kuwait: Partially Implemented; Syria and Yemen: Not Implemented). Accordingly, the meeting urged States, that have not yet done so, to complete the implementation.

Wind Shear Questionnaire

5.3.118 The meeting recalled that, in order to identify the International Aerodromes for which wind shear is considered a safety factor for operation; and determine the requirement and applicability area for Wind Shear warning/alert, a Questionnaire was distributed to States on 21 February 2018 (State letter Ref.: ME 3/2.3 – 18/066 refers). Replies have been received from eight (8) States (Bahrain, Egypt, Iran, Kuwait, Libya, Qatar, Sudan and Yemen).

5.3.119 The meeting noted that the Questionnaire mainly focused on the MET issues and, since wind shear is considered as a safety issue, the meeting agreed that there is a need to further investigate wind shear occurrences from a Safety perspective (to be addressed by RASG-MID).

5.3.120 The meeting noted that the replies provided by States on the Questionnaire could not effectively contribute to the identification of the Wind Shear warning/alerts requirement. Accordingly, the meeting urged States to identify those International Airports, for which wind shear is a safety factor (based on the occurrences/incidents and statistics for the past 3 to 5 years); and inform the ICAO MID Office, in order to include them in the applicability area for wind shear warning/alerts requirement.

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

**MSG CONCLUSION 6/36: IDENTIFICATION OF INTERNATIONAL AERODROMES
FOR WIND SHEAR WARNINGS/ALERTS REQUIREMENT**

That, based on the occurrences/incidents and statistics related to wind shear for the past 3 to 5 years, States be urged to:

- a) identify those International Aerodromes for which wind shear is considered a safety factor for operation; and*
- b) provide feedback to the ICAO MID Office before **15 February 2019**.*

REPORT ON AGENDA ITEM 6: AIR NAVIGATION DEFICIENCIES
Review of Air Navigation Deficiencies

6.1 The subject was addressed in WP/19 presented by the Secretariat. The meeting noted with concern that the majority of deficiencies listed in the MANDD have no specific Corrective Action Plan (CAP). The meeting urged States to implement the provisions of MIDANPIRG Conclusion 15/35 related to the elimination of Air Navigation Deficiencies, in particular, the submission of a specific Corrective Action Plan (CAP) for each deficiency.

6.2 The meeting reviewed the list of deficiencies in the AIM, AOP, ATM, CNS, SAR and MET fields as reflected in the MID Air Navigation Deficiency Database (MANDD) at: <http://www.icao.int/mid>. The meeting noted that the total number of air navigation deficiencies recorded in MANDD is **105** deficiencies compared to **114** deficiencies approved by MIDANPIRG/16.

6.3 A quantitative analysis of the MID States' air navigation deficiencies is shown in the tables and graphs presented at **Appendices 6A** and **6B**.

6.4 The meeting highlighted the following:

- In the AOP field; total number of AOP deficiencies is ten (10) priority "A". Eight (8) 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 80% of these deficiencies.
- In the AIM field; total number of AIM deficiencies is forty seven (47); forty one (41) priority "A" and six (6) priority "B". Seventeen (17) deficiencies related to eTOD; six (6) related to QMS; six (6) related to AIXM; six (6) related to WAC; four (4) related to pre-flight information services; three (3) related to AIP and aeronautical charts; three (3) related to AIRAC adherence; and two (2) related to WGS-84.
- In the ATM field; total number is twenty six (26); seventeen (17) priority "A" and nine (9) priority "B". Thirteen (13) related to the uncompleted signature of contingency agreements; Nine (9) related to the non-implementation of planned regional ATS Routes; and four (4) related to unsatisfactory reporting of large Height deviation (LHD) to the MIDRMA
- In the CNS field; total number of CNS deficiencies is two (2); one (1) priority "A" and one (1) priority "B". Both deficiencies are related to ATS Direct speech circuits.
- In the MET field; total number of MET deficiencies is ten (10) priority "A" deficiencies. Six (6) related to QMS; and four (4) related to METAR, TAF, SIGMET and WAFS.
- In the SAR field; total number is ten (10) priority "A" deficiencies. Five (5) related to the lack of SAR provisions; and five (5) related to non-compliance with the carriage of Emergency Locator Transmitter (ELT) requirements.

REPORT ON AGENDA ITEM 7: MIDANPIRG WORKING ARRANGEMENTS***MIDANPIRG Members/Alternates/Advisers and Sub Groups Focal Points***

7.1 The subject was addressed in WP/20 presented by the Secretariat. The meeting reviewed and updated the lists of MIDANPIRG Members/Alternates/Advisers and Subsidiary Bodies' Focal Points (ATM SG, AIM SG, CNS SG, MET SG and PBN SG) as at **Appendix 7A**.

7.2 The meeting urged States to support the work of the Subsidiary bodies by assigning experts and specialists able to effectively contribute to the work of the different MIDANPIRG subsidiary bodies.

MIDANPIRG Procedural Handbook

7.3 The subject was addressed in WP/21 presented by the Secretariat. The meeting recalled that the Fourth meeting of the MIDANPIRG/RASG-MID Coordination meeting (Bahrain, 25 September 2017) agreed that, in many cases, there is a need for an expeditious decision-making process (fast track, approval by passing, etc.). It was further agreed that the MIDANPIRG and RASG-MID should agree on such procedure and include it in their Procedural Handbooks.

7.4 The meeting discussed the proposal of a Fast Track/Approval by passing procedure that requires the inclusion of the following paragraph in MIDANPIRG Handbook:

“In case an urgent follow-up action on an outcome from a MIDANPIRG subsidiary body is identified/needed, the ICAO MID Office may coordinate with the Chairperson(s) the approval by passing of the corresponding outcome, without waiting for the MIDANPIRG or MSG approval”.

7.5 The meeting recalled that the MSG/5 meeting initiated discussion on the working arrangements of MIDANPIRG and in particular the interaction between MSG and ANSIG. The meeting was apprised of the global developments related to PIRGs and RASGs, which would have impact on the working arrangements of MIDANPIRG and RASG-MID.

7.6 Based on the above, the meeting agreed to defer the discussion on the amendment of the MIDANPIRG Handbook, Fast Track and working arrangements to the MIDANPIRG/17 meeting. However, the meeting invited States to provide the ICAO MID Office by **15 March 2019** with their views and proposals related to the MIDANPIRG working arrangements and the MIDANPIRG Procedural Handbook (organizational structure, empowerment of the subsidiary bodies, approval by passing, etc.). Accordingly, the meeting agreed to the following MSG Conclusion:

MSG CONCLUSION 6/37: MIDANPIRG WORKING ARRANGEMENTS

*That, States be invited to provide the ICAO MID Office, not later than **15 March 2019**, with their views and proposals related to the MIDANPIRG working arrangements and efficiency, and the MIDANPIRG Procedural Handbook (organizational structure, empowerment of the subsidiary bodies, approval by passing, etc.).*

REPORT ON AGENDA ITEM 8: FUTURE WORK PROGRAMME

8.1 The subject was addressed in WP/22 presented by the Secretariat. The meeting recalled that in accordance with the MIDANPIRG Procedural Handbook, the MSG is expected to review and update, as necessary, its Terms of Reference (TORs) and to decide on the dates and venue of its next meeting.

8.2 Taking into consideration the changes to the MIDANPIRG working arrangements that would be agreed upon in due course, the meeting agreed to defer the review of the MSG TORs and the decision on the venue and dates of the MSG/7 meeting to MIDANPIRG/17, which will be held in Cairo, Egypt, 15 – 18 April 2019, concurrently with the RASG-MID/7 meeting.

REPORT ON AGENDA ITEM 9: ANY OTHER BUSINESS

9.1 The meeting noted with appreciation EUROCONTROL willingness to support the work of MIDANPIRG and contribute to the efforts undertaken in the MID Region.

9.2 The meeting also commended the high level of cooperation and collaboration achieved between ACAO and ICAO MID Office, which will have positive impact on the support provided to States and the regional initiatives and projects.

9.3 The meeting noted with concern the low level of responses to the ICAO MID Office State Letters. Accordingly, the meeting agreed that the implementation of an online monitoring tool for the States' responses to the ICAO MID Office State Letters would support States in the process of follow-up and effective provision of replies.

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

MSG CONCLUSION 6/38: STATE LETTERS ONLINE MONITORING TOOL

That, in order to support States in the process of follow-up and effective provision of replies to the ICAO MID Office State Letters, ICAO is invited to explore/implement an online monitoring tool.

APPENDICES

APPENDIX 2A

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

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 16/1: MID RVSM SAFETY MONITORING REPORT (SMR) 2015 That, the MID RVSM Safety Monitoring Report (SMR) 2015 is endorsed.		MID RVSM SMR 2016	MIDANPIRG/16	Feb 2017	Completed
CONCLUSION 16/2: MID RVSM SMR 2017 That, a) the FPL/traffic data for the period 1 – 30 September 2017 be used for the development of the MID RVSM Safety Monitoring Report (SMR 2017); b) 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 c) the final version of the MID RVSM SMR 2017 be ready for presentation to and endorsement by MIDANPIRG/17.		State Letter Traffic Data	ICAO State	Aug 2017 Oct 2017	Actioned SL Ref.: AN 6/5.10.15A dated 31 Aug 2017 Completed
CONCLUSION 16/3: MID REGION AIR NAVIGATION STRATEGY That, the revised MID Region Air Navigation Strategy (MID Doc 002, Edition February 2017) at Appendix 5.1A is endorsed.		MID AN Strategy (MID Doc 002)	MIDANPIRG/16	Feb 2017	Completed
CONCLUSION 16/4: APPROVAL OF THE AMENDMENT TO THE MID eANP VOLUME III That, the amendment to the MID eANP Volume III at Appendix 5.1B is approved.		Amendment Notification of Amendment	MIDANPIRG/16 ICAO	Feb 2017 May 2017	Completed Amendment was approved by MIDANPIRG/16 Notification of amendment issued on 18 June 2017

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 16/5: ASSESSMENT OF PBN IMPLEMENTATION That, States be invited to: a) explore means and ways to assess the benefit accrued from the implementation of PBN; and b) report on annual basis (by 1 November), the environmental benefits accrued from PBN implementation to the ICAO MID Office in order to be included in the MID Region Air Navigation Report.		State Letter	ICAO	Apr2017	Actioned SL Ref.: AN 6/28 – 17/120 dated 12 April 2017 (Bahrain, Jordan, Sudan)
		Benefits accrued from PBN Implementation	States	Nov 2017 (annual basis)	
CONCLUSION 16/6: ACTION PLAN FOR A-CDM IMPLEMENTATION That, in line with the MID Air Navigation Strategy, States concerned: a) be urged to develop their A-CDM implementation plan, with the support of ICAO MID Office, if required; and b) provide the ICAO MID Office with a copy of their plan before 1 November 2017.		State Letter	ICAO	Jun 2017	Actioned/Ongoing SL Ref.: AN 5/23 – 17/174 dated 27 June 2017 (Bahrain, Sudan, UAE)
		States National Plan	States	Nov 2017	
CONCLUSION 16/7: MID REGION AIR NAVIGATION REPORT-2016 That, the MID Region Air Navigation Report-2016 is endorsed.		MID AN Report	MIDANPIRG/16	Feb 2017	Completed The Report Posted and published

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 16/8: MID REGION AIR NAVIGATION REPORT-2017 That, MID States be urged to: a) develop/update their National ASBU Implementation Plan, ensuring the alignment with and support to the MID Region Air Navigation Strategy (MID Doc 002); and b) provide the ICAO MID Office, with relevant data necessary for the development of the MID Region Air Navigation Report-2017, by 1 November 2017.		State Letter	ICAO	Sep 2017	Completed SL Ref.: AN 1/7-17/188 dated 2 July 2017 (Bahrain, Egypt, Jordan, Qatar, Sudan & UAE) The Report was endorsed by MSG/6
		National ASBU Implementation Plan	States	Nov 2017	
		Data for AN Report 2017		Nov 2017	
CONCLUSION 16/9: ESTABLISHMENT OF HELIPORTS DATABASE That, States be urged to establish and maintain a database for Heliports with information about location and type of use, as a minimum.		State Letter	ICAO	Jun 2017	Closed SL Ref.: AN 6/25 – 17/185 dated 29 June 2017 (Bahrain, Jordan, Oman)
CONCLUSION 16/10: GUIDANCE FOR AIM PLANNING AND IMPLEMENTATION IN THE MID REGION That, a) the Guidance for AIM Planning and Implementation in the MID Region is endorsed as MID Doc 008; and b) States be encouraged to use the MID Doc 008 in their AIM planning and implementation.		MID Doc 008	MIDANPIRG/16	Feb 2017	Actioned/Ongoing SL Ref: AN 8/4-17/133 dated 30 April 2017 (UAE) The draft Guidance will be presented to AIM SG/5 for finalization.
		State Letter	ICAO	May 2017	
		Updated National AIM Roadmaps	States	Nov 2017	

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 16/11: AIRAC ADHERENCE MONITORING That, a) States be urged to: i. implement a system for AIRAC adherence monitoring; and ii. report on annual basis (by 31 March) to the ICAO MID Office the case(s) of late publication of aeronautical information of operational significance and non-adherence to the AIRAC provisions, using the AIRAC Adherence Monitoring Questionnaire at Appendix 5.2.2D. b) IATA report to the concerned State(s) and the ICAO MID Office any case of late publication of aeronautical information of operational significance and non-adherence to the AIRAC provisions.		AIRAC adherence monitoring system State Letter Filled Questionnaire	State Letter ICAO States IATA	Nov 2017 Mar. 2017/ continuous Apr.2017/ continuous Nov 2017/ continuous	Closed SL Ref.: AN 8/4 – 17/087 dated 23 Mar 2017 13 States Replied (Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Sudan and UAE) The result of the surveys were reviewed by AIM SG/3 and AIM SG/4.
CONCLUSION 16/12: INTERREGIONAL SEMINAR ON “SERVICE IMPROVEMENT THROUGH INTEGRATION OF DIGITAL AIM, MET AND ATM INFORMATION” That, States, Organizations and Industry be invited to actively participate in the Interregional Seminar on “Service Improvement through Integration of Digital AIM, MET and ATM Information Services” (Brussels, Belgium, 2-5 October 2017).		State Letter Actively participate in the Seminar	ICAO States, Organizations and Industry	Jun 2017 Oct 2017	Completed SL Ref.: AN 8/28.1-17/175 dated 14 June 2017 Only 6 MID States participated
DECISION 16/13: DISSOLUTION OF THE MPCT That, the MAEP Projects Coordination Team (MPCT) is dissolved and its duties and responsibilities be taken over by the MAEP Board.		Dissolution of MPCT	MIDANPIRG/16	Feb. 2017	Completed

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
DECISION 16/14: MAEP BOARD TERMS OF REFERENCE That, the MAEP Board Terms of Reference be endorsed as at Appendix 5.2.2E.		MAEP Board ToR	MIDANPIRG/16	Feb 2017	Completed
CONCLUSION 16/15: MID IP NETWORK PROJECT (CRV) That, a) States that have already committed to join CRV, are invited to engage with the recommended supplier to establish individual service contracts; and b) States that have not yet done so, are urged to carry out a comprehensive CBA related to the implementation of an IP Network under the CRV framework; and inform the ICAO MID Office, as soon as possible, about their decision related to the joining of CRV.		State Letter	ICAO	May 2017	Actioned/Ongoing SL Ref.: AN 6/31.4-17/160 dated 29 May 2017 (Egypt)
		Engage with the recommended supplier	States	Dec 2017	
DECISION 16/16: ATFM TASK FORCE That, a) an ATFM Task Force be established to develop an ATFM Concept of Operations for the MID Region; b) the ATM SG/3 meeting develop the terms of reference of the ATFM Task Force; and c) States support the ATFM Task Force through: i. assignment of ATFM Focal Point to contribute to the work of the Task Force; and ii. provision of required data in timely manner, and in particular to the survey that will be carried out related to the airspace and sectors capacity, hot-spots, ATFM measures/system, etc.		Establishment of ATFM TF	MIDANPIRG/16	Feb 2017	Closed Completed
		ATFM Concept of Operations	ATFM TF	Sep 2017	
		Assign ATFM FP Support ATFM TF and provide required data	ICAO States	Apr 2017 May 2017 Jan 2018	
					SL Ref.: AN 6/5.5 – 17/121 dated 12 Apr. 2017 (Bahrain, Jordan, Kuwait) Completed

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
DECISION 16/17: MID ROUTE DEVELOPMENT WORKING GROUP (MID RDWG) That, a) a MID Route Development Working Group be established to support the route development within the MID Region and at the interfaces with ICAO AFI, APAC and EUR Regions; and b) the ATM SG develop the terms of reference of the MID RDWG.		Establishment of RDWG	MIDANPIRG/16	Feb 2017	Completed
		RDWG ToR	ATM SG	May 2017	ToR to be endorsed by the meeting
DECISION 16/18: WORLD CUP 2022 TASK FORCE That, a) a World Cup 2022 Task Force be established to develop and follow-up the implementation of a collaborative action plan to accommodate the expected high increase in traffic, in a safe and efficient manner, taking into consideration similar experiences; b) the Task Force address other major events such as the EXPO 2020; and c) the ATM SG develop the terms of reference of the Task Force.		Establishment of World Cup 2022	MIDANPIRG/16	Feb 2017	Closed
		TF ToR	ATM SG	May 2017	ToR endorsed by the meeting

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CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 16/19: IMPLEMENTATION OF REDUCED RADAR LONGITUDINAL SEPARATION IN THE MID REGION That, a) States, that have not yet done so; i) be urged to implement 20 NM radar longitudinal separation; and ii) be encouraged to further reduce the radar longitudinal separation within the MID Region to 10 NM; b) the ATM SG monitor the status of implementation and take appropriate actions to foster the implementation., metrics and targets, for which the necessary data is available.		State Letter	ICAO	Apr 2017	Closed SL Ref.: AN 6/5.5 – 17/122 dated 12 Apr. 2017 Continuous
CONCLUSION 16/20: SIDS AND STARS NEW PHRASEOLOGIES That, States be urged to: a) implement the provisions of amendment 7 to ICAO Doc 4444, in particular those related to the SIDs and STARS new phraseologies; and b) provide the ICAO MID Office with their implementation plan by 1 May 2017.		State Letter Implementation plans for the new SIDs and STARS phraseologies	ICAO States	Apr 2017 May 2017	Closed SL Ref.: AN 6/5.5 – 17/123 dated 12 Apr. 2017
DECISION 16/21: SAR LONGSTANDING DEFICIENCIES That, the ATM SG explore ways and means to support States in the elimination of the longstanding SAR deficiencies.		ATM SG	Means to support States with SAR deficiencies	May 2017	Closed Guidance included in the MID Region SAR Plan

CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 16/22: MODE S INTERROGATOR CODE (IC) ALLOCATION That, States, that have not yet done so, be urged to: a) provide the ICAO MID Office with their Mode S Interrogator Code (IC) Focal Points; and b) register to the MICA application for the allocation of the Mode S Interrogator Code (IC) at: https://ext.eurocontrol.int/mica/Index.action		State Letter	ICAO	Sep 2017	Closed SL Ref.: AN 7/27 – 17/329 dated 26 Nov. 2017 (Egypt, Jordan, Kuwait, Saudi Arabia, Sudan) Regional Workshop to be conducted (Feb. 2019)
		Focal Point(s) MICA Registration		Dec 2017	
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.		MID Region Surveillance Plan	CNS SG	Q1 2018	Closed (replaced and superseded by MSG Conclusion 6/32)
CONCLUSION 16/24: FTBP TESTING DOCUMENT That, the First Edition of File Transfer Body Part (FTBP) Testing Document at Appendix 5.2.2N is endorsed.		FTBP Testing Document	MIDANPIRG/16	Feb 2017	Completed
DECISION 16/25: TERMS OF REFERENCE OF THE MIDAMC STG That, the Terms of Reference and Work Programme of the MIDAMC STG be updated as at Appendix 5.2.2O .		MIDAMC STG TORs	MIDANPIRG/16	Feb 2017	Completed
DECISION 16/26: ATM DATA SECURITY ACTION GROUP That, the ATM Data Security Action Group (ADSAG) be: a) established to develop the MID Region ATM Data Security Plan, to be presented to the CNS SG/8. b) composed of members from Bahrain, Iran, Kuwait, Oman, Saudi Arabia, UAE (Rapporteur), ICAO and IFAIMA.		State Letter MID Region ATM Data Security Plan	ICAO ADSAG members	Jun 2017 Q1-2018	Ongoing SL Ref: AN 6/38 – 17/334 dated 29 Nov. 2017 (Bahrain, Jordan, Kuwait, UAE)

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CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 16/27: SPECIAL AIR-REPORT TEST That States be encouraged to participate in the EUR Special Air-Report Test in order to identify deficiencies and associated solutions in the reporting and dissemination of these reports.		State Letter	ICAO	July 2017	Completed SL Ref: AN 10/16-17/208 dated 1 Aug 2017 (Bahrain)
CONCLUSION 16/28: MID REGIONAL SIGMET GUIDE That the MID Regional SIGMET Guide as provided at Appendix 5.2.2Q is endorsed and be published as ICAO MID Doc 009.		MID Doc 009 updated	ICAO	Feb 2017	Completed (to be closed)
CONCLUSION 16/29: PROPOSAL FOR AMENDMENT TO MID ANP VOLUMES I AND II (MET PART) That ICAO initiate proposals for amendment to the MID ANP (Doc 9708) Volumes I and II, to include the changes at Appendices 5.2.2R and 5.2.2S , respectively.		Coordination with HQ	ICAO	Apr 2018	Ongoing Coordination with HQ ongoing
DECISION 16/30: DISSOLUTION OF THE ATM PERFORMANCE MEASUREMENT TASK FORCE (APM TF) That, a) the APM TF is dissolved; and b) the MIDANPIRG Organizational Structure contained in the MIDANPIRG Procedural Handbook (MID Doc 001) be amended accordingly.		APM TF dissolution MID Doc 001 updated	MIDANPIRG/16 ICAO	Feb 2017 May 2017	Completed Completed Completed

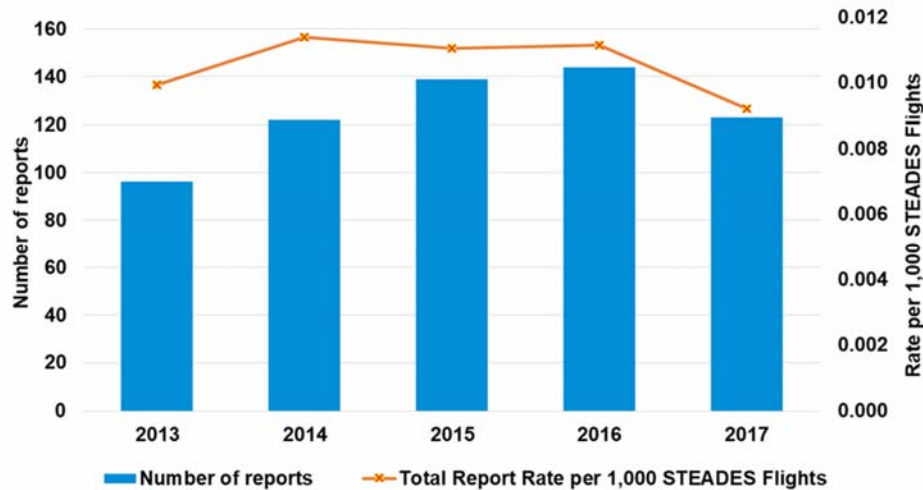
CONCLUSIONS AND DECISIONS	CONCERNS/ CHALLENGES (RATIONALE)	DELIVERABLE/ TO BE INITIATED BY		TARGET DATE	STATUS/REMARKS
CONCLUSION 16/31: ENVIRONMENTAL PROTECTION That, States that have not yet done so, be invited to: a) provide the ICAO MID Regional Office with updated contact details of their State's CO2 Action Plan/Environment Focal Points; b) develop/update their State Action Plans on CO2 emission reduction, using the guidelines contained in the ICAO Doc 9988; and submit them to ICAO through the APER website or the ICAO MID Regional Office; and c) take necessary actions for the implementation of the mitigation measures included in their Action Plan, commensurate with the establishment of a dedicated structure (e.g. Department, Section, etc.) within the Civil Aviation Authorities dealing with aviation environmental issues		State Letter	ICAO	May 2017	Closed SL Ref: EN 1/5-17/171 dated 7 June 2017 (Egypt, Iraq, Qatar)
		CO2 Action Plans	States	2018	
		Dedicated structure to Environmental protection			
DECISION 16/32: REVISED ANSIG TERMS OF REFERENCE That, a) the ANSIG Terms of Reference (TORs) be updated as at Appendix 7A; and b) the MIDANPIRG Procedural Handbook (MID Doc 001) be amended accordingly.		Updated TORs	MIDANPIRG/16	Feb 2017	Completed
		MID Doc 001 updated	ICAO	May 2017	Completed

APPENDIX 4A

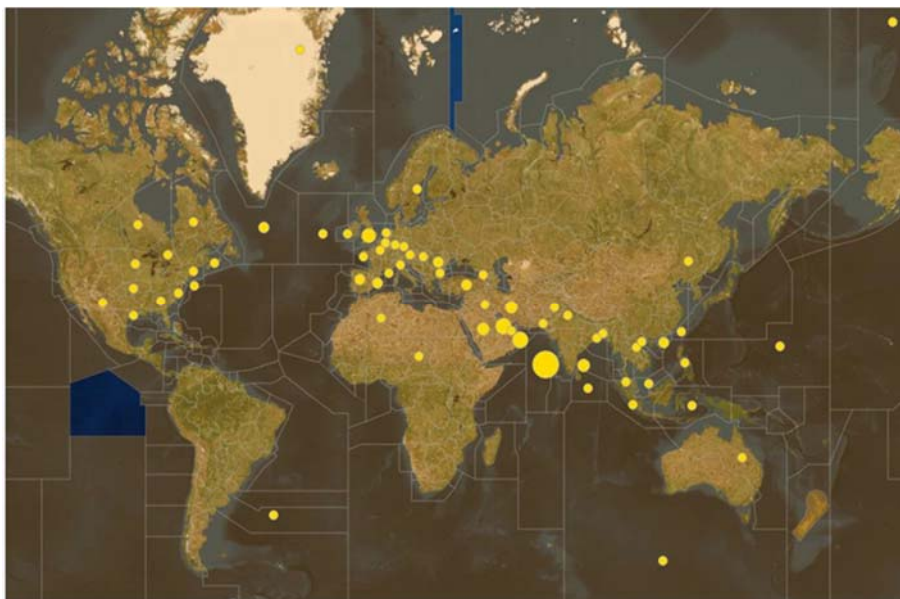
IATA Incidents Reported by Airlines - STEADES Data

Wake Turbulence

The data query resulted in a total of 1,159 reports in 2017. After quality controls were performed, 624 reports were retained for analysis, which equals to 0.01 reports per 1,000 flights or 1 encounter in every 100,000 flights. The figure below shows the number of reports and the rate per 1000 STEADES flights for the period 2013-2017.



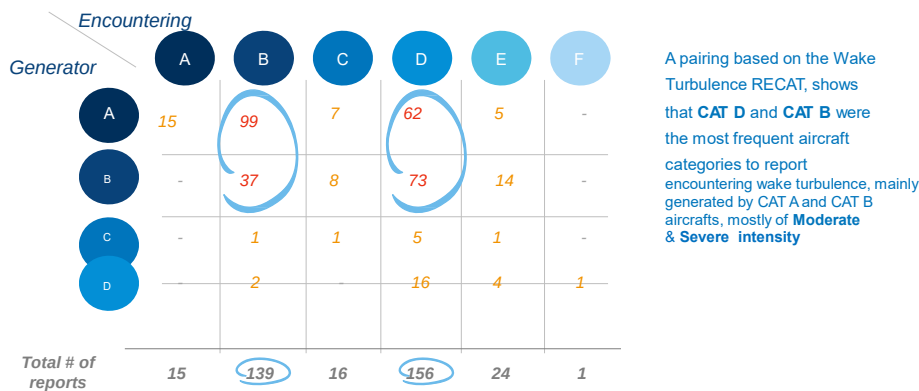
Muscat, Bahrain, Jeddah and Tehran FIRs are the top FIRs in terms of number of reports.



Muscat	12
Bahrain	11
Jeddah	7
Tehran	7

Upper Heavy (CAT B) and Upper Medium (CAT D) aircraft reported the highest number of events

Number of reports per Aircraft Wake Turbulence Category



Wake Turbulence generator: top aircraft type by category



The highest number of reports occurred when both aircraft were in level flight 186 reports.

The highest number of injuries occurred in moderate wake turbulence events

Key findings

- Mumbai, Muscat and Bahrain are the top 3 FIRs in terms of number of reports
- Upper Heavy (CAT B) and Upper Medium (CAT D) aircraft reported the highest number of events of wake turbulence encountered
- Wake Turbulence Encountered by CAT B, C and D generated from CAT A and B is mainly Moderate and Severe in intensity
- A380, B777 and B747 are the top three generator of wake turbulence in the dataset analyzed
- B777, A320, A330 and B737 are the top aircraft that encountered wake turbulence in the dataset analyzed
- The highest number of reports occurred when both aircraft were in level flight

APPENDIX 4B

**STRATEGY FOR THE ENHANCEMENT OF COOPERATION AMONG THE MIDDLE EAST
AND NORTH AFRICA (MENA) STATES IN THE PROVISION
OF AIG FUNCTIONS**

1- Background

Whereas it is incumbent on the State in which an accident occurs to institute an inquiry into the circumstances of the accident in conformity with Article 26 of the Convention;

Whereas Assembly Resolution A36-10, inter-alia:

- urges Contracting States to undertake every effort to enhance accident prevention measures, particularly in the areas of personnel training, information feedback and analysis and to implement voluntary and non-punitive reporting systems, so as to meet the new challenges in managing flight safety, posed by the anticipated growth and complexity of civil aviation;
- urges Contracting States to cooperate with ICAO and other States in a position to do so, in the development and implementation of accident prevention measures designed to integrate skills and resources to achieve a consistently high level of safety throughout civil aviation;

Whereas, amendment 15 of Annex 13 (STD 3.2) stipulates that a State shall establish an accident investigation authority that is independent from State aviation authorities and other entities that could interfere with the conduct or objectivity of an investigation;

Whereas, owing to the growing sophistication and complexity of modern aircraft, the conduct of an accident or serious incident investigation requires participation by experts from many specialized technical and operational fields and access to specially equipped facilities for investigation;

Whereas many Contracting States do not have such specialized technical and operational expertise and appropriate facilities;

Whereas the costs of salvage and investigation of major aircraft accidents may place a heavy financial burden on the resources of the State where the accident occurred;

Whereas Assembly Resolution A37-15 (Appendix U), recommends that Contracting States cooperate in the investigation of major aircraft accidents or accidents in which the investigation requires highly specialized experts and facilities;

Whereas, the ICAO Universal Safety Oversight Audit Programme (USOAP) audit findings indicate that a number of States have not been able to implement an effective accident and incident investigation system for their aviation activities;

Recognizing that the USOAP findings have been associated, in general, with a lack of resources (both human and financial), lack of appropriate legislation and regulations, lack of an organization for the investigation of accidents and incidents, lack of a training system for investigators, lack of equipment to conduct investigations and lack of policies, procedures and guidelines for accident and incident investigations;

Recognizing that combined with the expected increase in air transport operations, the relatively unchanged trend in the accident rate over the past several years might lead to an increase in the number of accidents per year;

Recognizing that there are many challenges to effective accident prevention, and that more effective identification and correction of aviation hazards and system deficiencies are required in order to complement regulatory efforts in further reducing the number of worldwide accidents and to improve the accident rate;

Recognizing that a regional investigation system can provide economies of scale by allowing for the sharing of required resources, and that by working together, States of a region or sub-region can have a more persuasive voice on the world stage and can help secure a more favorable climate aimed at a safer international air transportation system;

Acknowledging that during the AIG Divisional Meeting (2008) several States highlighted that, in regions where individual States do not have investigation capability, implementing a regional accident and incident investigation organization (RAIO) would ensure the effectiveness of investigations, reinforce conformity with the provisions of Annex 13, and contribute to the enhancement of aviation safety;

Whereas, Annex 13 (STD 5.1 and 5.1.2) stipulates that the State of Occurrence shall institute an investigation into the circumstances of the accident and serious incident (maximum mass of over 2 250 kg) and be responsible for the conduct of the investigation, but it may delegate the whole or any part of conducting of such investigation to another State or a RAIO by mutual arrangement and consent. In any event, the State of Occurrence shall use every means to facilitate the investigation;

Considering that the DGCA-MID/2 meeting (Jeddah, Saudi Arabia, 20 - 22 May 2013) noted that it is widely considered that implementing a RAIO would ensure the effectiveness of investigations, reinforce conformity with the provisions of Annex 13, and contribute to the enhancement of aviation safety; and accordingly through Conclusion 2/11 endorsed the First version of the Strategy for the establishment of RAIO(s);

Considering the AIG needs and capabilities of the Middle East and North Africa (MENA) States; and the implementation of different levels of cooperation for the provision of AIG services/functions at the regional/sub-regional level; and

Considering the challenges related to the establishment of a RAIO;

A strategy is crucial for the enhancement of cooperation in the provision of AIG services/functions among the Middle East and North Africa (MENA) States.

2- Objective

Contribute to improvement of aviation safety in the MENA States by enabling States to conduct effective and independent investigations of aircraft accidents and incidents; and support States in fulfilling their investigation obligations in Annex 13.

3- Methodology

During the ACAC/ICAO AIG Workshop held in Jeddah, Saudi Arabia, 25-27 April 2017, three (3) levels of cooperation for the provision of AIG services/functions in the MENA States have been defined as follows:

Level 1:

Cooperation among MENA States under the framework of Annex 13 and/ or a standard bilateral MOU to share, on ad-hoc basis, resources, training, information, documentation and capabilities; and strengthen conformity with Annex 13.

Level 2:

Cooperation among MENA States under the framework of a regional cooperation mechanism (well-defined scope and set of coordinated, organized and harmonized procedures and mechanisms) for the conduct of accidents and serious incidents investigations.

Level 3:

Establishment of a RAIO with well-defined mandate, roles and responsibilities, organization (human resources), funding mechanism, etc.; with a centralized decision-making process on RAIO activities.

The Table in **Attachment 1** provides more details about each level.

4- Strategic Plan

- (a) States are urged to develop and further strengthen regional/sub-regional cooperation for accidents and incidents investigation.
 - (b) MENA States should take necessary measures to reach at least level 2.
 - (c) An implementation Roadmap for MENA States should be developed, under the framework of RASG-MID, to provide the details and timelines related to the implementation of the different levels.
 - (d) Key Performance Indicators (KPIs) should be developed for the monitoring of the implementation of the Roadmap to ensure that the agreed goals are achieved.
 - (e) The decision on whether to continue towards the establishment of a full MENA RAIO, or to be satisfied with level 2 cooperation, will be taken in due course, depending on the achievement of the expected KPIs/goals.
-

ATTACHMENT 1

	Level 1 (Bilateral Agreements)	Level 2 (Regional Cooperation Mechanism)	Level 3 (RAIO)
Human resources	Shared between the two States	List of MENA States' investigators available to support States in the conduct of investigations, as required. The State conducting the investigation will hold the cost	Investigators from RAIO will lead/participate in investigation conducted by a member State, The cost share is determined by RAIO
AIG training	Shared between the two States	List of planned training courses in all member States is maintained by a voluntary State. Member States may benefit from training conducted by other member States.	- The syllabus of the basic training is RAIO-centralized. - Advanced and specialized trainings are determined by RAIO
Equipment, tools, and technology	Shared between the two States	List of MENA States' special equipment is determined and maintained by a voluntary State for use by all member States, as required. The State conducting the investigation will hold the cost	RAIO-centralized tools and equipment are used by member States. Cost share is determined by RAIO
Accidents and incidents database	Access may be granted to the other State's accident/incident database	Database is shared voluntarily and managed by a voluntary State	Database is obliged to be shared and is RAIO-centralized
Data repository	Access may be granted to the other State's data repository	Common data repository is managed by a voluntary State	Data repository is RAIO-centralized
Knowledge, safety information, and procedures	Shared between the two States	- Knowledge and information is stored in data repository managed by a voluntary State - Procedure is common	- Knowledge and information is stored in RAIO-centralized data repository - Procedure is centralized

	Level 1 (Bilateral Agreements)	Level 2 (Regional Cooperation Mechanism)	Level 3 (RAIO)
Services of State's National Centers of research, laboratories, institutions, experts, etc. (External to the AIG)	A State can utilize the other State's National Centers	List of MENA States' Centers that can be utilized by any member State. The State conducting the investigation will hold the cost	RAIO-centralized list of Centers. Cost share is determined by RAIO
Investigation regulations	Individual, but a State can benchmark the other State	Harmonized and coordinated by a voluntary State	RAIO-centralized
Oversight of the State investigation authority	Individual, but a State may conduct a peer-review upon the other State request	Pooled peer-review group maintained by a voluntary State	RAIO oversight (either by a RAIO group or by outsourced organization)
Funding of conducting investigations	The State responsible for initiating the investigation holds the cost	The State responsible for initiating the investigation holds the cost	Investigations into certain category of accidents are conducted by RAIO based on published criteria. Cost share is determined by RAIO
Funding of regional investigation organization	-	-	Centralized fund by States' contributions

APPENDIX 4C

ROADMAP FOR AIG REGIONAL COOPERATION

Level of Cooperation	Action		Target date	Deliverable	Champion	KPI
	No.	Description				
Level 1 Cooperation among MENA States under the framework of Annex 13 and/ or a standard bilateral MoU to share, on ad-hoc basis, resources, training, information, documentation and capabilities; and strengthen conformity with Annex 13	1	Develop a questionnaire and disseminate to States through a State Letter for surveying the current status of the MENA States in bilateral cooperation, and their willingness to move to Level 2	30 Sep 2018	Survey	AIG Core Team ICAO States	Number of States' responses
	2	Analyze the received responses including the assessment of the effective implementation of the cooperation elements as listed in the Strategy (Level 1)	31 Oct 2018		AIG Core Team	- Number of bilateral agreements per State - Level of effective implementation of Level 1 elements - Number of States willing to move to Level 2
Level 2 Cooperation among MENA States under the framework of a regional cooperation mechanism (well-defined scope and set of coordinated, organized and harmonized procedures and mechanisms) for the conduct of accidents and serious incidents investigation	3	Develop a Draft Questionnaire to survey States AIG capabilities	31 Dec 2018	Draft Questionnaire	AIG Core Team	
	4	Develop a Draft AIG RCM MoU	31 Dec 2018	Draft AIG RCM MoU	AIG Core Team	
	5	Endorsement of the Questionnaire by the RASG-MID/7 Meeting	Apr 2019	RASG-MID/7 Report	ICAO/RASG-MID	Questionnaire endorsed
	6	Endorse the Draft AIG RCM MoU by the DGCA-MID/5 Meeting and ACAO EC	Nov 2019	DGCA-MID/5 Report and ACAO EC Report	ICAO/DGCA-MID/5 ACAO EC	AIG RCM MoU endorsed
Remaining level 2 actions will be detailed in due course						

APPENDIX 5.2A

Table B0-ACDM 3-1

EXPLANATION OF THE TABLE

Column:

1- Name of the State

2- Aerodrome and Location Indicator

3 & 4 Fundamental ACDM Elements

3-Information Sharing:

FI – Fully Implemented

PI – Partially Implemented

NI – Not Implemented

Note 1- Information Sharing is essential since it forms the foundation for all the other subsequent elements.

4-The Milestones Approach (Turn- Round Process)

FI – Fully Implemented

PI – Partially Implemented

NI – Not Implemented

Note 2- The Milestones Approach (Turn- Round Process) aims to achieve common situational awareness by tracking the progress of a flight from the initial planning to the take off.

5 – 8 Other ACDM Elements

5- Variable Taxi Time

FI – Fully Implemented

PI – Partially Implemented

NI – Not Implemented

Note 3- Variable Taxi Time is the key to predictability of accurate take-off in block times especially at complex airports.

6-Collaborative Management of Flight Updates

FI – Fully Implemented

PI – Partially Implemented

NI – Not Implemented

Note 4- Collaborative Management of Flight Updates enhances the quality of arrival and departure information exchanges between the Network Operations and the CDM airports.

7-Collaborative Pre-departure Sequence

FI – Fully Implemented

PI – Partially Implemented

NI – Not Implemented

Note 5- (Collaborative) Pre-departure Sequence establishes an off-block sequence taking into account operators preferences and operational constraints.

8-ACDM in Adverse Conditions

FI – Fully Implemented

PI – Partially Implemented

NI – Not Implemented

Note 6- ACDM in Adverse Conditions achieves collaborative management of a ACDM during periods of predicted or unpredicted reductions of capacity.

9- Action Plan — short description of the State’s Action Plan with regard to ACDM Implementation, especially for items with a “PI” or “NI” status, including planned date(s) of full compliance, as appropriate.

10- Remarks — additional information, including detail of “PI” or “N”, as appropriate.

Table B0-ACDM 3-1

State	Aerodrome Location Indicator	ACDM IMPLEMENTATION ELEMENTS							
		Fundamental ACDM Elements		Other ACDM Elements				Action Plan	Remarks
		Information Sharing	Milestones Approach	Variable Taxi Time	Collaborative Management of Flight Updates	Collaborative Pre-departure Sequence	ACDM in Adverse Conditions		
1	2	3	4	5	6	7	8	9	10
Bahrain	OBBI								
Egypt	HECA								
Iran	OIII								
Kuwait	OKBK								
Oman	OOMS								
Qatar	OTBD								
	OTHH								
Saudi Arabia	OEJN								
	OERK								
UAE	OMDB								
	OMAA								

TABLE B0-FICE
EXPLANATION OF THE TABLE

Column	
1	Name of the State
2,3,4	Status of AMHS Capability and Interconnection and AIDC/OLDI Capability, where: Y – Fully Implemented N – Not Implemented
5	~~Status—Number of required AIDC/OLDI Interconnections implementation, where: Y—If AIDC/OLDI is implemented at least with one neighbouring ACC N—Not Implemented~~
6	~~Number of implemented AIDC/OLDI Interconnection Action plan—short description of the State's Action Plan with regard to the implementation of B0-FICE.~~
7	Remarks

State	AMHS Capability	AMHS Interconnection	AIDC/OLDI Capability	~~Required AIDC/OLDI Interconnections Implementation~~	~~Action Plan AIDC/OLDI Implementation~~	Remarks
~~1~~	~~2~~	~~3~~	~~4~~	~~5*~~	~~6~~	~~7~~
Bahrain	Y	Y	Y	~~5Y~~	<u>1</u>	connection with ABU Dhabi
Egypt	Y	Y	Y	~~4Y~~	<u>1</u>	
Iran	N	N	Y	~~4N~~	<u>0</u>	Contract signed for AMHS
Iraq	N	N	N	~~2N~~	<u>0</u>	Thales Topsky ATM system
Jordan	Y	Y	Y	~~2N~~	<u>0</u>	
Kuwait	Y	Y	Y	~~2N~~	<u>0</u>	
Lebanon	Y	Y	Y	~~1Y~~	<u>0</u>	
Libya	Y	N	Y	~~0N~~	<u>0</u>	<u>0</u> Contract signed for AMHS
Oman	Y	Y	Y	~~4N~~	<u>1</u>	
Qatar	Y	Y	Y	~~2Y~~	<u>1</u>	local implementation for OLDI
Saudi Arabia	Y	Y	Y	~~7Y~~	<u>2</u>	local implementation for AIDC
Sudan	Y	Y	Y	~~4N~~	<u>0</u>	

Syria	N	N	N	~~0~~ <u>N</u>	~~0~~	
UAE	Y	Y	Y	~~4~~ <u>Y</u>	~~3~~	
Yemen	N	N	N	~~0~~ <u>N</u>	~~0~~	Contract signed for AMHS
Total Percentage/ <u>Number</u>	73%	67%	80%	~~41~~ <u>40%</u>	~~2~~ <u>(22%)</u>	

B0-DATM Enablers/Tables

In order to assist States in the planning for the transition from AIS to AIM in an expeditious manner, the following Tables, which provide more details than the standard ANRF, should be used:

- 1- **Table B0-DATM 3-1** sets out the requirements for the Provision of AIS/AIM products and services based on the Integrated Aeronautical Information Database (IAID). It reflects the transition from the current product centric AIS to data centric AIM. For the future digital environment it is important that the authoritative databases are clearly designated and such designation must be published for the users. This is achieved with the concept of the Integrated Aeronautical Information Database (IAID), a single access point for one or more authoritative databases (~~AIS~~AIP, Terrain, Obstacles, AMDB, etc) for which the State is responsible. This Table will be used for the monitoring of the Key Performance Indicators (KPIs) related to elements Nr. 1 and 2 of the Module B0-DATM.
- 2- **Table B0-DATM 3-2** sets out the requirements for aeronautical data quality. It will be used for the monitoring of the Key Performance Indicators (KPIs) related to the element Nr. 3 of the Module B0-DATM.
- 3- **Table B0-DATM 3-3** sets out the requirements for the implementation of the World Geodetic System – 1984 (WGS-84). The requirement to use a common geodetic system remains essential to facilitate the exchange of data between different systems. The expression of all coordinates in the AIP and charts using WGS-84 is an important first step for the transition to AIM. This Table will be used for the monitoring of the Key Performance Indicators (KPIs) related to the element Nr. 4 of the Module B0-DATM.
- 4- **Table B0-DATM 3-4-1** sets out the requirements for the provision of Terrain and Obstacle data sets for Area 1 and Area 4. It will be used for the monitoring of the Key Performance Indicators (KPIs) related to the element Nr. 5 of the Module B0-DATM.
- 5- **Table B0-DATM 3-4-2** sets out the requirements for the provision of Terrain and Obstacle data sets for Area 2. It will be used for the monitoring of the Key Performance Indicators (KPIs) related to the element Nr. 5 of the Module B0-DATM.
- 6- **Table B0-DATM 3-4-3** sets out the requirements for the provision of Terrain and Obstacle data sets for Area 3 and implementation of Airport Mapping Databases (AMDB). It will be used for the monitoring of the Key Performance Indicators (KPIs) related to the element Nr. 5 of the Module B0-DATM.

Table B0-DATM 3-1

Provision of AIS/AIM products and services based on the Integrated Aeronautical Information Database (IAID)

EXPLANATION OF THE TABLE

Column:

- 1 Name of the State or territory for which the provision of AIS/AIM products and services based on the IAID is required.
- 2 Requirement for the implementation and designation of the authoritative IAID, shown by:
 FI – Fully Implemented
~~PI – Partially Implemented~~
 NI – Not Implemented
Note 1 — The IAID of a State is a single access point for one or more databases (~~AISAIP~~, Terrain, Obstacles, AMDB, etc). The minimum set of databases which should be integrated is defined in Annex 15.
~~*Note 2 — Information providing detail of “PI” should be given in the Remarks column (the implemented components of the IAID).*~~
~~*Note 3-2 — The information related to the designation of the authoritative IAID should be published in the AIP (GEN 3.1)*~~
- 3 Requirement for an IAID driven AIP production, shown by:
 FI – Fully Implemented (eAIP: Text, Tables and Charts)
 PI – Partially Implemented
 NI – Not Implemented
Note 4-3 — AIP production includes, production of AIP, AIP Amendments and AIP Supplements
~~*Note 4 — Charts’ GIS-based database should be interoperable with AIP database*~~
- 4 Requirement for an IAID driven NOTAM production, shown by:
 FC – Fully Compliant
 NC – Not Compliant
- 5 Requirement for an IAID driven SNOWTAM ~~production~~processing, shown by:
~~FC-FI~~ – Fully Implemented~~Compliant~~
~~NC-NI~~ – Not Implemented~~compliant~~
- 6 Requirement for an IAID driven PIB production, shown by:
 FC – Fully Compliant
~~PC~~ – Partially Compliant
 NC – Not Compliant
- ~~7 — Requirement for Charting systems to be interoperable with the IAID, shown by:
 FC — Fully compliant
 PC — Partially compliant
 NC — Not compliant~~
- 87 Requirement for Procedure design systems to be interoperable with the IAID, shown by:
 FI – Fully Implemented

PI – Partially Implemented

NI – Not Implemented

Note 5 — full implementation includes the use of the IAID for the design of the procedures and for the storage of the encoded procedures in the IAID

98 Requirement for ATS systems to be interoperable with the IAID, shown by:

FI – Fully Implemented

PI – Partially Implemented

NI – Not Implemented

109 Action Plan — short description of the State’s Action Plan with regard to the provision of AIM products and services based on the IAID, especially for items with a “PC”, “PI”, “NC” or “NI” status, including planned date(s) of full compliance, as appropriate.

110 Remarks — additional information, including detail of “PC”, “NC”, “PI” and “NI”, as appropriate.

TABLE B0-DATM-3-1

Provision of AIS/AIM products and services based on the Integrated Aeronautical Information Database (IAID)

State	IAID	AIP	NOTAM	SNOWTAM	PIB	~~Charting~~	Procedure Design	ATS	Action Plan	Remarks
1	2	3	4	5	6	7	87	98	109	110
BAHARAIN	~~PIFI~~	FI	FC	~~FCFI~~	FC	~~FC~~	PI	FI	National AIM Roadmap- ~~2015~~ 2016	AIXM: ~~4.5~~ 5.1 by ~~end 2015~~
EGYPT	FI	PI	~~NCFC~~	~~NCFI~~	FC	~~NC~~	NI	PI	National AIM Roadmap- ~~2015~~ 2017	AIXM: 5.1 3 and 7 by ~~2015~~ , 4-9 by 20162018
IRAN, ISLAMIC REPUBLIC OF	NI	NI	NC	~~NI~~	NC	~~NC~~	NI	NI	National AIM Roadmap- ~~2015~~ 2016	AIXM: NI Separate semi-automated NOTAM/SNOWTAM system is operative
IRAQ	NI	NI	NC	~~NCNI~~	NC	~~NC~~	NI	NI	National AIM Roadmap- ~~2014~~ 2015	AIXM: NI
JORDAN	~~PINI~~	NI	FC	~~FCNI~~	FC	~~PC~~	NI	NI	National AIM Roadmap- ~~2014~~ 2017	AIXM: database through EAD
KUWAIT	~~PINI~~	NI	FC	~~NCNI~~	PC	~~NC~~	NI	NI	National AIM Roadmap- ~~2015~~ 2016	AIXM: NI (5.1 in progress)
LEBANON	NI	~~FI~~ NI	NC	~~NCNI~~	NC	~~NC~~	NI	NI	National AIM Roadmap- ~~2014~~ 2016	AIXM: 4.5
LIBYA	NI	NI	NC	~~NCNI~~	NC	~~NC~~	NI	NI	No Action Plan	AIXM: NI
OMAN	NI	NI	NC	~~NCNI~~	NC	~~NC~~	NI	NI	National AIM Roadmap- ~~2014~~ 2016	AIXM: NI (5.1 in progress)
QATAR	~~PINI~~	PI	FC	~~PCNI~~	FC	~~PC~~	PI	NI	National AIM Roadmap- ~~2015~~ 2016	AIXM: 5.1 Q4/2017 – Data Integration (AIP, Terrain, Obstacle, Procedure Design and AMDB datasets)
SAUDI ARABIA	FI	FI	~~FCNC~~	~~FCNI~~	~~FCP~~ C	~~FC~~	FI	FI	National AIM Roadmap- ~~2014~~ 2017	AIXM: 4.5
SUDAN	~~PINI~~	NI	FC	~~NI~~ ~~NC~~	FC	~~PC~~	PI	PI	National AIM Roadmap- ~~2015~~ 2017	1. AIS DB integrated with MET & ATM 2. Contract Signed for eAIP; AIXM connected with Charting SYS. 7. Contract signed. 8. Ongoing project AIXM: NI (5.1 in progress) AIS Automation Project is

State	IAID	AIP	NOTAM	SNOWTAM	PIB	~~Charting~~	Procedure Design	ATS	Action Plan	Remarks
1	2	3	4	5	6	7	87	98	109	1110
										ongoing
SYRIAN ARAB REPUBLIC	NI	NI	NC	~~NC~~ NI	NC	~~NC~~	NI	NI	No Action Plan	<u>AIXM: NI</u>
UNITED ARAB EMIRATES	~~PI~~ NI	FI	NC	~~NC~~ NI	PC	~~PC~~	NI	PI	National AIM Roadmap- ~~2014~~ 2017	<u>AIXM: 5.1</u> <u>AMDB: 2016-2021; PIB: AVBL at OMAA, OMDb, OMDW, OMFJ, other ADs 2020; Charting system upgrade is planned for 2017; Procedure Design 2020; ATS: ACC AVBL, ADs 2020</u> <u>Digital NOTAM: 2016-2021</u> ~~AMDB: 2016-2021~~ ~~eTOD integration: 2016~~ ~~PIB: AVBL at OMMA, OMDb, OMDW; other ADs 2020~~ ~~Charting: 2016~~ ~~Procedure Design 2020~~ ~~ATS: ACC AVBL, ADs 2020~~ ~~Digital NOTAM 2016-2021~~
YEMEN	NI	NI	NC	~~NC~~ NI	NC	~~NC~~	NI	NI	No Action Plan	<u>AIXM: NI</u>

Table B0-DATM-3-2

Aeronautical Data Quality

EXPLANATION OF THE TABLE

Column:

- 1 Name of the State or territory.
- 2 Compliance with the requirement for implementation of QMS for Aeronautical Information Services including safety and security objectives, shown by:
 - FC – Fully compliant
 - NC – Not compliant
- 3 Compliance with the requirement for the establishment of formal arrangements with approved data originators concerning aeronautical data quality, shown by:
 - FC – Fully compliant
 - PC – Partially compliant
 - NC – Not compliant
- 4 Implementation of digital data exchange with originators, shown by:
 - FI – Implemented
 - PI – Partially Implemented
 - NI – Not implemented

Note 1 — Information providing detail of “PI” and “NI” should be given in the Remarks column (percentage of implementation).
- 5 Compliance with the requirement for metadata, shown by:
 - FC – Fully compliant
 - PC – Partially compliant
 - NC – Not compliant
- 6 Compliance with the requirements related to aeronautical data quality monitoring (accuracy, resolution, timeliness, completeness), shown by:
 - FC – Fully compliant
 - PC – Partially compliant
 - NC – Not compliant
- 7 Compliance with the requirements related to aeronautical data integrity monitoring, shown by:
 - FC – Fully compliant
 - PC – Partially compliant
 - NC – Not compliant
- 8 Compliance with the requirements related to the AIRAC adherence, shown by:
 - FC – Fully compliant
 - NC – Not compliant
- 9 Action Plan — short description of the State’s Action Plan with regard to aeronautical data quality requirements implementation, especially for items with a “PC”, “PI”, “NC” or “NI” status, including planned date(s) of full compliance, as appropriate.
- 10 Remarks — additional information, including detail of “PC”, “NC”, “PI” and “NI”, as appropriate.

TABLE B0-DATM-3-2
Aeronautical Data Quality

State	QMS	Establishment of formal agreements	Digital data exchange with originators	Metadata	Data quality monitoring	Data integrity monitoring	AIRAC adherence	Action Plan	Remarks
1	2	3	4	5	6	7	8	9	10
BAHARAIN	FC	~~FC~~ PC	PI	~~PC~~ FC	~~PC~~ FC	~~PC~~ FC	FC	National AIM Roadmap- ~~2015~~ 2016	
EGYPT	FC	PC	PI	FC	PC	PC	FC	National AIM Roadmap- ~~2015~~ 2017	3, 4, 6 and 7 by ~~2016~~ 2018
IRAN, ISLAMIC REPUBLIC OF	FC	PC	NI	NC	~~NC~~ FC	~~NC~~ FC	FC	National AIM Roadmap- ~~2015~~ 2016	
IRAQ	NC	NC	NI	NC	NC	NC	FC	National AIM Roadmap- ~~2014~~ 2015	
JORDAN	FC	~~NC~~ PC	NI	~~PC~~ FC	FC	FC	FC	National AIM Roadmap- ~~2014~~ 2017	
KUWAIT	FC	PC	NI	NC	NC	NC	FC	National AIM Roadmap- ~~2015~~ 2016	
LEBANON	NC	~~NC~~ PC	NI	~~NC~~ PC	~~NC~~ PC	~~NC~~ PC	FC	National AIM Roadmap- ~~2014~~ 2016	
LIBYA	NC	NC	NI	NC	NC	NC	NC	No Action Plan	
OMAN	NC	NC	NI	NC	~~NC~~ PC	~~NC~~ PC	FC	National AIM Roadmap- ~~2014~~ 2016	
QATAR	FC	~~FC~~ PC	PI	FC	PC	PC	FC	National AIM Roadmap- ~~2015~~ 2016	~~SLA with MIL in progress~~
SAUDI ARABIA	FC	~~PC~~ FC	NI	FC	FC	FC	FC	National AIM Roadmap- ~~2014~~ 2017	~~SLA will be completed end 2015~~
SUDAN	FC	FC	NI	NC	FC	FC	FC	National AIM Roadmap- ~~2015~~ 2017	
SYRIAN ARAB REPUBLIC	NC	NC	NI	NC	NC	NC	NC	No Action Plan	
UNITED ARAB EMIRATES	FC	PC	~~NI~~ PI	FC	FC	FC	FC	National AIM Roadmap- ~~2014~~ 2017	<u>SLA initiated with MIL-ongoing</u> Digital data exchange with originator: planned (2016-2021)

									CAAP 56 details of agreements
YEMEN	NC	NC	NI	PC	NC	NC	NC	No Action Plan	

Table B0-DATM-3-3

World Geodetic System-1984 (WGS-84)

EXPLANATION OF THE TABLE

Column:

- 1 Name of the State or territory for which implementation of WGS-84 is required.
- 2 Compliance with the requirements for implementation of WGS-84 for FIR and Enroute points, shown by:
 - FC – Fully compliant
 - PC – Partially compliant
 - NC – Not compliant
- 3 Compliance with the requirements for implementation of WGS-84 for Terminal Areas (arrival, departure and instrument approach procedures), shown by:
 - FC – Fully compliant
 - PC – Partially compliant
 - NC – Not compliant
- 4 Compliance with the requirements for implementation of WGS-84 for Aerodrome, shown by:
 - FC – Fully compliant
 - PC – Partially compliant
 - NC – Not compliant
- 5 Compliance with the requirements for implementation of Geoid Undulation, shown by:
 - FC – Fully compliant
 - PC – Partially compliant
 - NC – Not compliant
- 6 Action Plan — short description of the State's Action Plan with regard to WGS-84 implementation, especially for items with a "PC", "PI", "NC" or "NI" status, including planned date(s) of full compliance, as appropriate.
- 7 Remarks — additional information, including detail of "PC" and "NC", as appropriate.

TABLE B0-DATM-3-3
World Geodetic System-1984 (WGS-84)

State	FIR/ENR	Terminal	AD	GUND	Action Plan	Remarks
1	2	3	4	5	6	7
BAHARAIN	FC	FC	FC	FC		~~Plan to be updated by 2016~~
EGYPT	FC	FC	FC	FC		
IRAN, ISLAMIC REPUBLIC OF	FC	FC	FC	FC		
IRAQ	~~PCFC~~	~~PCFC~~	~~PCFC~~	NC	National AIM Roadmap ~~2014~~ 2015	
JORDAN	FC	FC	FC	FC		
KUWAIT	FC	FC	FC	FC		Last survey FEB 2015
LEBANON	FC	FC	FC	~~NCFC~~	~~National AIM Roadmap 2014~~	
LIBYA	PC	PC	NC	NC	No Action Plan	
OMAN	FC	FC	FC	FC		
QATAR	FC	FC	FC	FC		Annual Validation/Survey Updates planned up to 2017
SAUDI ARABIA	FC	FC	FC	FC		
SUDAN	FC	FC	FC	FC		
SYRIAN ARAB REPUBLIC	FC	FC	FC	NC	No Action Plan	
UNITED ARAB EMIRATES	FC	FC	FC	FC		
YEMEN	FC	FC	FC	FC		

Table B0-DATM-3-4-1
Provision of Terrain and Obstacle data sets for Areas 1 and 4

EXPLANATION OF THE TABLE

Column

1	Name of the State or territory for which Terrain and Obstacle data sets for Areas 1 and 4 are required.
2	Compliance with requirement for the provision of Terrain data sets for Area 1, shown by: FC – Fully Compliant PC – Partially Compliant NC – Not Compliant
3	Compliance with requirement for the provision of Terrain data sets for Area 4, shown by: FC – Fully Compliant PC – Partially Compliant NC – Not Compliant N/A – Not Applicable
4	Compliance with requirement for the provision of Obstacle data sets for Area 1, shown by: FC – Fully Compliant PC – Partially Compliant NC – Not Compliant
5	Compliance with requirement for the provision of Obstacle data sets for Area 4, shown by: FC – Fully Compliant PC – Partially Compliant NC – Not Compliant N/A – Not Applicable
6	Action plan — short description of the State’s Action Plan with regard to compliance with the requirements for provision of Terrain and Obstacle data sets for Areas 1 and 4, especially for items with a “PC” or “NC” status, including planned date(s) of full compliance, as appropriate.
7	Remarks— additional information, including detail of “PC” and “NC”, as appropriate.

TABLE B0-DATM-3-4-1

Provision of Terrain and Obstacle data sets for Areas 1 and 4

State	Terrain data sets		Obstacle data sets		Action Plan	Remarks
	Area 1	Area 4	Area 1	Area 4		
1	2	3	4	5	6	7
BAHARAIN	FC	FC	FC	FC		
EGYPT	FC	FC	~~PCNC~~	~~PCNC~~	National AIM Roadmap- ~~2015~~ 2017	<u>4 and 5 (HECA & HESH): 2019</u>
IRAN, ISLAMIC REPUBLIC OF	FC	FC	FC	FC		
IRAQ	NC	NC	NC	NC	National AIM Roadmap- ~~2014~~ 2015	
JORDAN	~~NCPC~~	~~NCFC~~	~~NCPC~~	~~NCFC~~	National AIM Roadmap- ~~2014~~ 2017	
KUWAIT	FC	FC	FC	FC		
LEBANON	NC	N/A	NC	N/A	National AIM Roadmap- ~~2014~~ 2016	
LIBYA	NC	N/A	NC	N/A	No Action Plan	
OMAN	NC	N/A	NC	N/A	National AIM Roadmap- ~~2014~~ 2016	
QATAR	FC	FC	FC	FC		
SAUDI ARABIA	FC	FC	FC	FC		
SUDAN	NC	N/A	NC	N/A	National AIM Roadmap- ~~2015~~ 2017	
SYRIAN ARAB REPUBLIC	NC	N/A	NC	N/A	No Action Plan	
UNITED ARAB EMIRATES	PC	FC	PC	FC	National AIM Roadmap- ~~2014~~ 2017	<u>A recurrent data acquisition eTOD Area 1 is planned</u>
YEMEN	NC	N/A	NC	N/A	No Action Plan	

Table B0-DATM-3-4-2
Provision of Terrain and Obstacle data sets for Area 2

EXPLANATION OF THE TABLE

Column

1	Name of the State or territory for which Terrain and Obstacle data sets for Area 2 are required.
2	Compliance with requirement for the provision of Terrain data sets for Area 2a, shown by: FC – Fully Compliant PC – Partially Compliant NC – Not Compliant
3	Compliance with requirement for the provision of Terrain data sets for Area 2b, shown by: FI – Fully Implemented PI – Partially Implemented NI – Not implemented N/A – Not Applicable
4	Compliance with requirement for the provision of Terrain data sets for Area 2c, shown by: FI – Fully Implemented PI – Partially Implemented NI – Not Implemented N/A – Not Applicable
5	Compliance with requirement for the provision of Terrain data sets for Area 2d, shown by: FI – Fully Implemented PI – Partially Implemented NI – Not Implemented N/A – Not Applicable
6	Compliance with requirement for the provision of Obstacle data sets for Area 2a, shown by: FC – Fully Compliant PC – Partially Compliant NC – Not Compliant
7	Compliance with requirement for the provision of Obstacle data sets for Area 2b, shown by: FI – Fully Implemented PI – Partially Implemented NI – Not implemented N/A – Not Applicable
8	Compliance with requirement for the provision of Obstacle data sets for Area 2c, shown by: FI – Fully Implemented

PI – Partially Implemented

NI – Not Implemented

N/A – Not Applicable

- 9 Compliance with requirement for the provision of Obstacle data sets for Area 2d, shown by:
- FI – Fully Implemented
 - PI – Partially Implemented
 - NI – Not Implemented
 - N/A – Not Applicable
- 10 Action plan — short description of the State’s Action Plan with regard to compliance with the requirements for provision of Terrain and Obstacle data sets for Area 2, especially for items with a “PC”, “PI”, “NC” or “NI” status.
- 11 Remarks— additional information, including detail of “PC”, “PI” and “NC”, “NI”, as appropriate.

TABLE B0-DATM-3-4-2

Provision of Terrain and Obstacle data sets for Area 2

State	Terrain data sets				Obstacle data sets				Action Plan	Remarks
	Area 2a	Area 2b	Area 2c	Area 2d	Area 2a	Area 2b	Area 2c	Area 2d		
1	2	3	4	5	6	7	8	9	10	11
BAHARAIN	NC	NI	NI	NI	~~NCFC~~	~~NIPI~~	~~NIPI~~	~~NIPI~~	National AIM Roadmap- ~~2015~~ 2016	
EGYPT	PC	PI	PI	PI	NC	NI	NI	NI	National AIM Roadmap- ~~2015~~ 2017	<u>To be completed by 2020</u>
IRAN, ISLAMIC REPUBLIC OF	~~NCFC~~	~~NIPI~~	~~NIPI~~	~~NIPI~~	~~NCFC~~	~~NIPI~~	~~NIPI~~	~~NIPI~~	~~National AIM Roadmap 2015~~	
IRAQ	NC	NI	NI	NI	NC	NI	NI	NI	National AIM Roadmap- ~~2014~~ 2015	
JORDAN	~~NCPC~~	~~NIPI~~	~~NIPI~~	NI	~~NCPC~~	~~NIPI~~	~~NIPI~~	NI	National AIM Roadmap- ~~2014~~ 2017	<u>Area 2a, 2b and 2c implemented for OJAI RWY 26R/08L</u>
KUWAIT	NC	NI	NI	NI	NC	NI	NI	NI	National AIM Roadmap- ~~2015~~ 2016	
LEBANON	NC	NI	NI	NI	NC	NI	NI	NI	National AIM Roadmap- ~~2014~~ 2016	
LIBYA	NC	NI	NI	NI	NC	NI	NI	NI	No Action Plan	
OMAN	NC	NI	NI	NI	NC	NI	NI	NI	National AIM Roadmap- ~~2014~~ 2016	
QATAR	FC	FI	FI	FI	FC	FI	FI	FI		
SAUDI ARABIA	NC	NI	NI	NI	NC	NI	NI	NI	National AIM Roadmap- ~~2014~~ 2017	
SUDAN	NC	NI	NI	NI	NC	NI	NI	NI	National AIM Roadmap- ~~2015~~ 2017	
SYRIAN ARAB REPUBLIC	NC	NI	NI	NI	NC	NI	NI	NI	No Action Plan	
UNITED ARAB EMIRATES	NC	NI	NI	~~NIPI~~	~~NCFC~~	~~NIPI~~	~~NIPI~~	~~NIPI~~	National AIM Roadmap- ~~2014~~ 2017	<u>eTOD Area 2 (all sub-areas) survey & data acquisition through international airport service providers</u>
YEMEN	NC	NI	NI	NI	NC	NI	NI	NI	No Action Plan	

Table B0-DATM-3-4-3 **Provision of Terrain and Obstacle data sets for Area 3 and Airport Mapping** **Databases (AMDB)** ---

EXPLANATION OF THE TABLE

Column

1	Name of the State or territory for which Terrain and Obstacle data sets for Area 3 and AMDB are required.
2	Compliance with requirement for the provision of Terrain data sets for Area 3, shown by: FI – Fully Implemented PI – Partially Implemented NI – Not Implemented N/A – Not Applicable
3	Compliance with requirement for the provision of Obstacle data sets for Area 3, shown by: FI – Fully Implemented PI – Partially Implemented NI – Not Implemented N/A – Not Applicable
4	Implementation of AMDB, shown by: FI – Fully Implemented PI – Partially Implemented NI – Not Implemented N/A – Not Applicable
5	Action plan — short description of the State’s Action Plan with regard to compliance with the requirements for provision of Terrain and Obstacle data sets for Area 3 and AMDB implementation, especially for items with a “PC”, “PI”, “NC” or “NI” status.
6	Remarks— additional information, including detail of “PI” and “NI”, as appropriate.

TABLE B0-DATM-3-4-3**Provision of Terrain and Obstacle data sets for Area 3 and Airport Mapping Databases (AMDB)**

State	Terrain data sets (Area 3)	Obstacle data sets (Area 3)	AMDB	Action Plan	Remarks
1	2	3	4	5	6
BAHARAIN	NI	~~NI~~ <u>FI</u>	NI	National AIM Roadmap- ~~2015~~ <u>2016</u>	
EGYPT	NI	NI	NI	National AIM Roadmap- ~~2015~~ <u>2017</u>	<u>A3: 2019; AMDB: 2020</u>
IRAN, ISLAMIC REPUBLIC OF	~~NI~~ <u>FI</u>	~~NI~~ <u>FI</u>	NI	National AIM Roadmap- ~~2015~~ <u>2016</u>	
IRAQ	NI	NI	NI	National AIM Roadmap- ~~2014~~ <u>2015</u>	
JORDAN	~~NI~~ <u>PI</u>	~~NI~~ <u>PI</u>	NI	National AIM Roadmap- ~~2014~~ <u>2017</u>	<u>Area 3 implemented for OJAI RWY 26R/08L</u>
KUWAIT	FI	FI	NI	National AIM Roadmap- ~~2015~~ <u>2016</u>	
LEBANON	NI	NI	NI	National AIM Roadmap- ~~2014~~ <u>2016</u>	
LIBYA	NI	NI	NI	No Action Plan	
OMAN	NI	NI	NI	National AIM Roadmap- ~~2014~~ <u>2016</u>	
QATAR	~~NI~~ <u>FI</u>	~~FI~~ <u>PI</u>	~~NI~~ <u>PI</u>	National AIM Roadmap- ~~2015~~ <u>2016</u>	<u>Q4/2017 AMDB implementation</u> ~~AMDB to be implemented last quarter of 2015~~
SAUDI ARABIA	NI	NI	NI	National AIM Roadmap- ~~2014~~ <u>2017</u>	
SUDAN	NI	NI	NI	National AIM Roadmap- ~~2015~~ <u>2017</u>	
SYRIAN ARAB REPUBLIC	NI	NI	NI	No Action Plan	
UNITED ARAB EMIRATES	~~NI~~ <u>FI</u>	~~NI~~ <u>FI</u>	NI	National AIM Roadmap- ~~2014~~ <u>2017</u>	<u>AMDB technical infrastructure (metadata, model) implemented in IAID, pending compatibility analysis AIXM 5.1 with revised AMDB model (RTCA DO-272D) when released.</u>
YEMEN	NI	NI	NI	No Action Plan	

Table B0-AMET 3-1

SADIS FTP

EXPLANATION OF THE TABLE

Column

- 1 Name of the State
- 2 Status of implementation of SADIS FTP, where:
Y – Yes, implemented
N – No, not implemented

- 3 Action Plan
- 4 Remarks

State	Status	Action Plan	Remarks
1	2	3	4
BAHRAIN	Y		
EGYPT	Y		
IRAN (ISLAMIC REPUBLIC OF)	N	No Action Plan	
IRAQ	Y		
JORDAN	Y		
KUWAIT	Y		
LEBANON	N	No Action Plan	
LIBYA	Y		
OMAN	Y		
QATAR	Y		
SAUDI ARABIA	N	Coordinating with SADIS Provider	
SUDAN	Y		
SYRIAN ARAB REPUBLIC	N	No Action Plan	
UNITED ARAB EMIRATES	Y		
YEMEN	Y		

Table B0-AMET 3-2

Volcanic Ash Advisory Centers

Not Applicable

EXPLANATION OF THE TABLE

Column

- 1 Name of the State responsible for the provision of a volcanic ash advisory centre (VAAC)
- 2 Name of the VAAC
Note: The name is extracted from the ICAO Location Indicators (Doc 7910).
- 3 ICAO location indicator of the VAAC
- 4 Status of implementation of volcanic ash advisory information, where:
FC—Fully compliant
PC—Partially compliant
NC—Not compliant
- 5 Status of implementation of volcanic ash advisory information in graphical format, where:
FC—Fully compliant
PC—Partially compliant
NC—Not compliant

State	Volcanic Ash Advisory Centre (VAAC)	ICAO Location Indicator	Status of Implementation	
			VAA	VAG
1	2	3	4	5
FRANCE	Toulouse	LFPW	FC	FC

Table B0-AMET 3-3

Tropical Cyclone Advisory Centers

Not Applicable

EXPLANATION OF THE TABLE

Column

- 1 Name of the State responsible for the provision of a tropical cyclone advisory centre (TCAC)
- 2 Name of the TCAC
Note: The name is extracted from the ICAO Location Indicators (Doc 7910).
- 3 ICAO location indicator of the TCAC
- 4 Status of implementation of tropical cyclone advisory information, where:
FC—Fully compliant
PC—Partially compliant
NC—Not compliant
- 5 Status of implementation of tropical cyclone advisory information in graphical format, where:
FC—Fully compliant
PC—Partially compliant
NC—Not compliant

State	Tropical Cyclone Advisory Centre (TCAC)	ICAO Location Indicator	Status of Implementation	
			TCA	TCG
1	2	3	4	5
INDIA	New Delhi	VIDP	FC	FC

Table B0-AMET 3-4

Quality Management System

EXPLANATION OF THE TABLE

Column

- 1 Name of the State
- 2, 3, 4, Status of implementation of Quality Management System of meteorological information –
- 5 QMS: not started/ planning, ongoing/ partially implemented, Implemented/ISO 9001 Certified, Date of Certification.
- 6 Action Plan
- 7 Remarks

State	Not started/ planning	Ongoing/ partially implemented	Implemented/ ISO 9001 Certified		Action Plan	Remarks
			Status	Date of Certification		
1	2	3	4	5	6	7
BAHARAIN			√	2008		
EGYPT			√	23 May 2012		Recertification: May 2015
IRAN, ISLAMIC REPUBLIC OF			√	Oct 2015		
IRAQ	√				No Action Plan	
JORDAN			√	2 Apr 2014		Recertification: 14 April 2017
KUWAIT			√	23 Aug 2013		Recertification: 22 Aug 2016
LEBANON	√				No Action Plan	
LIBYA	√				No Action Plan	
OMAN		√			TBD	
QATAR			√	Dec 2011		
SAUDI ARABIA			√	Aug 2014		
SUDAN			√	5 June 2014		
SYRIAN ARAB REPUBLIC	√				No Action Plan	
UNITED ARAB EMIRATES			√	19 Dec 2012		Recertification: 18 Dec 2015
YEMEN	√				No Action Plan	

Table B0-AMET 3-5
SIGMET Availability

EXPLANATION OF THE TABLE

Column

- 1** Name of the State
- 2** Status of implementation of SIGMET, where:
Y – Yes, implemented (at least one SIGMET received within a 5 month monitoring period, or as required)
N – No, not implemented (no SIGMET received within a 5 month monitoring period)
- 3** Status of implementation of SIGMET format, where:
Y – Yes, implemented (at least 95% of received SIGMET messages reveal the correct format (TTAAii CCCC in accordance to the MID SIGMET Guide; ATSU, MWO, FIR and FIR name in accordance to ICAO Doc 7910) for the first two lines of SIGMET)
N – No, not implemented (less than 95% of received SIGMET messages reveal the correct format for the first two lines of SIGMET)
- 4** Action Plan
- 5** Remarks

State	Implementation		Action Plan	Remarks
	SIGMET Reception	SIGMET Format		
1	2	3	4	5
BAHRAIN	Y	Y		
EGYPT	Y	Y		
IRAN, ISLAMIC REPUBLIC OF	Y	Y		
IRAQ	Y	Y		Verify the header for Iraq is WSIQ01 ORBI for FIR ORBB – if so, update to MID Doc 009
JORDAN	Y	Y		
KUWAIT	Y	Y		
LEBANON	Y	Y		
LIBYA	Y	N		Indicators HLMC for MWO and HLLL for FIR are not defined in ICAO Doc 7910
OMAN	Y	Y		
QATAR	N/A	N/A		These fields are not applicable to Qatar
SAUDI ARABIA	Y	Y		
SUDAN	Y	Y		
SYRIAN ARAB REPUBLIC	N	N	No Action Plan	
UNITED ARAB EMIRATES	Y	Y		
YEMEN	N	N	No Action Plan	

Table B0-AMET 3-6
WIND SHEAR Availability

TBD

Draft Table B0-AMET 3-7

OPMET Availability (METAR and TAF)

EXPLANATION OF THE TABLE

Column

- 1 Name of the State
- 2, 3 Status of availability of METAR and TAF for AOP aerodromes, where:
Y – Yes, implemented (95% availability of required METAR within a State; 95% availability of required TAF within a State)
N – No, not implemented
- 4 Remarks

State	Implementation		Remarks
	METAR	TAF	
1	2	3	4
BAHRAIN	Y	Y	
EGYPT	Y	Y	
IRAN, ISLAMIC REPUBLIC OF	Y	Y	
IRAQ	N	N	METAR and TAF needed for ORBM
JORDAN	Y	Y	
KUWAIT	Y	Y	
LEBANON	Y	Y	
LIBYA	Y	Y	
OMAN	Y	Y	
QATAR	Y	Y	
SAUDI ARABIA	Y	Y	
SUDAN	Y	Y	
SYRIAN ARAB REPUBLIC	N	N	METAR & TAF needed for OSAP
UNITED ARAB EMIRATES	Y	Y	
YEMEN	N	N	METAR & TAF needed for OYAA, OYHD, OYRN, OYSN and OYTZ

Table B0-FRTO

EXPLANATION OF THE TABLE

Column

- 1 Name of the State
 - 2 Status of implementation of Flexible Use of Airspace (FUA) Level 1-Strategic.
 - 3 Status of implementation of Flexible Use of Airspace (FUA) Level 2-Pre-tactical
 - 4 Status of implementation of Flexible Use of Airspace (FUA) Level 3-Tactical
- Implementation should be based on the published aeronautical information:
 FI – Fully Implemented
 PI – Partially Implemented
 NI – Not Implemented
- 5 Remarks

Applicability State	FUA Level 1	FUA Level 2	FUA Level 3	Remarks
1	2	3	4	5
Bahrain				
Egypt				
Iran				
Iraq				
Jordan				
Lebanon				
Libya				
Kuwait				
Oman				
Qatar				
Saudi Arabia				
Sudan				
Syria				
Unite Arab Emirates				
Yemen				
Total				
Percentage				

Table B0-NOPS

EXPLANATION OF THE TABLE

Column

- 1 Name of the State
- 2 Mechanism for the implementation of ATFM Measures based on collaborative decision.
Reference to documentation related to the established mechanism for the implementation of
- 3 ATFM Measures based on collaborative decision
Status of the establishment of ATFM Structure
- 4
- 5 Reference to documentation reflecting the establishment of the ATFM Structure
- 6 Remarks

Applicability State	Mechanism for the implementation of ATFM Measures based on collaborative decision	Reference	ATFM Structure	Reference	Remarks
1	2	3	4	5	6
Bahrain					
Egypt					
Iran					
Iraq					
Jordan					
Lebanon					
Libya					
Kuwait					
Oman					
Qatar					
Saudi Arabia					
Sudan					
Syria					
UAE					
Yemen					
Total					
Percentage					

ACAS V7.1 Status and regulation reference

State	Status	Regulation Reference	Effective Date	Remarks
1	2	3	4	5
Bahrain	Y	Aeronautical Circular AC/OPS/05/2015 dated 10th of March 2015		Air Navigation Technical Regulations (ANTR) updated to reflect Annex 10 (Volume IV) Reference needs to be provided http://www.mtt.gov.bh/content/aa-laws-and-regulations
Egypt	Y	ECAR Part 121.356 & ECAR Part 91.221		Egyptian Civil Aviation Regulation (ECAR) Parts 121 and 91 have been updated in accordance with the relevant provisions of ICAO Annex 10, Volume IV, Ch.4 http://www.civilaviation.gov.eg/Regulations/regulation.html
Iran	Y	Aeronautical Telecommunications bylaw, articles 3 and 4		According to articles 3 and 4 of Iran aeronautical telecommunications by law, ratified by board of ministers, Airborne collision avoidance systems are categorized as aeronautical telecommunications systems and should be manufactured, installed and maintained according to standards of Annex 10. -Since no difference to ICAO annex 10 is notified, ACAS V 7.1 is mandatory according to provisions of annex 10 amendment 85. -Airworthiness directives issued by FAA and EASA shall to be implemented by Iranian AOC holders.
Iraq	N			
Jordan	Y	JCAR-OPS.1 (1.668 airborne collision avoidance system)		
Kuwait	Y	Kuwait Civil Aviation Safety Regulations – Part 6 – Operation of		

State	Status	Regulation Reference	Effective Date	Remarks
1	2	3	4	5
		Aircraft, Para. 6.20.4		
Lebanon	Y			Regulation reference needs to be provided
Libya	N			
Oman	Y			Regulation reference needs to be provided
Qatar	Y	QCAR – OPS 1, Subpart K, QCAR – OPS 1.668 – Airborne collision avoidance system QCAR Part 10 - Volume4 Chapter 4 Airborne Collision Avoidance System		References: http://www.caa.gov.qa/en/safety_regulations
Saudi Arabia	Y	GACAR PART 91 – Appendix C		
Sudan	Y	Amended Annex 10 (V4)- ANNEX 6 (V2)		According to adopted annexes to Sudan Regulations (SUCAR 10 V4 Par. 4.3.5.3.1 and SUCAR 6 V2 par 2.05.15)
Syria	N			
UAE	Y	CAR-OPS 1.668 Airborne Collision Avoidance System (See IEM OPS 1.668) and CAAP 29 and AIP 1.5.6.6		https://www.gcaa.gov.ae/en/ePublication/Pages/CARs.aspx?CertD=CARS
Yemen	Y			Reference need to be provided

TABLE B0-SNET

EXPLANATION OF THE TABLE

Column

1	Name of the State and ATS Units within a State providing Enroute and Approach services
2	Enroute and Approach ATS Units providing Radar services “R”
3	Enroute and Approach ATS Units providing Procedural services “P”
4	Enroute and Approach ATS Units within a State providing radar services where Short-Term Conflict Alert (STCA) was implemented
5	Enroute and Approach ATS Units within a State providing radar services where Minimum Safe Altitude Warning (MSAW) was implemented
6	Action Plan for the implementation of STCA and MSAW
7	Status of implementation of STCA and MSAW (reference to column 2)

State/ ATS Units (ENR & APP)	ATS		STCA	MSAW	Action Plan	Status
	R	P				
1	2	3	4	5	6	7
Bahrain	2	0	2	2		STCA 100% MSAW 100%
Bahrain ACC	R		Y	Y		
Bahrain APP	R		Y	Y		
Egypt	7	1				STCA 100% MSAW 100%
Cairo ACC	R		Y	Y		
Alex APP	R		Y	Y		
Aswan APP	R		Y	Y		
Cairo APP	R		Y	Y		
Luxor APP	R		Y	Y		
Hurghada APP	R		Y	Y		
Marsa APP		P	N/A	N/A		
Sharm APP	R		Y	Y		
Iran	5	2				STCA 100% MSAW 100%
Tehran ACC	R		Y	Y		
Bandar Abbas APP		P	N/A	N/A		
Esfahan APP	R		Y	Y		
Mashhad APP	R		Y	Y		
Mehrabad APP	R		Y	Y		
Shiraz APP	R		Y	Y		
Tabriz APP		P	N/A	N/A		
Iraq	2	0				STCA 100% MSAW 100%
Baghdad ACC	R		Y	Y		
Baghdad APP	R		Y	Y		
Jordan	2	1				STCA 100%

State/ ATS Units (ENR & APP)	ATS		STCA	MSAW	Action Plan	Status
	R	P				
1	2	3	4	5	6	7
Amman ACC	R		Y	Y		MSAW 100%
Amman APP	R		Y	Y		
Aqaba APP		P	N/A	N/A		
Kuwait	2	0				STCA 100% MSAW 100%
Kuwait ACC	R		Y	Y		
Kuwait APP	R		Y	Y		
Lebanon	2	0				STCA 100% MSAW 100%
Beirut ACC	R		Y	Y		
Beirut APP	R		Y	Y		
Libya	0	4				STCA 0% MSAW 0%
Tripoli ACC		P	N/A	N/A		
Tripoli APP		P	N/A	N/A		
Benghazi Centre		P	N/A	N/A		
Benghazi APP		P	N/A	N/A		
Oman	3	0				STCA 100% MSAW 100%
Muscat ACC	R		Y	Y		
Seeb APP	R		Y	Y		
Salalah APP	R		Y	Y		
Qatar	1	0				STCA 100% MSAW 100%
Doha Radar	R		Y	Y		
Saudi Arabia	6	0				STCA 100% MSAW 100%
Jeddah ACC	R		Y	Y		
Riyadh ACC	R		Y	Y		
Jeddah APP	R		Y	Y		
Riyadh APP	R		Y	Y		
Madina APP	R		Y	Y		
Damam APP	R		Y	Y		
Sudan	2	3				STCA 100% MSAW 100%
Khartoum ACC	R		Y	Y		
Khartoum APP	R		Y	Y		
Elobeid APP		P	N/A	N/A		
Nyala APP		P	N/A	N/A		
Port Sudan APP		P	N/A	N/A		
Syria	0	4				STCA 0%

State/ ATS Units (ENR & APP)	ATS		STCA	MSAW	Action Plan	Status
	R	P				
1	2	3	4	5	6	7
Damascus ACC		P				MSAW 0%
Damascus ACC		P				
Aleppo APP		P				
Latakia APP		P				
UAE	7	0	6	6		STCA 86% MSAW 86%
SZC	R		Y	Y		
Al Ain APP	R		Y	Y		
Abu Dhabi Radar	R		Y	Y		
Al Maktoum APP	R		Y	Y		
Dubai Radar	R		Y	Y		
Fujairah APP	R		Y	Y		
RAS AL KHAIMAH	R		N	N		
Yemen		3				STCA 0% MSAW 0%
Sana'a ACC		P	N/A	N/A		
Aden APP		P	N/A	N/A		
Sana'a APP		P	N/A	N/A		
Total	41	18	40 Y	40 Y		STCA 97%
Percentage			18 N/A	18 N/A		MSAW 97%



ICAO

CAPACITY & EFFICIENCY

MSG/6-REPORT
Appendix 5.2B

AIR NAVIGATION REPORT

ICAO Middle East Region



SECOND EDITION (REFERENCE PERIOD: January – December 2017)



MONITORING ASBU IMPLEMENTATION



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A Coordinated Approach to Regional Air Navigation Systems Implementation

The air transport industry plays a major role in world economic activity. It directly and indirectly supports 67.3 million jobs by aviation worldwide, contributes over \$2.7 trillion to global Gross Domestic Product (GDP), and carries over 4.1 billion passengers and 53 million tonnes of freight annually.

This is illustrated by the fact that over half of the world's 1.2 billion tourists who travelled across international borders last year were transported by air, and that air transport now carries some 35% of world trade by value. Indeed, more than 90% of cross border Business-to-Consumer (B2C) e-commerce was carried by air transport.

Middle East has been the fastest growing Region for passenger and cargo traffic since 2011. In 2016, MID air carriers recorded 11.8% growth in Revenue Passenger-Kilometers (RPKs). Although this growth has declined to 6.9% in 2017, the Region carried 14% RPK share in the year 2017.

The continuing growth of traffic in the MID Region places increased demand on airspace capacity, which necessitates an optimum utilization of the available airspace and airports.

One of the key elements to maintaining the vitality of civil aviation is to ensure safe, secure, efficient and environmentally sustainable operations at the global, regional and national levels. In this respect, ICAO works constantly to address the expectations of the aviation community in all key performance areas through the following coordinated activities:

- Policy and Standardization initiatives;
- Implementing programmes to address performance issues;
- Monitoring of key performance trends and indicators; and
- Performance Analysis.

The GANP represents a rolling, 15-year strategic methodology which leverages existing technologies and anticipates future developments based on State/industry agreed operational objectives.



Mohamed K. Rahma
Regional Director,
ICAO Middle East Office

Its structured approach, organized in blocks of upgrades in non-overlapping six-year time increments starting in 2013 and continuing through 2031 and beyond, provides a basis for sound investment strategies and will generate commitment from States, equipment manufacturers, operators and service providers.

The GANP also explores the need for more integrated aviation planning at both regional and national level and addresses required solutions through the consensus-driven Aviation System Block Upgrade (ASBU) systems engineering modernization strategy.

In all of its coordinated activities, ICAO always strives to achieve a balance between the need for increased capacity and efficiency while maintaining aviation safety and the impact on climate change at an acceptable level.

The regular review of implementation progress and the analysis of potential impediments will ultimately ensure the harmonious transition from one region to another following major traffic flows, as well as ease the continuous evolution towards the GANP's performance targets.

MID Air Navigation Report is the main tool for monitoring and reporting on the status of air navigation systems implementation in the MID Region.

This second edition of the Report provides update on the status and progress of the Priority 1 ASBU Block 0 Modules within the ICAO MID Region during the reporting period of January 2017 to December 2017.

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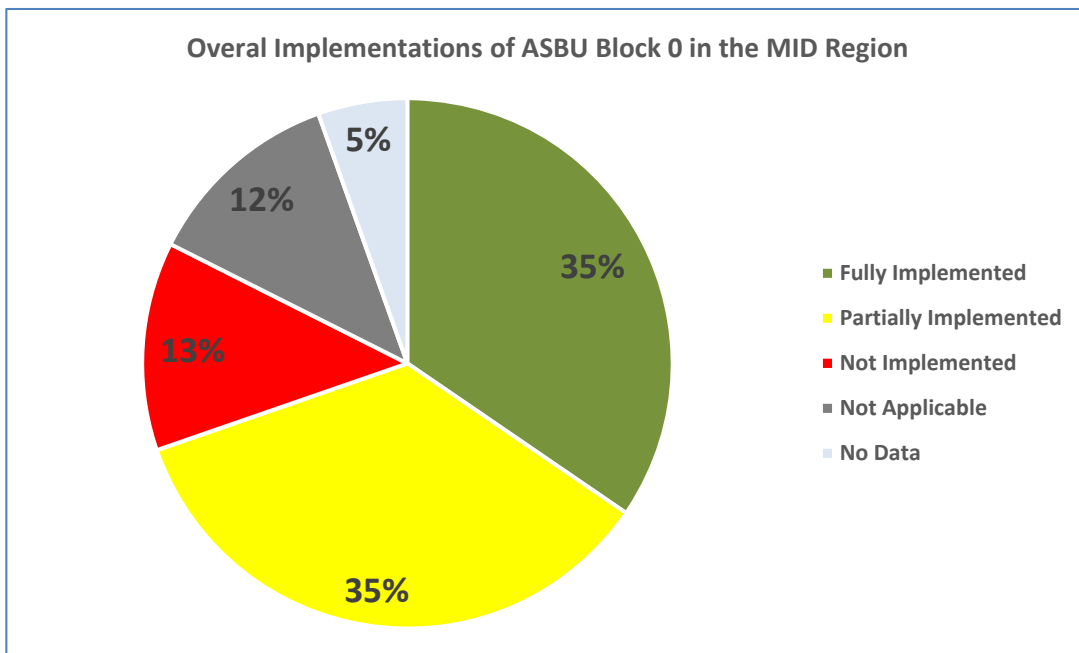
EXECUTIVE SUMMARY

The Second Edition of the ICAO MID Air Navigation Report (2017) provides an overview of the status of implementation of the Priority 1 ASBU Block 0 Modules in the MID Region as well as the progress achieved by MID States from the first edition of the MID Air Navigation Report (2016).

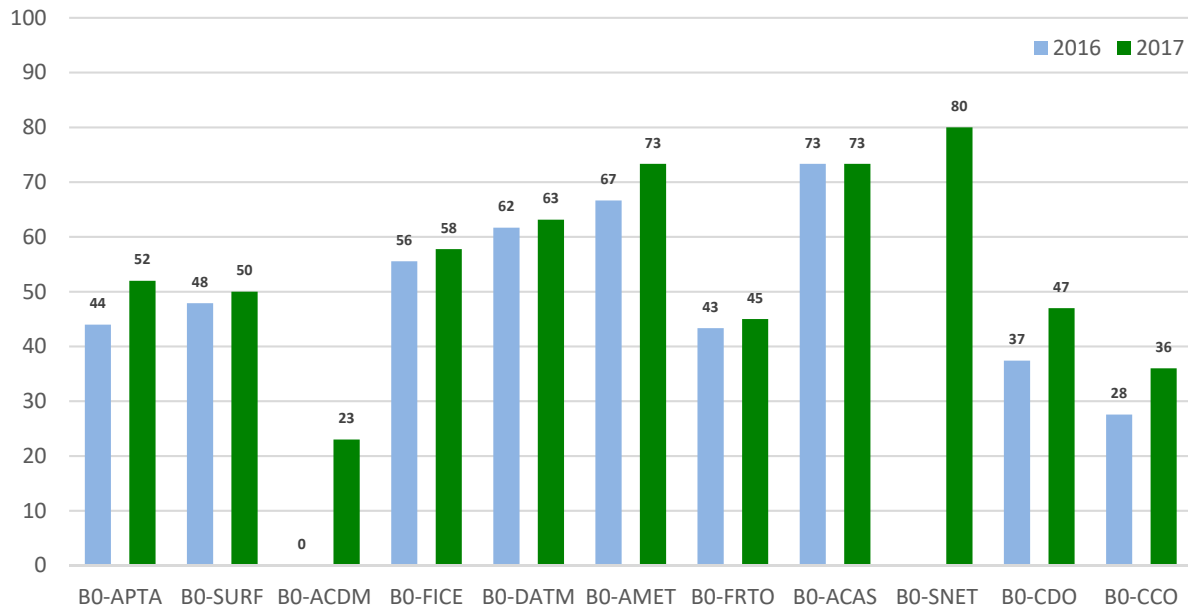
The main part of the document includes Section 2, which provides the status of implementation and the Regional Dashboard for the Priority 1 ASBU Block 0 Modules in the MID Region through different statistical maps and charts.

This Section will be complemented by providing the Outlook 2020 of the Region in Section 3 and environmental protection matters in Section 4. Section 5 provides some best practices/success stories of States in the implementation of ASBU Block 0 Modules.

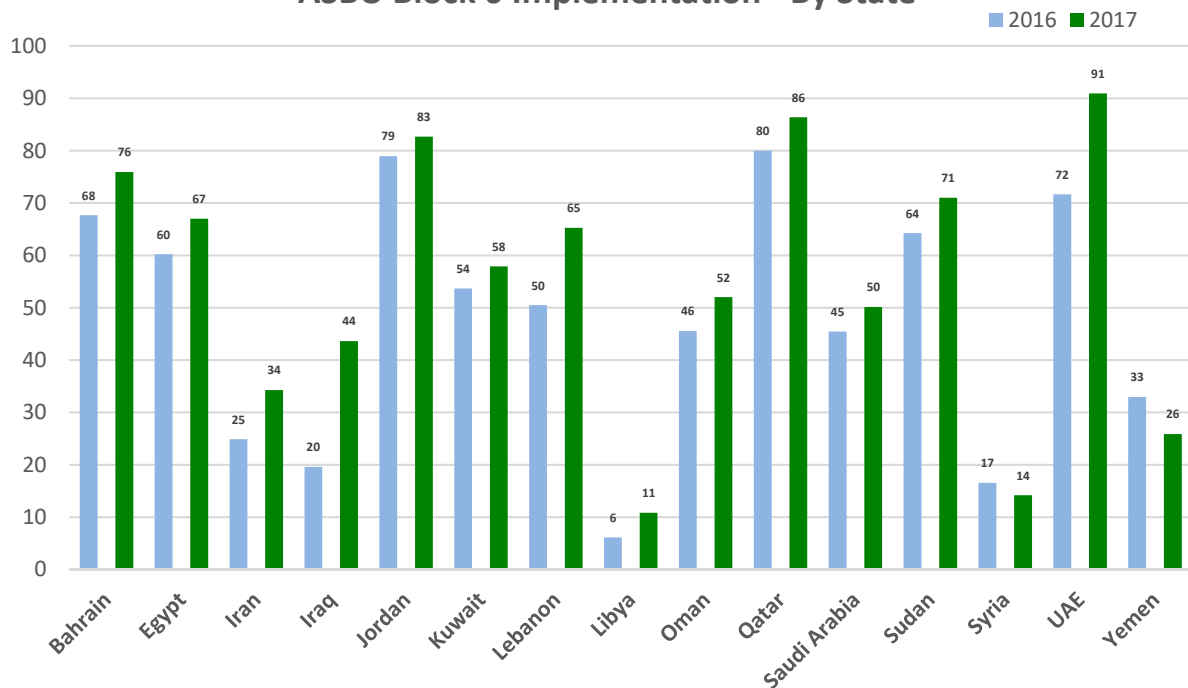
To summarize the implementation status and progress of ASBU Block 0 Modules, the following ASBU Block 0 Implementation Dashboards present status and progress achieved in the implementation of each Module and by State. Detailed status is provided in Section 2.



ASBU Block 0 Implementation - By Module



ASBU Block 0 Implementation - By State



Note 1 – utmost care was taken in the calculation of percentages, figures and numbers, however the statistics and graphs in this report should be considered as approximate amounts.

Note 2 – progress of States from 2016 to 2017 may be from the States implementation as well as some changes in the Modules structure (i.e. introduction of new element for BO-AMET, introduction of BO-SNET as a new Priority1 Module and definition of applicable aerodromes for BO-CDO and BO-CCO)

1. INTRODUCTION

1.1 Objectives

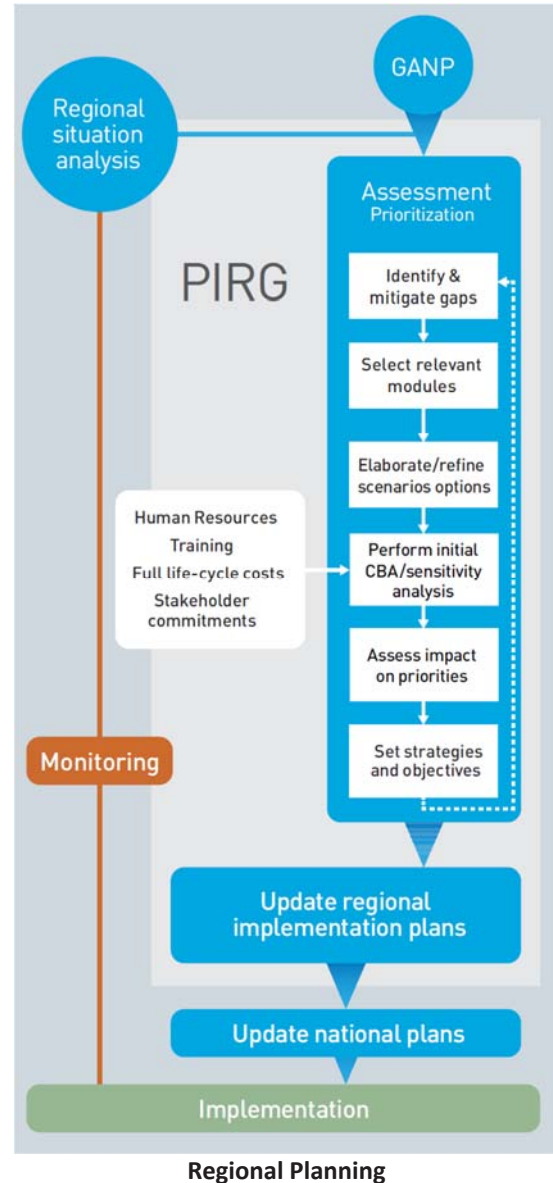
The second edition of the ICAO MID Region Air Navigation Report presents an overview of the planning and implementation progress for the Priority 1 ASBU Block 0 Modules (and its detailed elements) within the ICAO MID Region during the reporting period January 2017 till December 2017.

The implementation status data covers the fifteen (15) ICAO MID States.

GANP states that the regional national planning process should be aligned and used to identify those Modules which best provide solutions to the operational needs identified. Depending on implementation parameters such as the complexity of the operating environment, the constraints and the resources available, regional and national implementation plans will be developed in alignment with the GANP. Such planning requires interaction between stakeholders including regulators, users of the aviation system, the air navigation service providers (ANSPs), aerodrome operators and supply industry, in order to obtain commitments to implementation.

Accordingly, deployments on a global, regional and sub-regional basis and ultimately at State level should be considered as an integral part of the global and regional planning process through the Planning and Implementation Regional Groups (i.e. MIDANPIRG). The PIRG process will further ensure that all required supporting procedures, regulatory approvals and training capabilities are set in place. These supporting requirements will be reflected in regional online Air Navigation Plan (MID eANPs) developed by MIDANPIRG, ensuring strategic transparency, coordinated progress and certainty of investment. In this way, deployment arrangements including applicability dates can also be agreed and collectively applied by all stakeholders involved in the Region. The MID Region Air Navigation Report which contains all information on the implementation process of the

Priority 1 ASBU Modules of the MID Region Air Navigation Strategy (MID Doc 002) is the key document for MIDANPIRG and its Subsidiary Bodies to monitor and analyze the implementation within the MID Region.



1.2 Background

Following the discussions and recommendations from the Twelfth Air Navigation Conference (AN-Conf/12), the Fourth Edition of the Global Air Navigation Plan (GANP) based on the Aviation Systems Block Upgrades (ASBU) approach was endorsed by the 38th Assembly of ICAO in October 2013. The Assembly Resolution 38-02 which agreed, amongst others, to call upon States, planning and implementation regional groups (PIRGs), and the aviation industry to provide timely information to ICAO (and to

each other) regarding the implementation status of the GANP, including the lessons learned from the implementation of its provisions and to invite PIRGs to use ICAO standardized tools or adequate regional tools to monitor and (in collaboration with ICAO) analyze the implementation status of air navigation systems.

The Fourth meeting of the MIDANPIRG Steering Group (MSG/4) which was held in Cairo, Egypt from 24 to 26

November 2014 endorsed the MID Region Air Navigation Strategy. The Strategy was later updated by MIDANPIRG/15 and 16 and published as MID Doc 002. The Strategy includes 12 priority 1 Block 0 Modules and their associated performance indicators and targets.

MIDANPIRG and its Subsidiary Bodies (in particular ANSIG) monitor the progress and the status of implementation of the ASBU Block 0 Modules in the MID Region.

Doha Declaration, which was endorsed by the third meeting of Directors General of Civil Aviation (DGCA-MID/3) (Doha, Qatar, 27-29 April 2015), has set five Targets for the Air Navigation Capacity and Efficiency, as follows:

- 1- *Optimization of Approach Procedures including vertical guidance (PBN):* Implement PBN approach procedures with vertical guidance, for all runways ends at international aerodromes, either as the primary approach or as a back-up for the precision approaches by 2017
- 2- *Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration:* 11 States to implement AIDC/OLDI between their ACCs and at least one adjacent ACC by 2017
- 3- *Service Improvement through Digital Aeronautical Information Management:* All States to complete

implementation of Phase I of the transition from AIS to AIM by 2017

- 4- *Meteorological information supporting enhanced operational efficiency and safety:* 12 States to complete the implementation of QMS for MET by 2017
- 5- *ACAS Improvement:* All States require carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons by 2017

The MID Region Air Navigation Report is an integral part of the air navigation planning and implementation process in the MID Region; and the main tool for the monitoring and assessing the implementation of Air navigation Systems and ASBUs in the MID Region.

1.3 Scope

This MID Air Navigation Report addresses the implementation status of the priority 1 ASBU Block 0 Modules for the reference period January 2017 to December 2017.

The Report covers the fifteen (15) ICAO MID States:

Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Sudan, Syria, United Arab Emirates and Yemen.



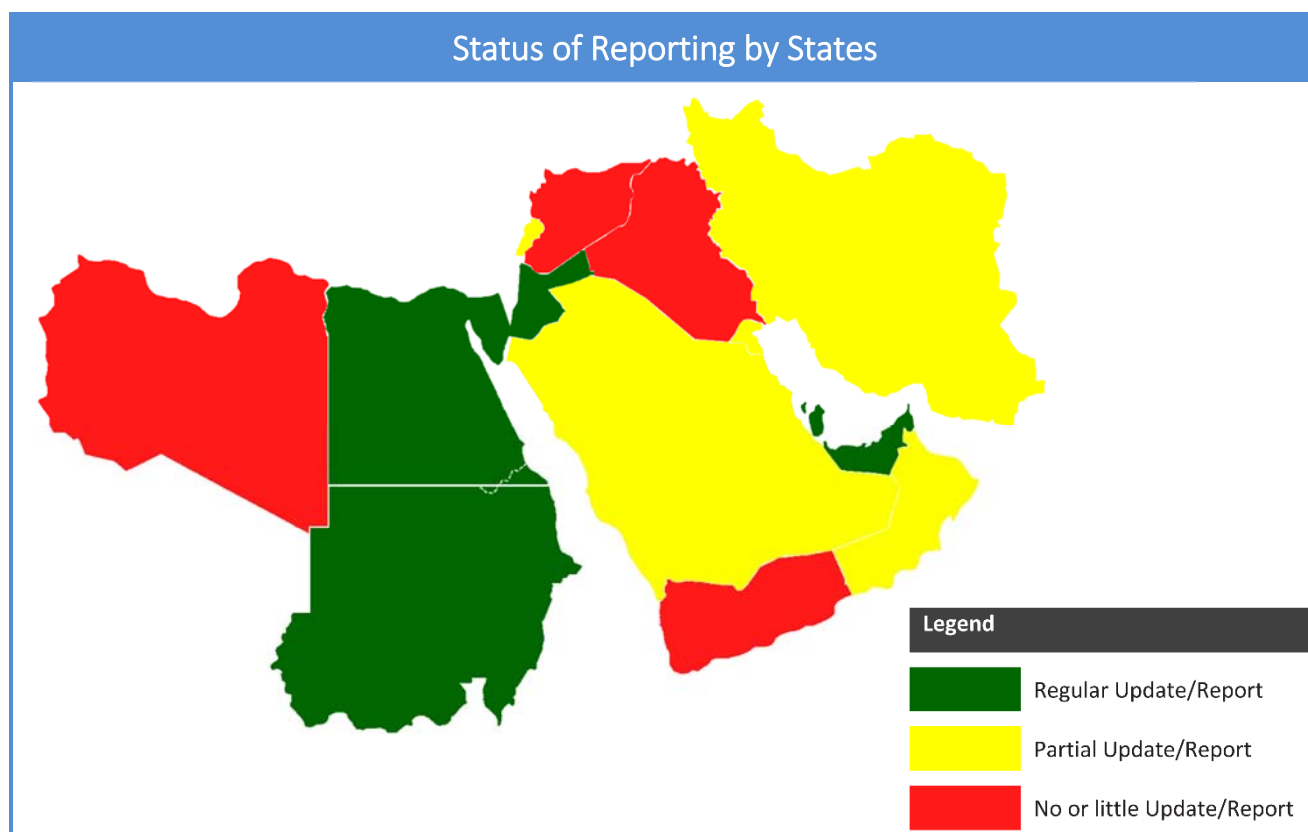
1.4 Collection of data

For the purpose of collecting necessary data for the MID Air Navigation Report-2017, a State Letter Ref.: AN 1/7 – 17/188 was issued on 2 July 2017, to follow-up on the MIDANPIRG Conclusion 16/8, which urged States to provide the relevant data necessary for the development of the MID Region Air Navigation Report-2017. However, some States did not respond to the

State Letter. Status of States providing update is shown in the following map.

Data collected from States was complemented by some updates provided mainly through the MIDANPIRG Subsidiary Bodies and the MID eANP Volume III.

Where the required data was not provided, it is indicated in the Report by color coding (Missing Data).



1.5 Structure of the Report

Executive Summary provides an overall review of the ASBU Block 0 implementation in the MID Region.

Section 1 (Introduction) presents the objective and background of the report as well as the scope covered and method of data collection.

Section 2 lists the priority 1 ASBU Block 0 Modules in the MID Region and presents the status of their implementation and their progress in graphical and numeric form.

Section 3 presents the ASBU Block 0 implementation outlook for 2020 in the MID Region.

Section 4 provides an update on the State's CO2 action plans and presents an estimation of environmental benefits, in terms of CO2 emissions reduction, accrued

from the implementation of some ASBU Block 0 Modules in the MID Region.

Section 5 includes some success stories related to the NCLB activities and implementation of ASBU Block 0 Modules, as well as their associated operational improvements and environmental benefits.

Section 6 concludes the Report by providing a brief analysis on the status of implementation and the progress of the different priority 1 ASBU Block 0 Modules.

Appendix A provides detailed status of the implementation of Priority 1 Block 0 Modules and their associated Elements for the MID States.

Appendix B illustrates the detailed status of implementation of ASBU Block 0 Modules in the MID States by 2020.



2. STATUS AND PROGRESS OF ASBU IMPLEMENTATION

The ICAO Block Upgrades refer to the target availability timelines for a group of operational improvements (technologies and procedures) that will eventually realize a fully-harmonized global Air Navigation System. The technologies and procedures for each Block have been organized into unique Modules which have been determined and cross-referenced based on the specific Performance Improvement Area to which they relate.

Block 0 Modules are characterized by operational improvements which have already been developed and implemented in many parts of the world. It therefore has a near-term implementation period of 2013–2018, whereby 2013 refers to the availability of all components of its particular performance modules and 2018 refers to the target implementation deadline. ICAO has been working with its Member States to help each determine exactly which capabilities they should have in place based on their unique operational requirements.

This chapter of the report gives an overview of the status of implementation for each of the Priority 1 ASBU Block 0 Modules for the MID States. The status of implementation of each Module versus its target(s) is also provided for each priority 1 ASBU Block 0 Module.

The following color scheme is used for illustrating the status of implementation:

Legend	
	Completed
	Partially Completed (50%+)
	Partially Completed/Late (50%-)
	Not Started/Not Implemented
	Not Applicable
	Missing Data

Note – Missing data is excluded in the calculation of the average regional status of implementation.

2.1 MID Region ASBU Block 0 Modules Prioritization

This report covers twelve (out of eighteen) ASBU Block 0 Modules that have been determined by MIDANPIRG/MSG as priority 1 for the MID Region (MID Doc 002 Edition February 2017, refers).

Module Code	Module Title	Priority	Start Date	Monitoring		Remarks
				Main	Supporting	
Performance Improvement Areas (PIA) 1: Airport Operations						
B0-APTA	Optimization of Approach Procedures including vertical guidance	1	2014	PBN SG	ATM SG, AIM SG, CNS SG	
B0-WAKE	Increased Runway Throughput through Optimized Wake Turbulence Separation	2				
B0-RSEQ	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	2				
B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	1	2014	ANSIG	CNS SG	Coordination with RGS WG
B0-ACDM	Improved Airport Operations through Airport-CDM	1	2014	ANSIG	CNS SG, AIM SG, ATM SG	Coordination with RGS WG
Performance Improvement Areas (PIA) 2 Globally Interoperable Systems and Data Through Globally Interoperable System Wide Information Management						
B0-FICE	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	1	2014	CNS SG	AIM SG, ATM SG	
B0-DATM	Service Improvement through Digital Aeronautical Information Management	1	2014	AIM SG		
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	1	2014	MET SG		
Performance Improvement Areas (PIA) 3 Optimum Capacity and Flexible Flights – Through Global Collaborative ATM						
B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	2014	ATM SG		
B0-NOPS	Improved Flow Performance through Planning based on a Network-Wide view	1	2014			
B0-ASUR	Initial capability for ground surveillance	2				
B0-ASEP	Air Traffic Situational Awareness (ATSA)	2				
B0-OPFL	Improved access to optimum flight levels through climb/descent procedures using ADS-B	2				
B0-ACAS	ACAS Improvements	1	2014	CNS SG		
B0-SNET	Increased Effectiveness of Ground-Based Safety Nets	1	2017	ATM SG		

Performance Improvement Areas (PIA) 4 Efficient Flight Path – Through Trajectory-based Operations

B0-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDO)	1	2014	PBN SG		
B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	2		ATM SG	CNS SG	
B0-CCO	Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)	1	2014	PBN SG		

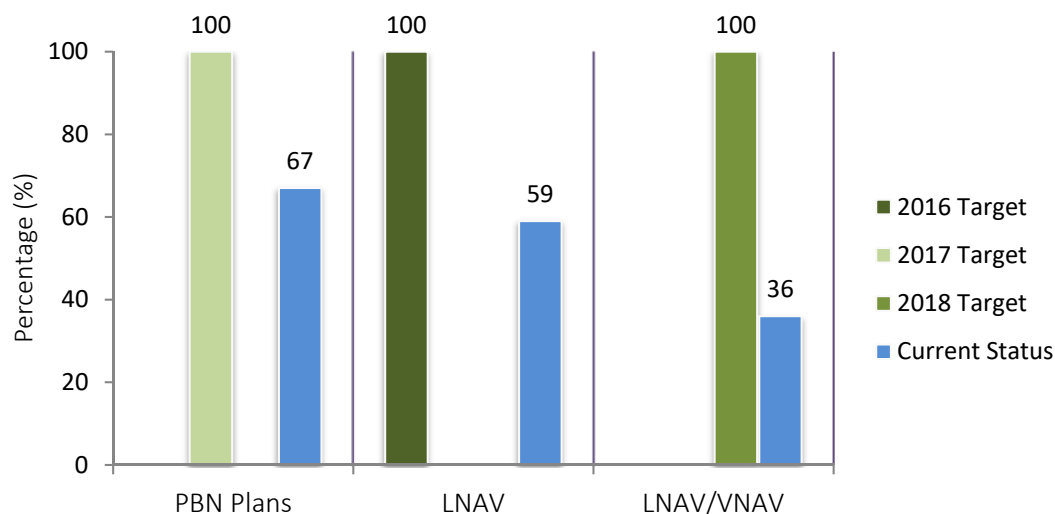
2.2 ASBU Implementation Status and Progress in the MID Region

2.2.1 B0-APTA

The use of performance-based navigation (PBN) and ground-based augmentation system (GBAS) landing system (GLS) procedures will enhance the reliability and predictability of approaches to runways, thus increasing safety, accessibility and efficiency. This is possible through the application of Basic global navigation satellite system (GNSS), Baro vertical navigation (VNAV), satellite-based augmentation system (SBAS) and GLS. The flexibility inherent in PBN approach design can be exploited to increase runway capacity.

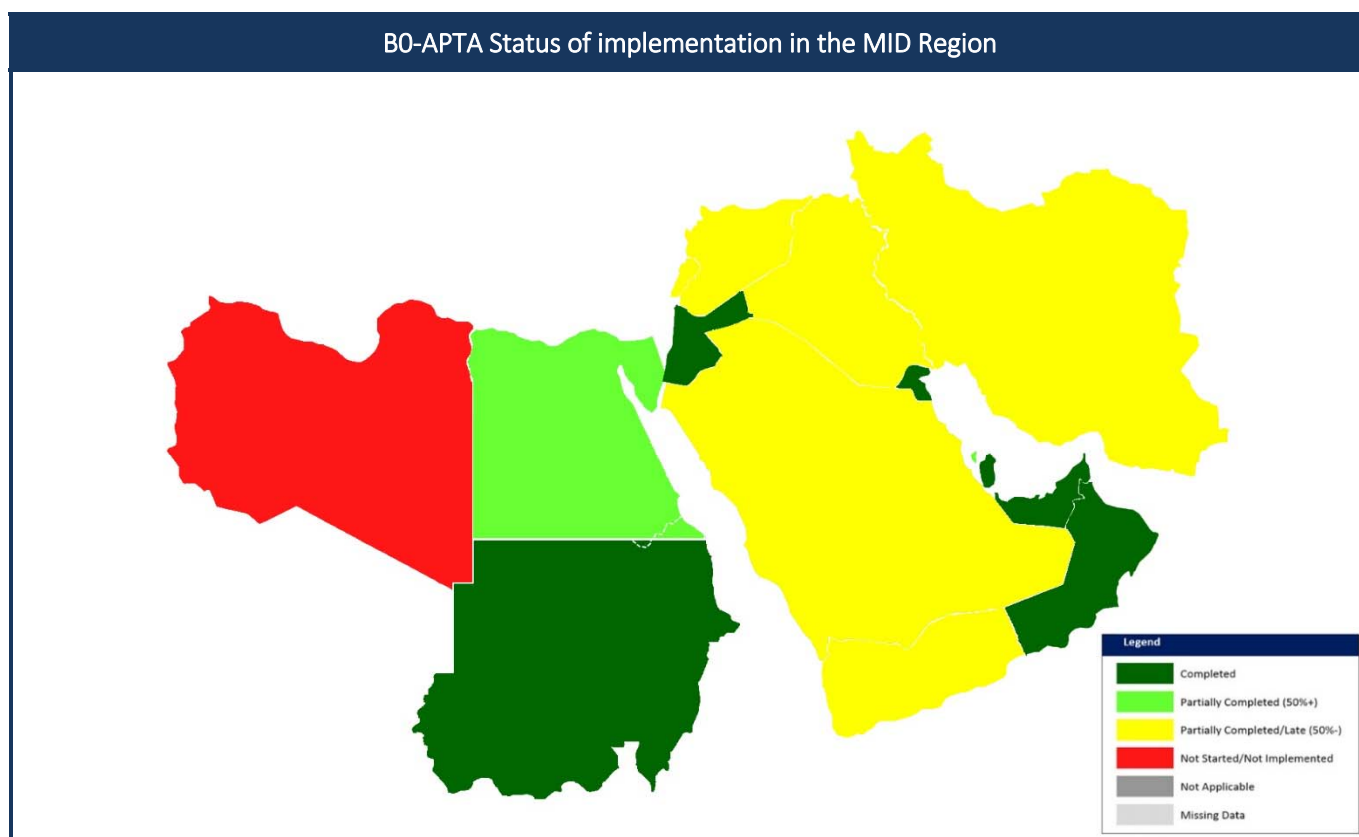
B0 – APTA: Optimization of Approach Procedures including vertical guidance			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
States' PBN Implementation Plans	All States	Indicator: % of States that provided updated PBN implementation Plan Supporting metric: Number of States that provided updated PBN implementation Plan	100% by Dec. 2018
LNAV	All RWYs Ends at International Aerodromes	Indicator: % of runway ends at international aerodromes with RNAV(GNSS) Approach Procedures (LNAV) Supporting metric: Number of runway ends at international aerodromes with RNAV (GNSS) Approach Procedures (LNAV)	All runway ends at Int'l Aerodromes, either as the primary approach or as a back-up for precision approaches by Dec. 2016
LNAV/VNAV	All RWYs ENDs at International Aerodromes	Indicator: % of runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV) Supporting metric: Number of runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV)	All runway ends at Int'l Aerodromes, either as the primary approach or as a back-up for precision approaches by Dec. 2017

B0-APTA Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-APTA	PBN Plan															
	LNAV															
	LNAV/VNAV															

The progress for B0-APTA is good (with approximately 52% implementation).

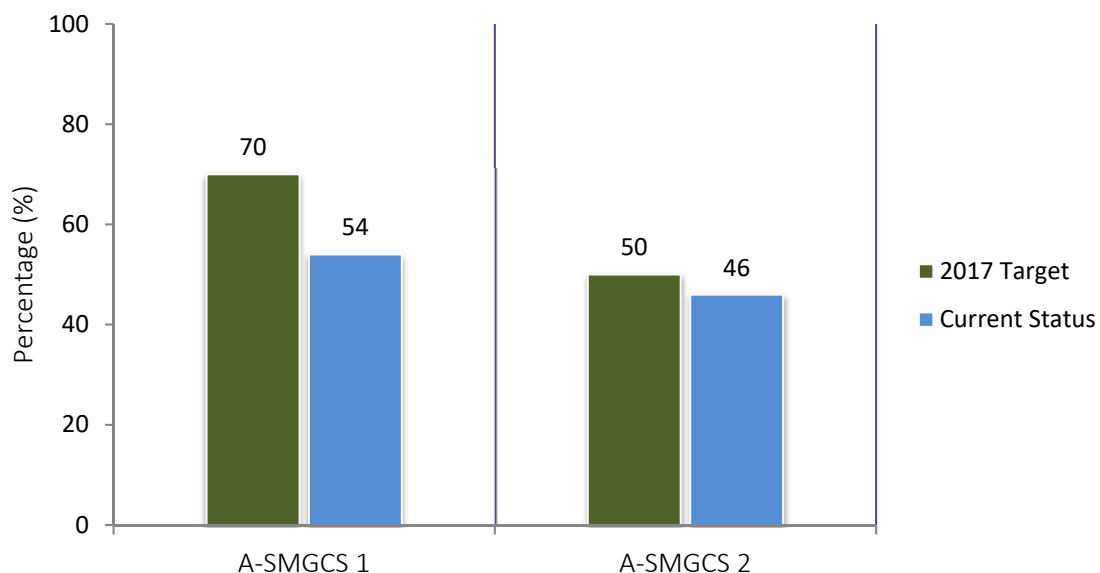


2.2.2 B0-SURF

Basic A-SMGCS provides surveillance and alerting of movements of both aircraft and vehicles on the aerodrome thus improving runway/aerodrome safety. ADS-B information is used when available (ADS-B APT).

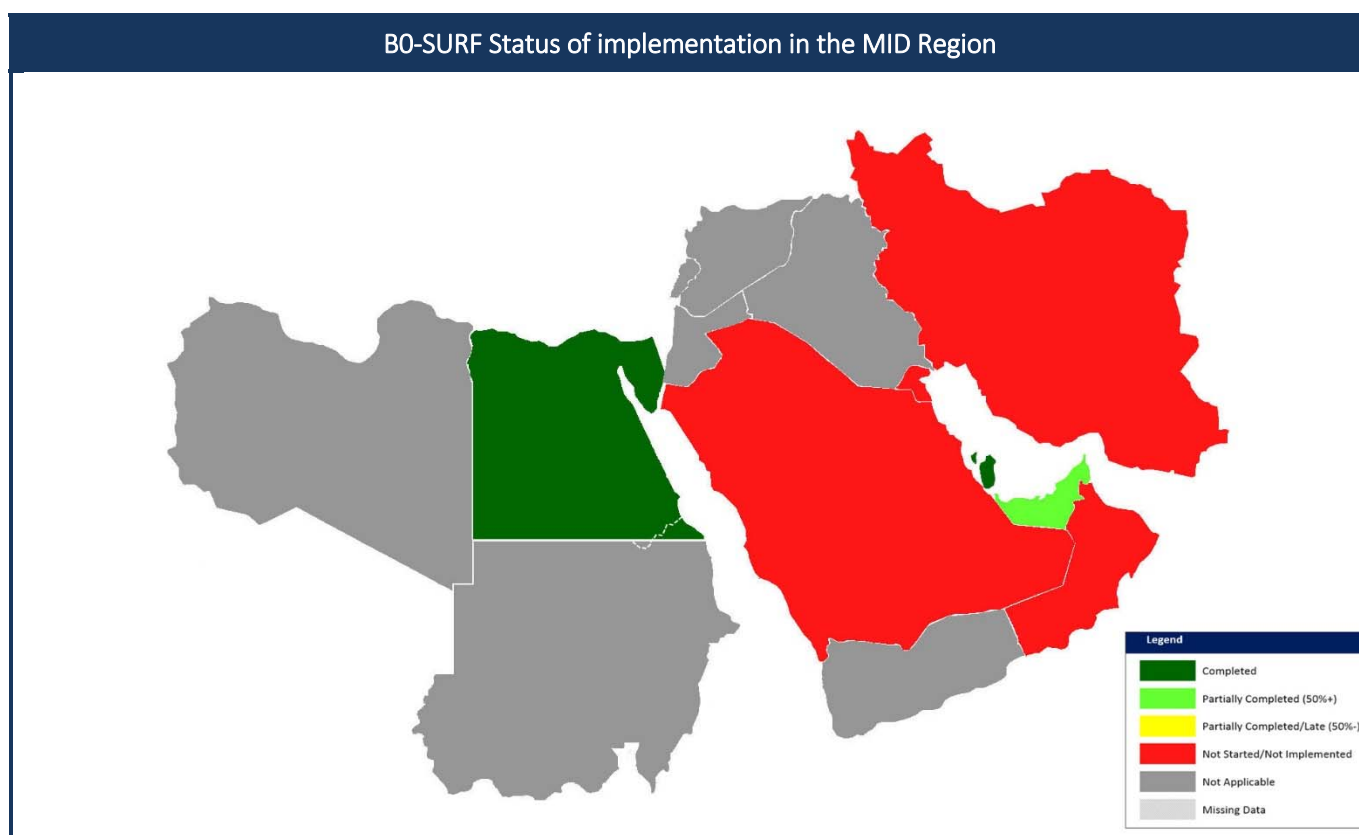
B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
A-SMGCS Level 1*	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEDF, OEJN, OERK, OMDB, OMAA, OMDW	Indicator: % of applicable international aerodromes having implemented A-SMGCS Level 1 Supporting Metric: Number of applicable international aerodromes having implemented A-SMGCS Level 1	70% by Dec. 2017
A-SMGCS Level 2*	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEJN, OERK, OMDB, OMAA, OMDW	Indicator: % of applicable international aerodromes having implemented A-SMGCS Level 2 Supporting Metric: Number of applicable international aerodromes having implemented A-SMGCS Level 2	50% by Dec. 2017

B0-SURF Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-SURF	A-SMGCS Level 1															
	A-SMGCS Level 2															

The progress for B0-SURF is good (with approximately 50% implementation). B0-SURF is not applicable for 7 States.

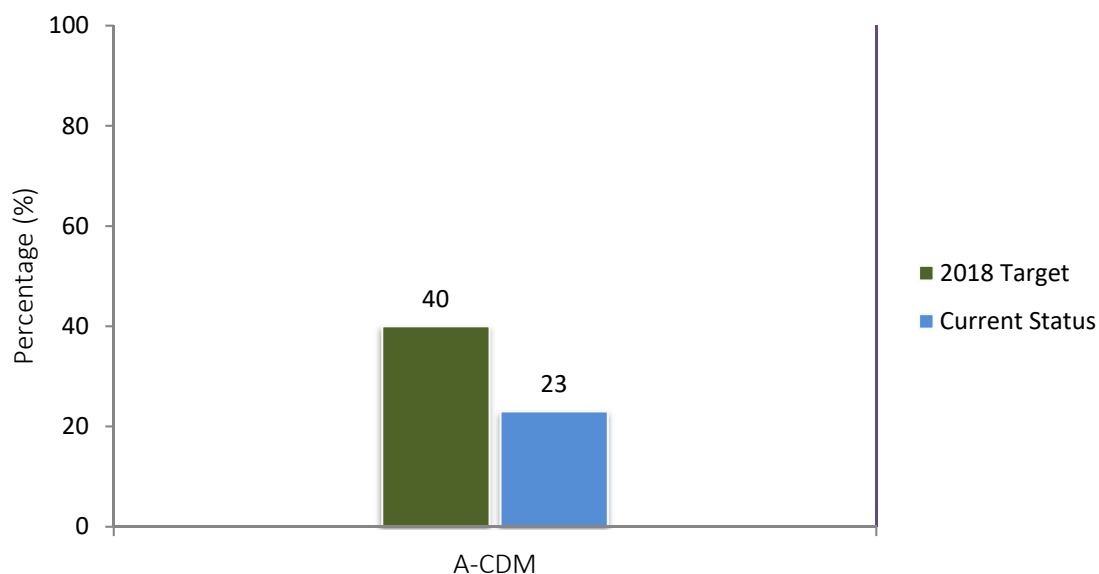


2.2.3 B0-ACDM

To implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and maneuvering areas and enhance safety, efficiency and situational awareness.

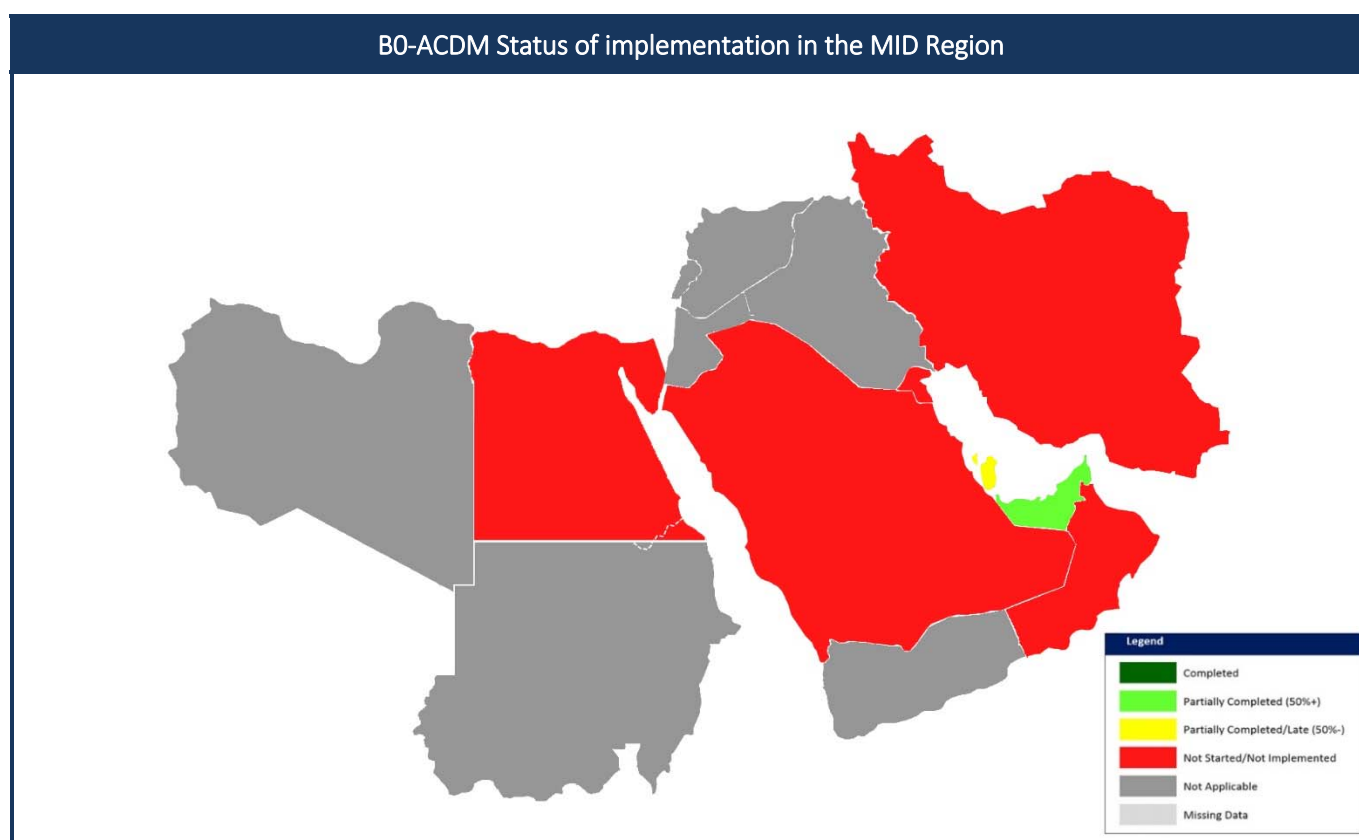
B0 – ACDM: Improved Airport Operations through Airport-CDM			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
A-CDM	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEJN, OERK, OMDB, OMAA, OMDW	Indicator: % of applicable international aerodromes having implemented improved airport operations through airport-CDM Supporting metric: Number of applicable international aerodromes having implemented improved airport operations through airport-CDM	50% by Dec. 2018

B0-ACDM Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-ACDM	A-CDM	Yellow	Red	Red	Grey	Grey	Red	Grey	Grey	Red	Yellow	Red	Grey	Grey	Green	Grey

The progress for B0-ACDM is very slow (with approximately 23% implementation. Nevertheless, implementation is ongoing in some States.



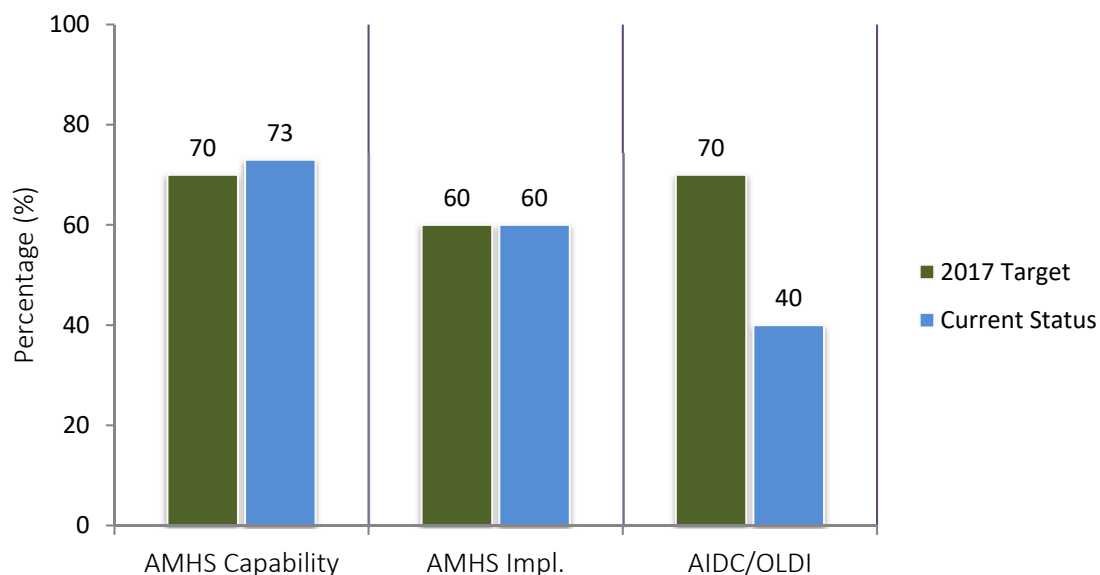
2.2.4

B0-FICE

To improve coordination between air traffic service units (ATSUs) by using ATS Interfacility Data Communication (AIDC) defined by the ICAO *Manual of Air Traffic Services Data Link Applications* (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process particularly for oceanic ATSUs.

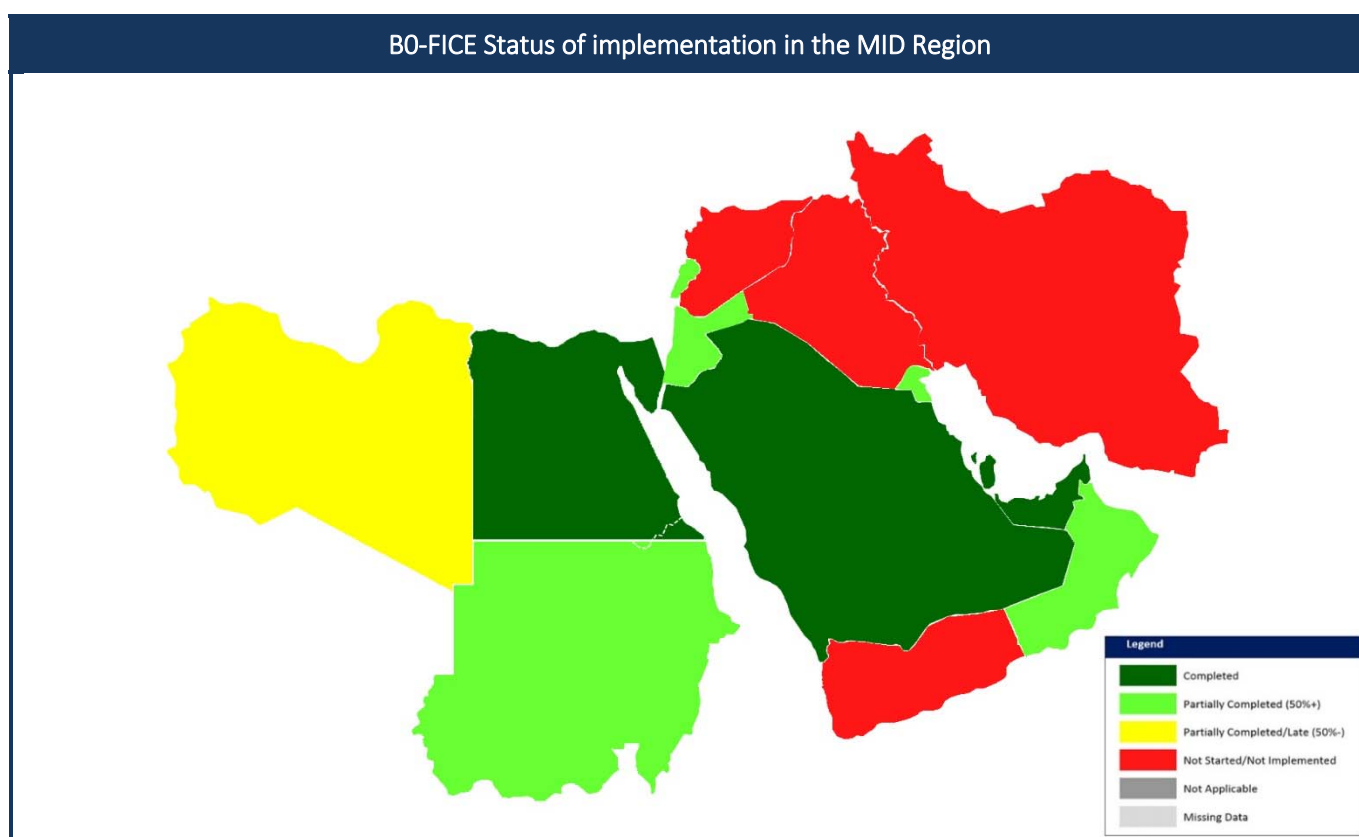
B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
AMHS capability	All States	Indicator: % of States with AMHS capability Supporting metric: Number of States with AMHS capability	70% of States with AMHS capability by Dec. 2017
AMHS implementation /interconnection	All States	Indicator: % of States with AMHS implemented (interconnected with other States AMHS) Supporting metric: Number of States with AMHS implemented (interconnections with other States AMHS)	60% of States with AMHS interconnected by Dec. 2017
Implementation of AIDC/OLDI between adjacent ACCs	All ACCs	Indicator: % of FIRs within which all applicable ACCs have implemented at least one interface to use AIDC/OLDI with neighboring ACCs Supporting metric: Number of AIDC/OLDI interconnections implemented between adjacent ACCs	70% by Dec. 2017

B0-FICE Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-FICE	AMHS capability															
	AMHS impl. /interconnection															
	Implementation of AIDC/OLDI between adjacent ACCs															

The progress for B0-FICE is good (with approximately 58% implementation).

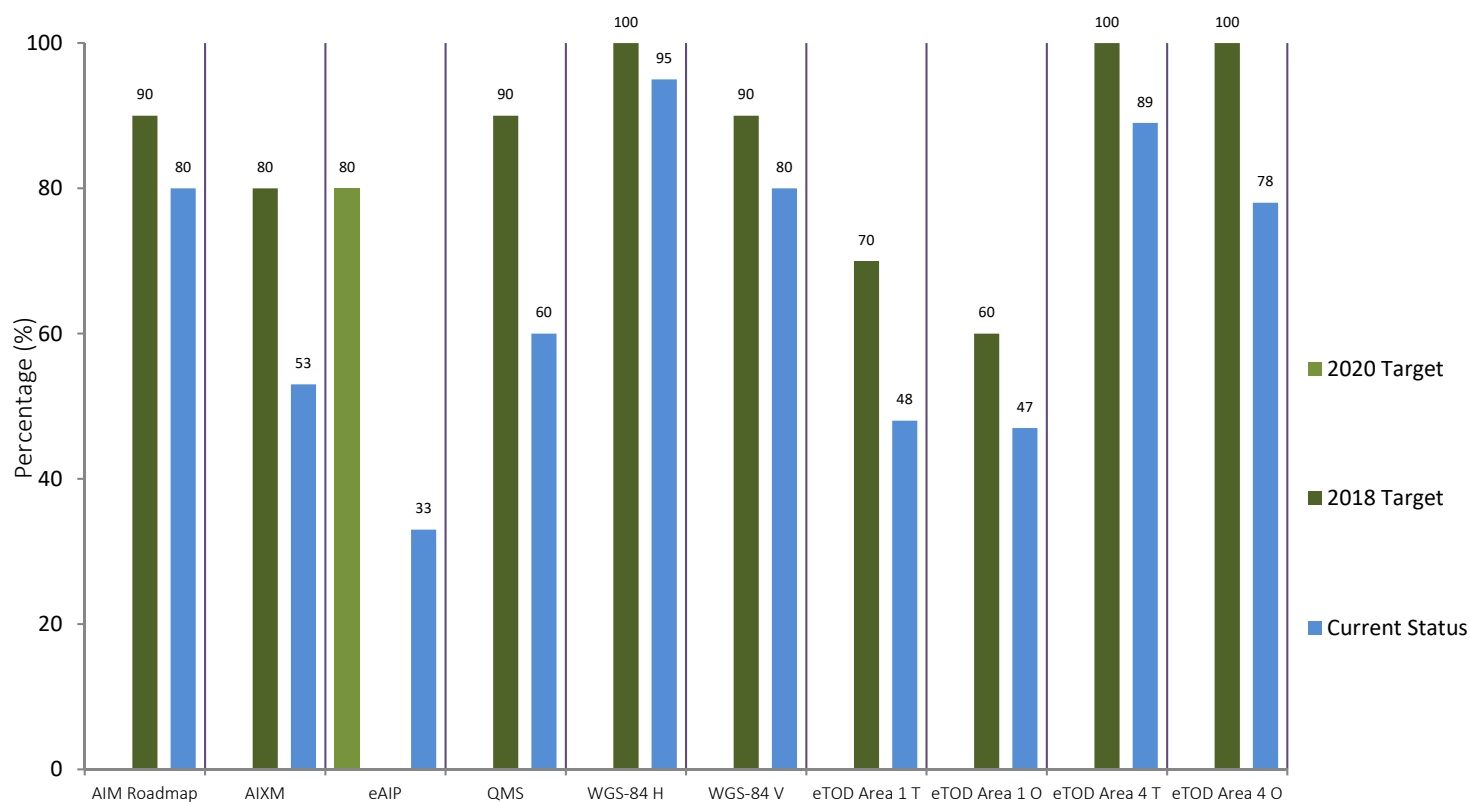


2.2.5 B0-DATM

The initial introduction of digital processing and management of information, through aeronautical information service (AIS)/aeronautical information management (AIM) implementation, use of aeronautical information exchange model (AIXM), migration to electronic aeronautical information publication (AIP) and better quality and availability of data.

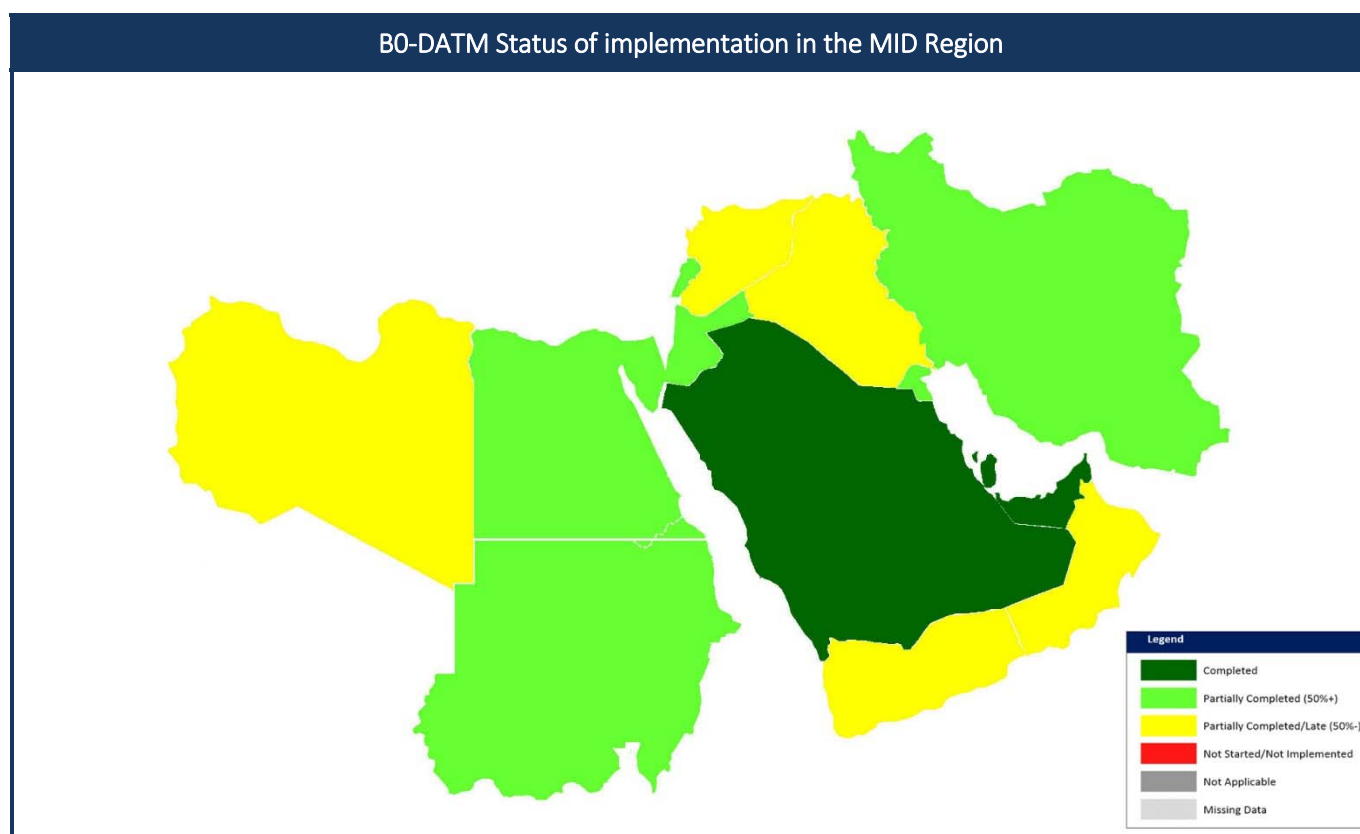
B0 – DATM: Service Improvement through Digital Aeronautical Information Management			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
National AIM Implementation Plan/Roadmap	All States	Indicator: % of States that have National AIM Implementation Plan/Roadmap Supporting Metric: Number of States that have National AIM Implementation Plan/Roadmap	90% by Dec. 2018
AIXM	All States	Indicator: % of States that have implemented an AIXM-based AIS database Supporting Metric: Number of States that have implemented an AIXM-based AIS database	80% by Dec. 2018
eAIP	All States	Indicator: % of States that have implemented an IAID driven AIP Production (eAIP) Supporting Metric: Number of States that have implemented an IAID driven AIP Production (eAIP)	80% by Dec. 2020
QMS	All States	Indicator: % of States that have implemented QMS for AIS/AIM Supporting Metric: Number of States that have implemented QMS for AIS/AIM	90% by Dec. 2018
WGS-84	All States	Indicator: % of States that have implemented WGS-84 for horizontal plan (ENR, Terminal, AD) Supporting Metric: Number of States that have implemented WGS-84 for horizontal plan (ENR, Terminal, AD) Indicator: % of States that have implemented WGS-84 Geoid Undulation Supporting Metric: Number of States that have implemented WGS-84 Geoid Undulation	Horizontal: 100% by Dec. 2018 Vertical: 90% by Dec. 2018
eTOD	All States	Indicator: % of States that have implemented required Terrain datasets Supporting Metric: Number of States that have implemented required Terrain datasets Indicator: % of States that have implemented required Obstacle datasets Supporting Metric: Number of States that have implemented required Obstacle datasets	Area 1 : Terrain: 70% by Dec. 2018 Obstacles: 60% by Dec. 2018 Area 4: Terrain: 100% by Dec. 2018 Obstacles: 100% by Dec. 2018
Digital NOTAM*	All States	Indicator: % of States that have included the implementation of Digital NOTAM into their National Plan for the transition from AIS to AIM Supporting Metric: Number of States that have included the implementation of Digital NOTAM into their National Plan for the transition from AIS to AIM	90% by Dec. 2020

B0-DATM Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-DATM	National AIM Roadmap															
	AIXM															
	eAIP															
	QMS															
	WGS-84 – H															
	WGS-84 – V															
	Area 1 Terrain															
	Area 1 Obstacles															
	Area 4 Terrain															
	Area 4 Obstacles															

The progress for B0-DATM is good (with approximately 63% implementation). TOD Area 4 is not applicable in 6 States.



2.2.6

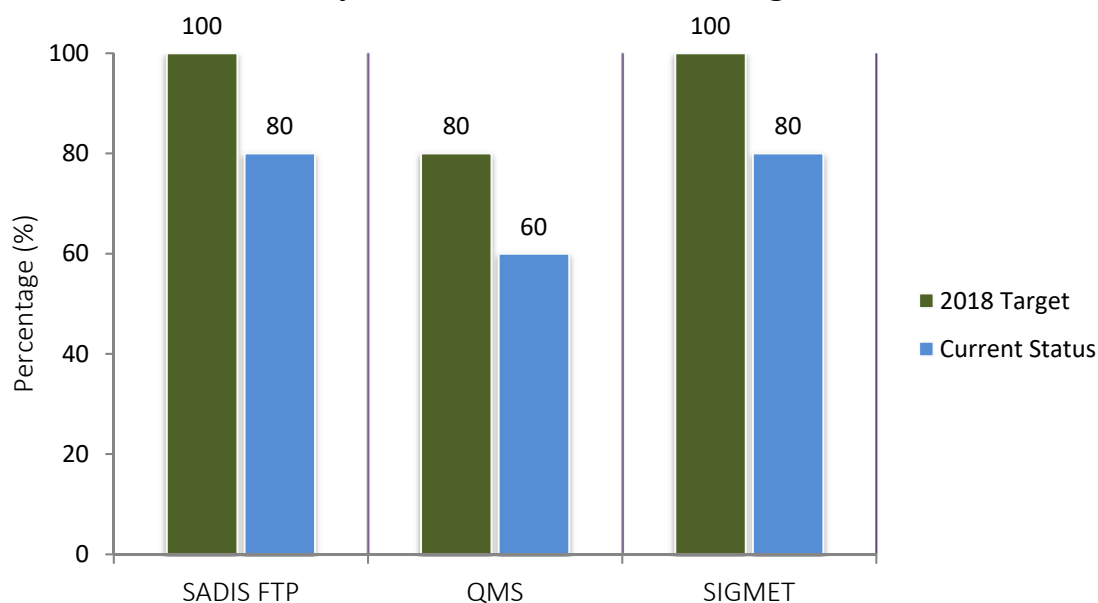
B0-AMET

Global, regional and local meteorological information:

- forecasts provided by world area forecast centres (WAFC), volcanic ash advisory centres (VAAC) and tropical cyclone advisory centres (TCAC);
- aerodrome warnings to give concise information of meteorological conditions that could adversely affect all aircraft at an aerodrome including wind shear; and
- SIGMETs to provide information on occurrence or expected occurrence of specific en-route weather phenomena which may affect the safety of aircraft operations and other operational meteorological (OPMET) information, including METAR/SPECI and TAF, to provide routine and special observations and forecasts of meteorological conditions occurring or expected to occur at the aerodrome.

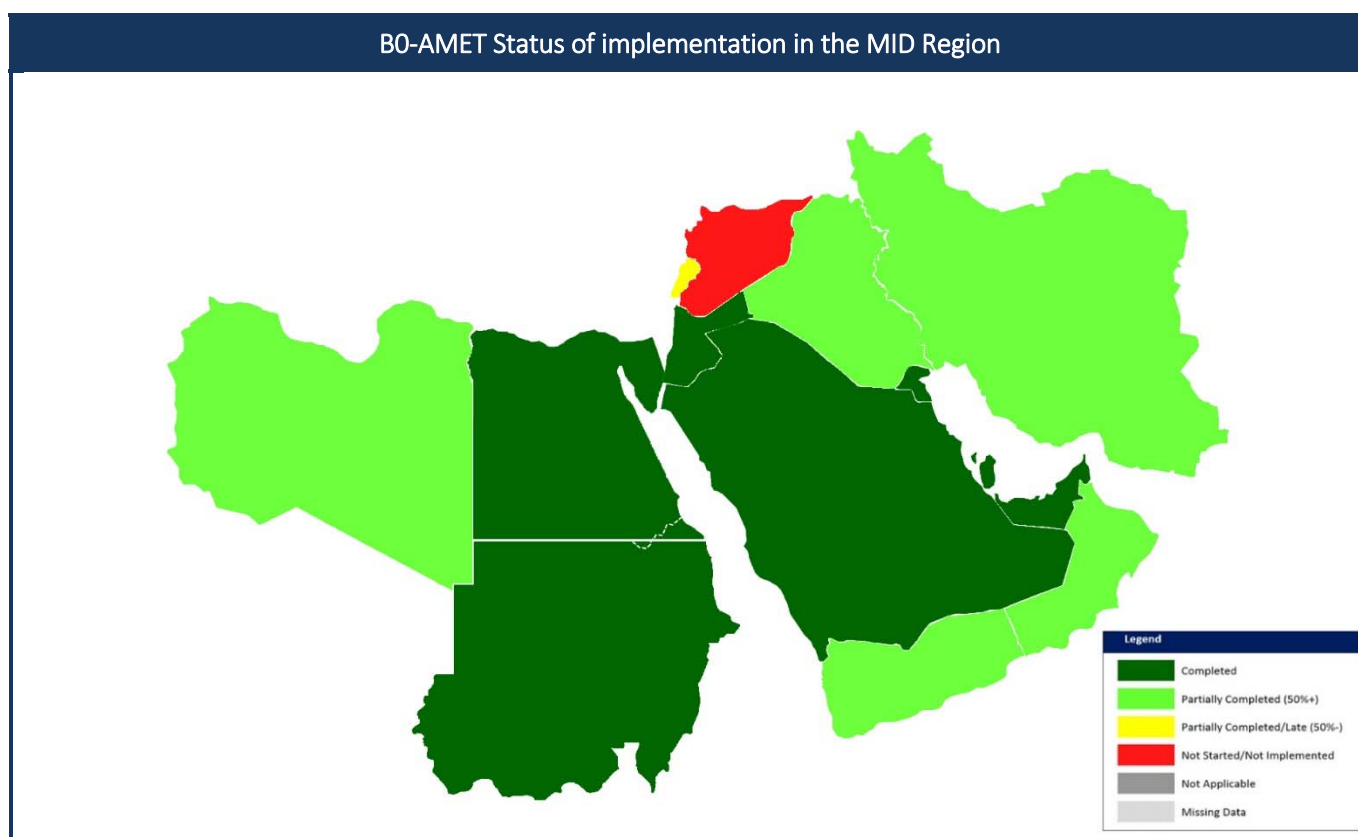
B0 – AMET: Meteorological information supporting enhanced operational efficiency and safety			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
SADIS FTP	All States	Indicator: % of States that have implemented SADIS FTP service Supporting Metric: Number of States that have implemented SADIS FTP service	100% by Dec. 2018
QMS	All States	Indicator: % of States having implemented QMS for MET Supporting metric: number of States having implemented QMS for MET	80% by Dec. 2018
SIGMET	All MWOs in MID Region	Indicator: % of FIRs in which SIGMET is implemented Supporting metric: number of FIRs SIGMET is implemented	100% by Dec. 2018

B0-AMET Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-AMET	SADIS FTP															
	QMS															
	SIGMET															

The progress for B0-AMET is good (with approximately 73% implementation).



2.2.7

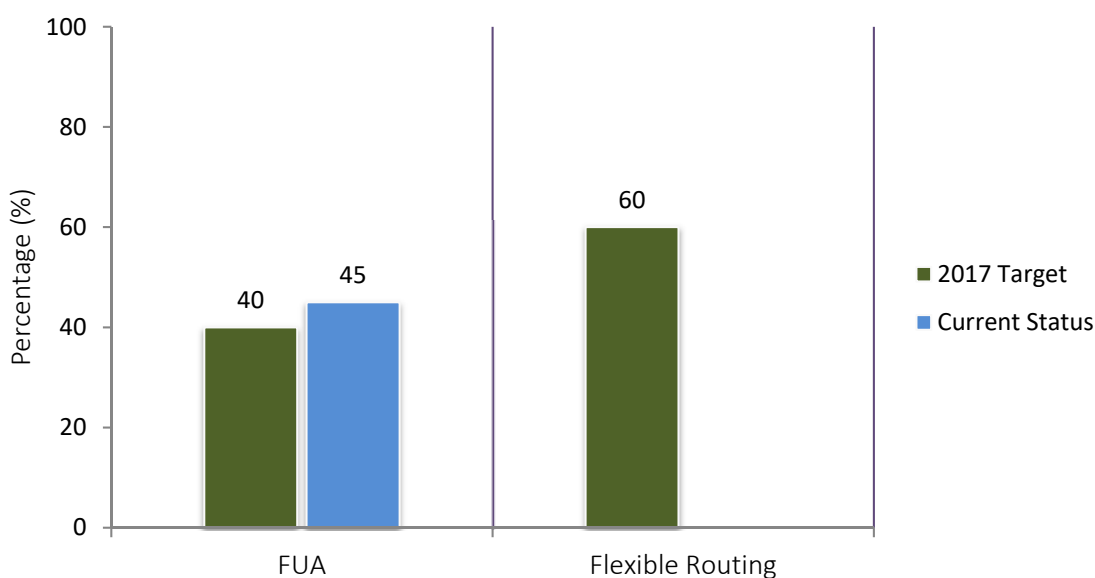
B0-FRTO

To allow the use of airspace which would otherwise be segregated (i.e. special use airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight length and fuel burn.

B0 – FRTO: Improved Operations through Enhanced En-Route Trajectories			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
Flexible use of airspace (FUA)	All States	Indicator: % of States that have implemented FUA Supporting metric*: number of States that have implemented FUA	40% by Dec. 2017
Flexible routing	All States	Indicator: % of required Routes that are not implemented due military restrictions (segregated areas) Supporting metric 1: total number of ATS Routes in the Mid Region Supporting metric 2*: number of required Routes that are not implemented due military restrictions (segregated areas)	60% by Dec. 2017

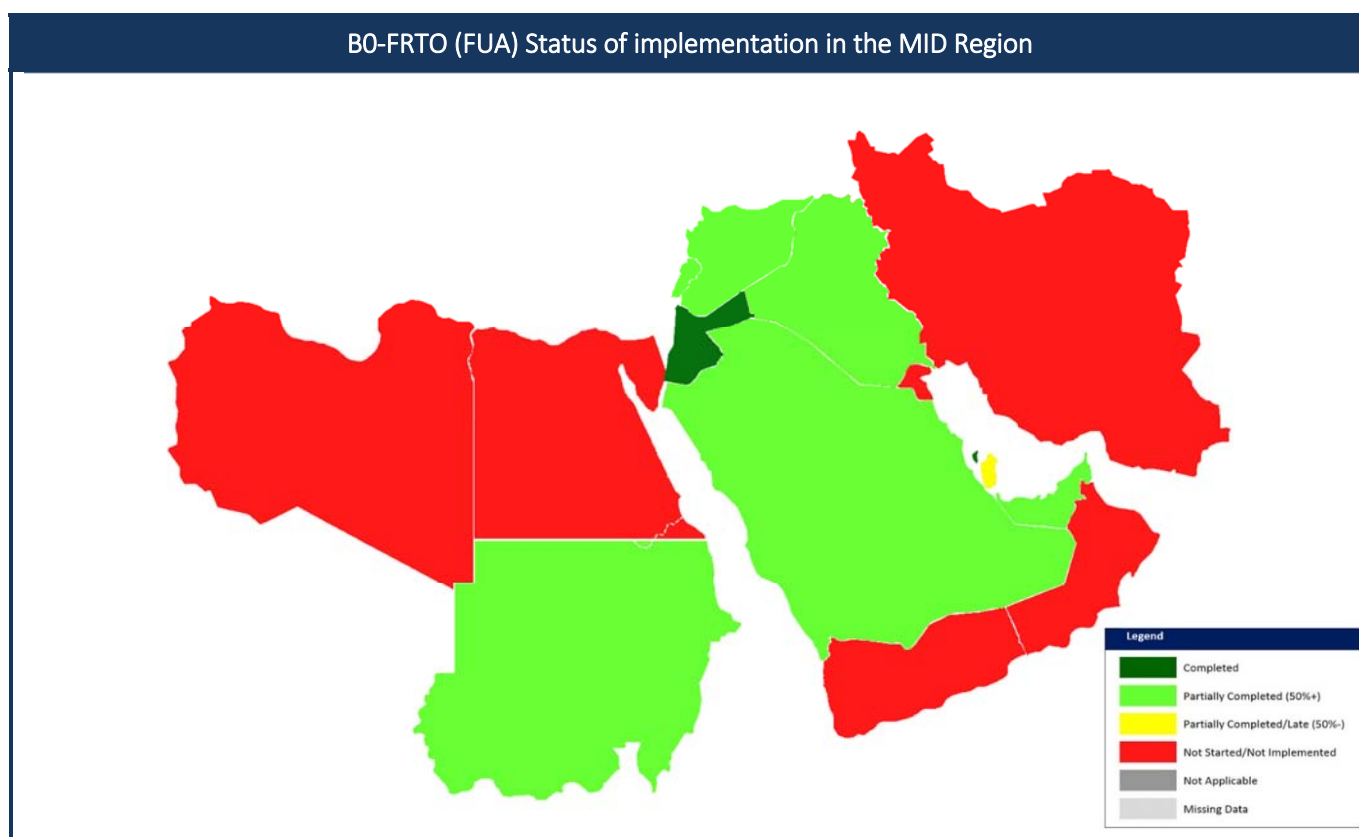
* Implementation should be based on the published aeronautical information

B0-FRTO Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-FRTO	Flexible use of airspace (FUA)	Completed	Not Started/Not Implemented	Not Started/Not Implemented	Partially Completed (50%+)	Completed	Not Started/Not Implemented	Partially Completed (50%+)	Not Started/Not Implemented	Not Started/Not Implemented	Partially Completed/Late (50%-)	Partially Completed (50%+)	Partially Completed (50%+)	Partially Completed (50%+)	Partially Completed (50%+)	Not Started/Not Implemented
	Flexible routing	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data	Missing Data

The progress for B0-FRTO (FUA) is acceptable (with approximately 45% implementation). The element “Flexible Routing” could not be monitored because of the lack of data.



2.2.8

B0-NOPS

Air Traffic Flow Management (ATFM) is used to manage the flow of traffic in a way that minimizes delay 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 crisis caused by human or natural phenomena.

Experience clearly shows the benefits related to managing flows consistently and collaboratively over an area of a sufficient geographical size to take into account sufficiently well the network effects. The concept for ATFM and demand and capacity balancing (DCB) should be further exploited wherever possible. System improvements are also about better procedures in these domains, and creating instruments to allow collaboration among the different actors.

B0 – NOPS: Improved Flow Performance through Planning based on a Network-Wide view			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
ATFM Measures implemented in collaborative manner	All States	Indicator: % of States that have established a mechanism for the implementation of ATFM Measures based on collaborative decision Supporting metric: number of States that have established a mechanism for the implementation of ATFM Measures based on collaborative decision	100% by Dec. 2017

Note – B0-NOPS could not be monitored because the elements and associated performance indicators and targets have not yet been agreed upon and are under development.

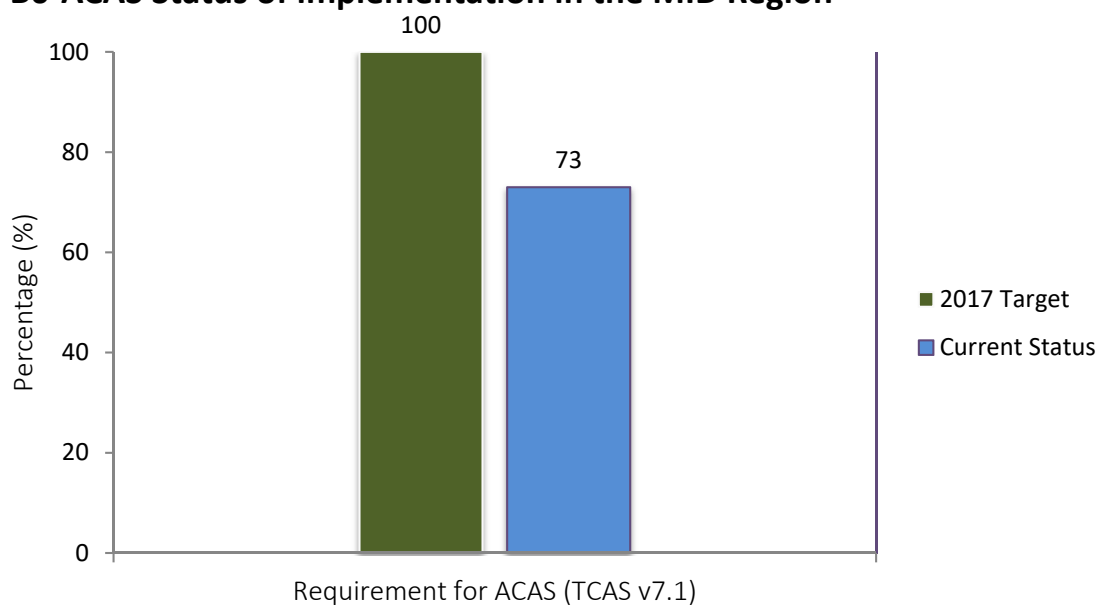
2.2.9

B0-ACAS

To provide short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation.

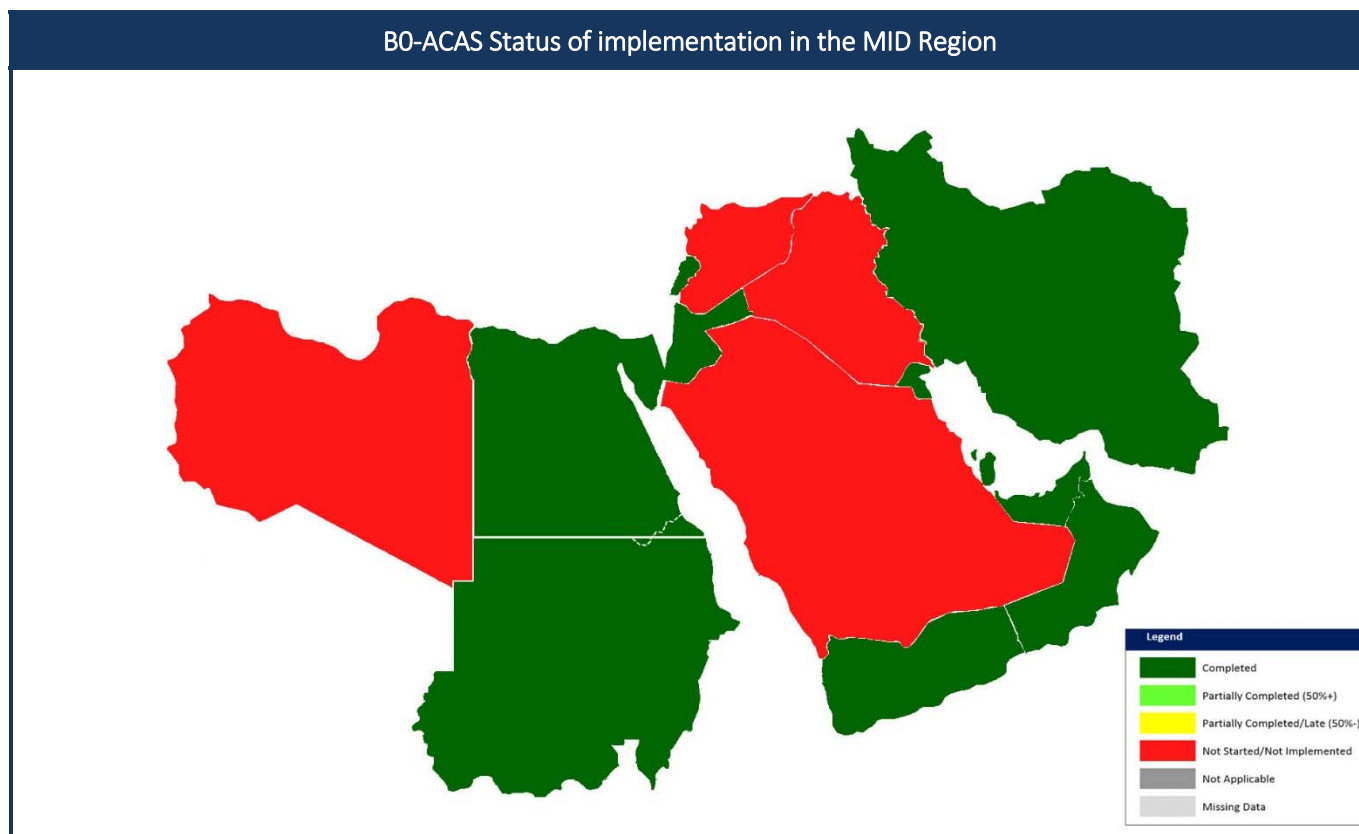
B0 – ACAS: ACAS Improvements			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
Avionics (TCAS v7.1)	All States	Indicator: % of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons Supporting metric: Number of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons	100% by Dec. 2017

B0-ACAS Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-ACAS	ACAS (TCAS V7.1)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

The progress for B0-ACAS is good (with approximately 73% implementation).



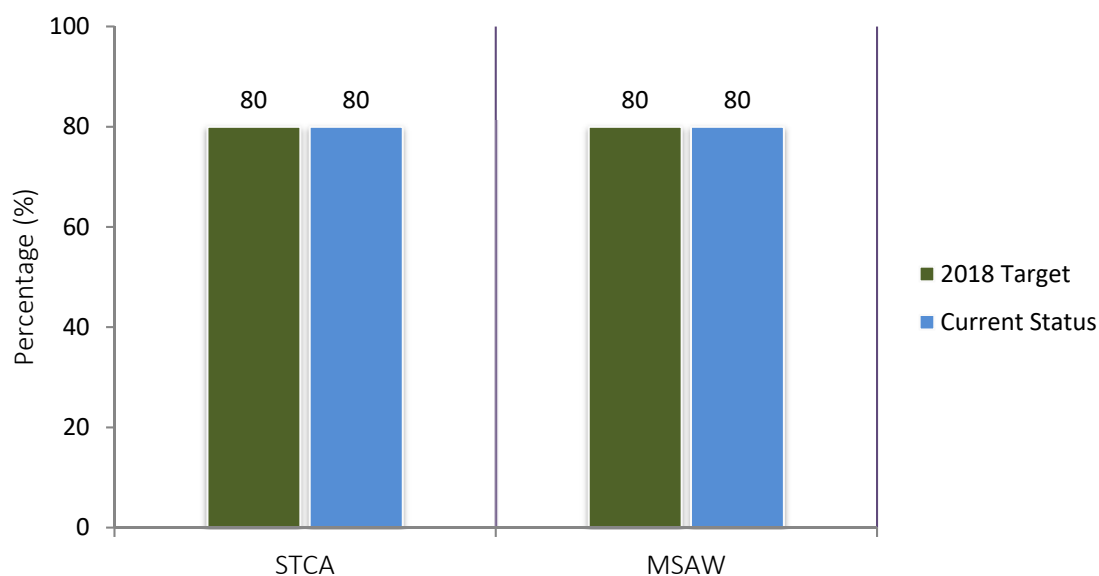
2.2.10

B0-SNET

To enable monitoring of flights while airborne to provide timely alerts to air traffic controllers of potential risks to flight safety. Alerts from short-term conflict alert (STCA), area proximity warnings (APW) and minimum safe altitude warnings (MSAW) are proposed. Ground-based safety nets make an essential contribution to safety and remain required as long as the operational concept remains human centered.

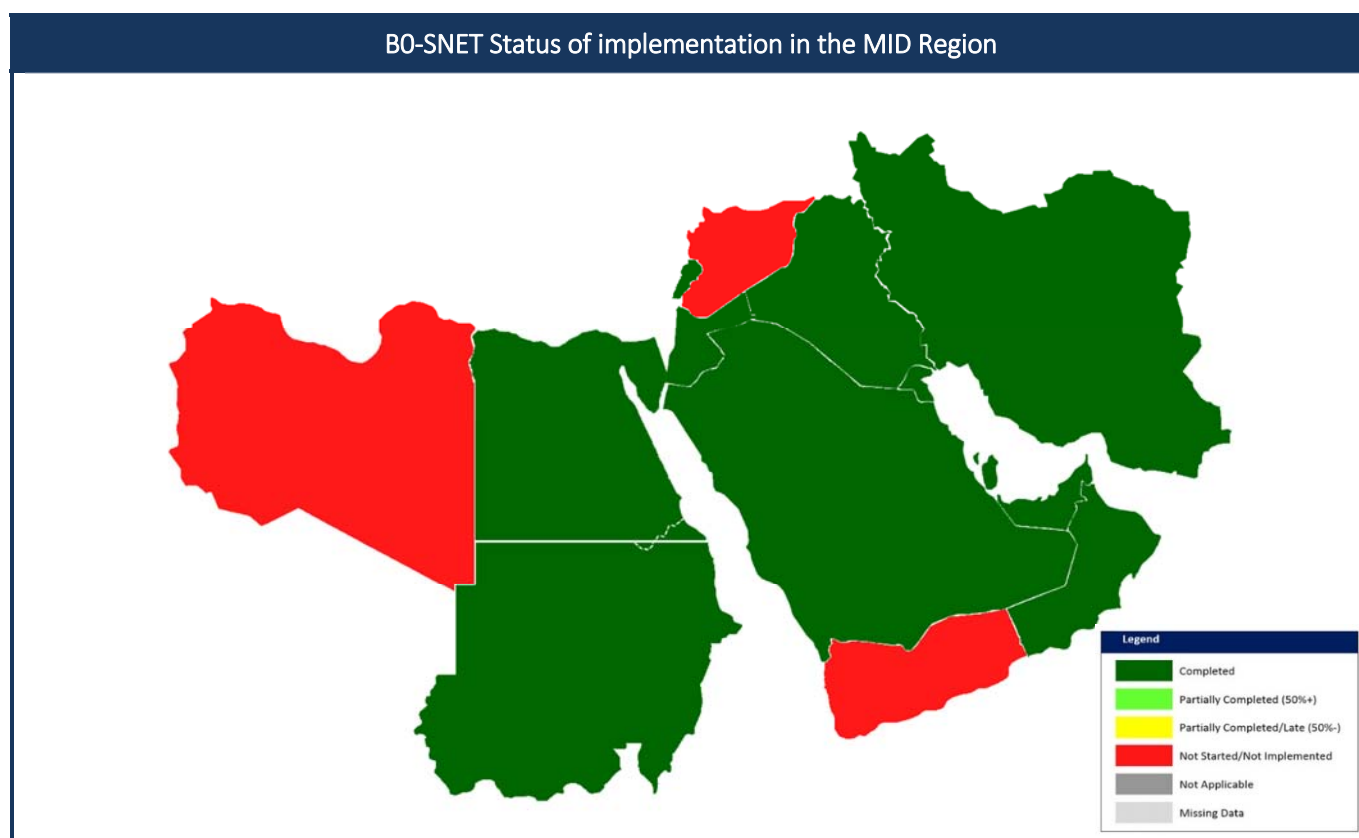
B0 – SNET: Increased Effectiveness of Ground-based Safety Nets			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
Short-term conflict alert (STCA)	All States	Indicator: % of States that have implemented Short-term conflict alert (STCA) Supporting metric*: number of States that have implemented Short-term conflict alert (STCA)	80 % by 2018
Minimum safe altitude warning (MSAW)	All States	Indicator: % of States that have implemented Minimum safe altitude warning (MSAW) Supporting metric*: number of States that have implemented Minimum safe altitude warning (MSAW)	80 % by 2018

B0-SNET Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-SNET	Short-term conflict alert (STCA)															
	Minimum safe altitude warning (MSAW)															

The progress for B0-SNET is very good (with approximately 80% implementation).



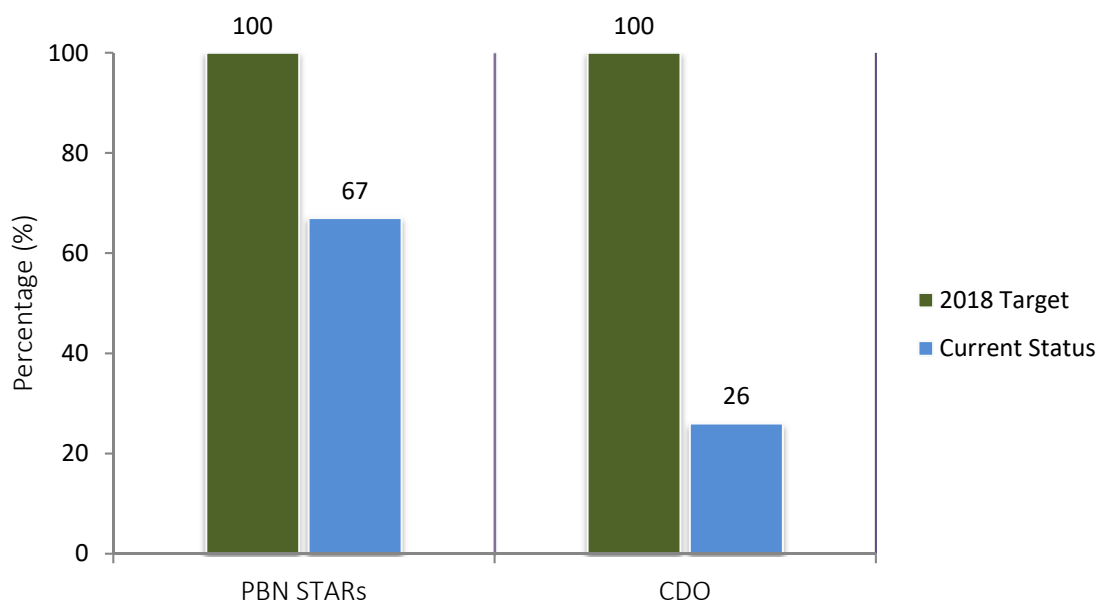
2.2.11

B0-CDO

To use performance-based airspace and arrival procedures allowing aircraft to fly their optimum profile using continuous descent operations (CDOs). This will optimize throughput, allow fuel efficient descent profiles and increase capacity in terminal areas.

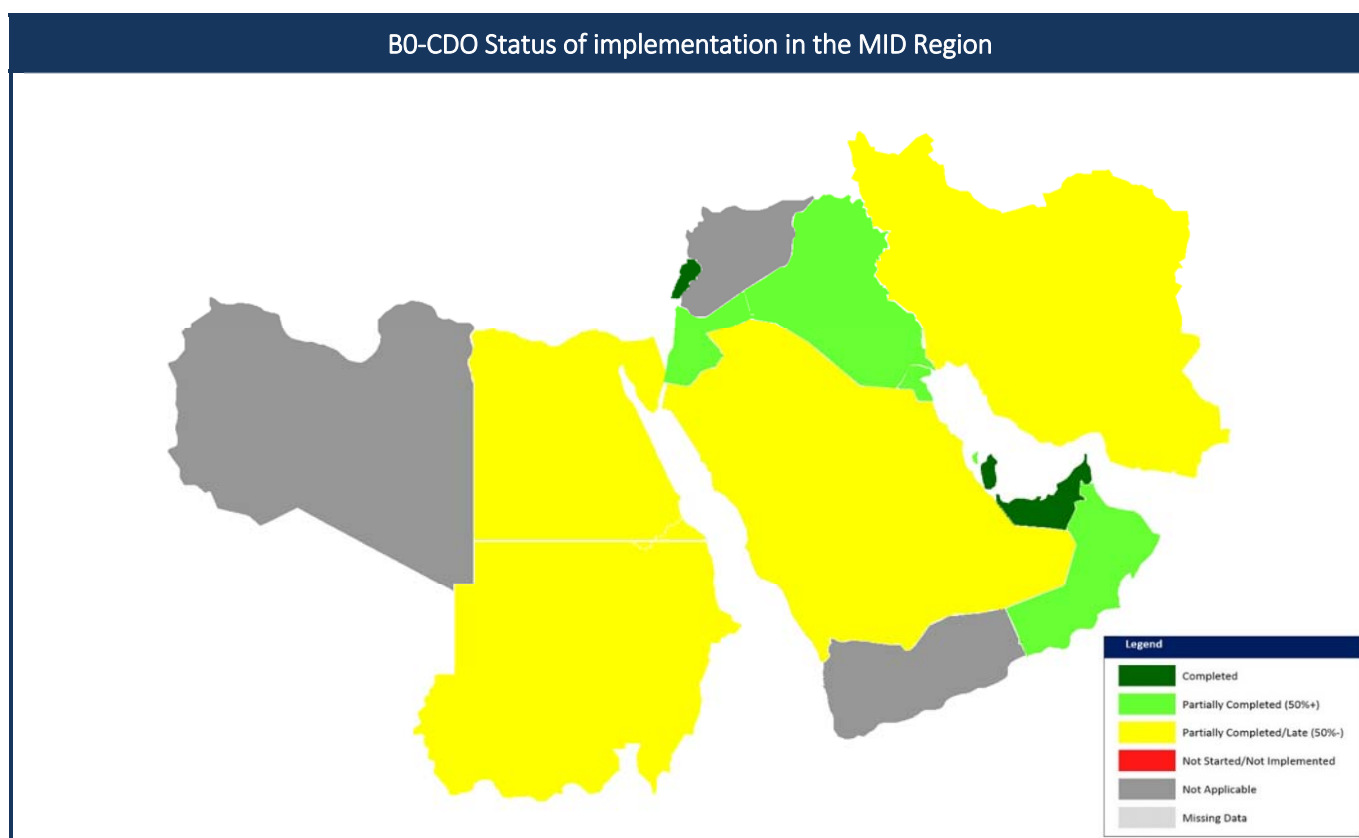
B0 – CDO: Improved Flexibility and Efficiency in Descent Profiles (CDO)			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
PBN STARS	OBBI, HESN, HESH, HEMA, HEGN, HELX, OIIE, OISS, OIKB, OIMM, OIFM, ORER, ORNI, OJAM, OJAI, OJAQ, OKBK, OLBA, OOMS, OOSA, OTHH, OEJN, OEMA, OEDF, OERK, HSNN, HSOB, HSSS, HSPN, OMAA, OMAD, OMDB, OMDW, OMSJ	Indicator: % of International Aerodromes/TMA with PBN STAR implemented as required. Supporting Metric: Number of International Aerodromes/TMAs with PBN STAR implemented as required.	100% by Dec. 2018 for the identified Aerodromes/TMAs
International aerodromes/TMAs with CDO	OBBI, HESH, HEMA, HEGN, OIIE, OIKB, OIFM, OJAI, OJAQ, OKBK, OLBA, OOMS, OTHH, OEJN, OEMA, OEDF, OERK, HSSS, HSPN, OMAA, OMDB, OMDW, OMSJ	Indicator: % of International Aerodromes/TMA with CDO implemented as required. Supporting Metric: Number of International Aerodromes/TMAs with CDO implemented as required.	100% by Dec. 2018 for the identified Aerodromes/TMAs

B0-CDO Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-CDO	PBN STARs	Completed	Partially Completed (50%+)	Partially Completed/Late (50%-)	Partially Completed (50%+)	Completed	Completed	Completed	Not Started/Not Implemented	Completed	Completed	Partially Completed (50%+)	Partially Completed/Late (50%-)	Not Started/Not Implemented	Completed	Not Started/Not Implemented
	International aerodromes/TMAs with CDO	Not Started/Not Implemented	Not Started/Not Implemented	Not Started/Not Implemented	Not Started/Not Implemented	Not Started/Not Implemented	Not Started/Not Implemented	Completed	Not Started/Not Implemented	Not Started/Not Implemented	Completed	Not Started/Not Implemented	Not Started/Not Implemented	Not Started/Not Implemented	Completed	Not Started/Not Implemented

The progress for B0-CDO is acceptable (with approximately 47% implementation).



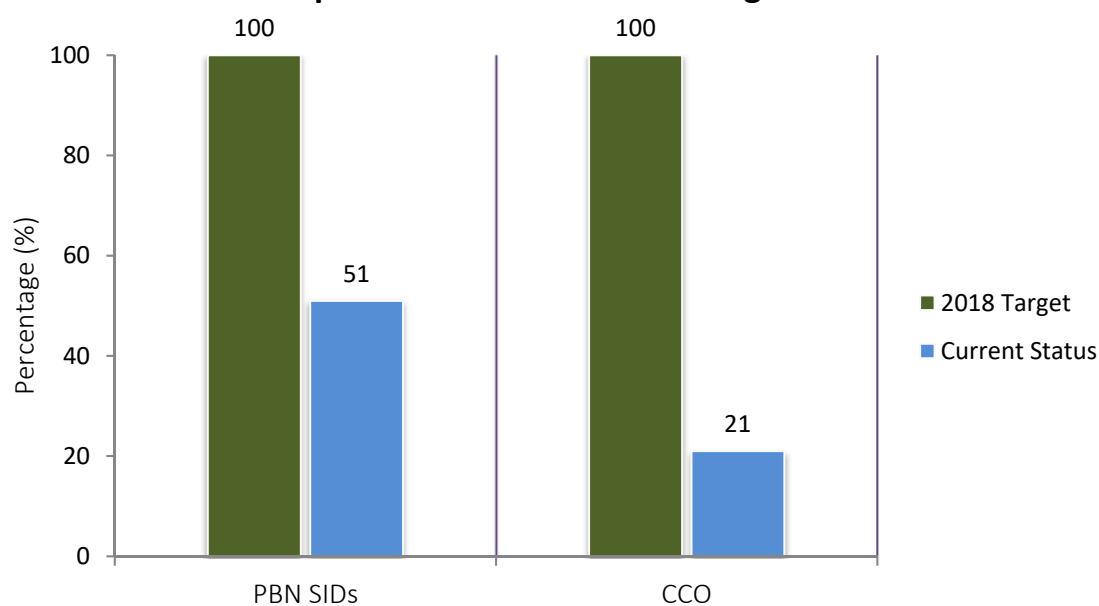
2.2.12

B0-CCO

To implement continuous climb operations in conjunction with performance-based navigation (PBN) to provide opportunities to optimize throughput, improve flexibility, enable fuel-efficient climb profiles and increase capacity at congested terminal areas.

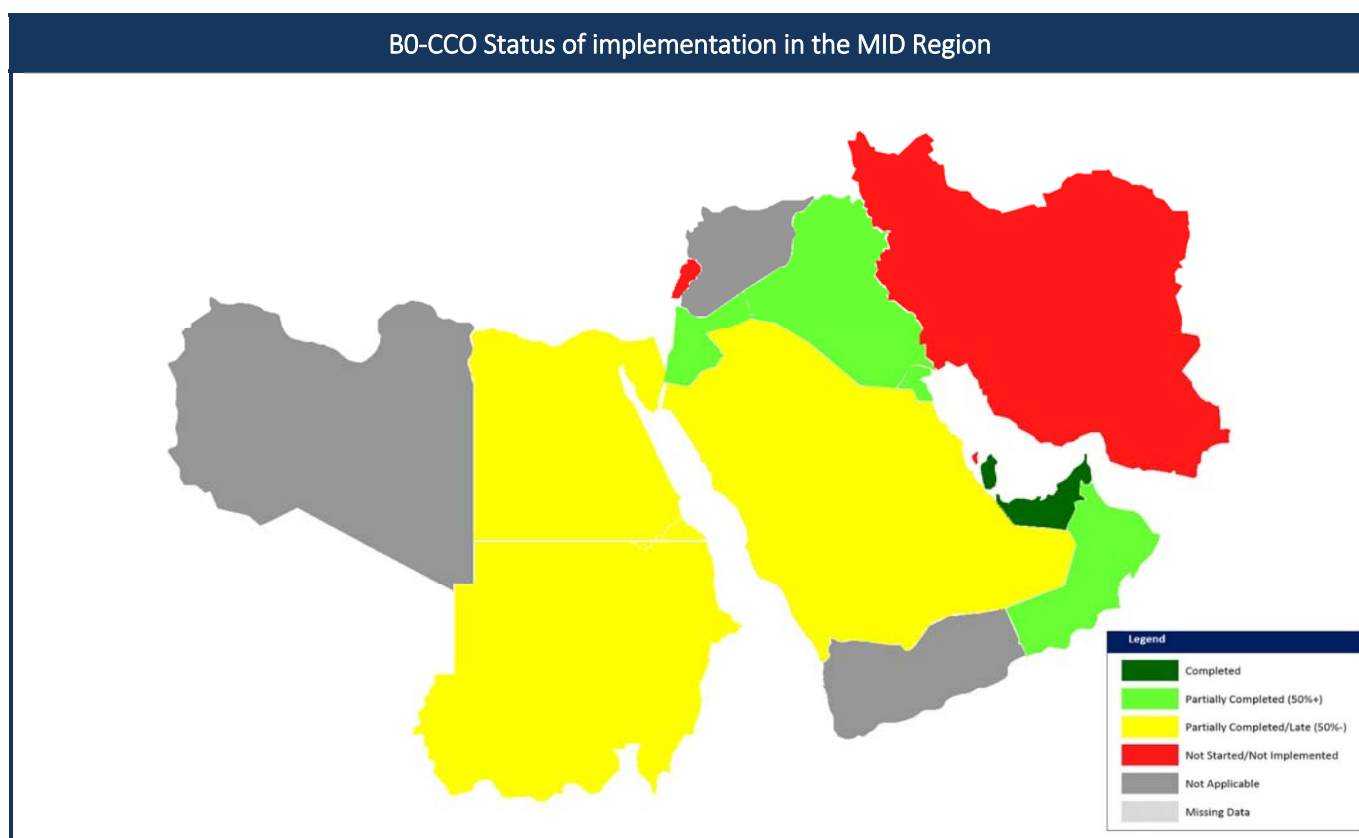
B0 – CCO: Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)			
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets
PBN SIDs	OBBI, HESN, HESH, HEMA, HEGN, HELX, OIIE, OISS, OIKB, OIMM, OIFM, ORER, ORNI, OJAM, OJAI, OJQA, OKBK, OLBA, OOMS, OOSA, OTHH, OEJN, OEMA, OEDF, OERK, HSNM, HSOB, HSSS, HSPN, OMAA, OMAD, OMDB, OMDW, OMSJ	Indicator: % of International Aerodromes/TMA with PBN SID implemented as required. Supporting Metric: Number of International Aerodromes/ TMAs with PBN SID implemented as required.	100% by Dec. 2018 for the identified Aerodromes/TMAs
International aerodromes/TMAs with CCO	OBBI, HESN, HESH, HEMA, HEGN, HELX, OIIE, OIKB, OIFM, ORER, ORNI, OJAM, OJAI, OJQA, OKBK, OLBA, OOMS, OOSA, OTHH, OEJN, OEMA, OEDF, OERK, HSNM, HSOB, HSSS, HSPN, OMAA, OMDB, OMDW, OMSJ	Indicator: % of International Aerodromes/TMA with CCO implemented as required. Supporting Metric: Number of International Aerodromes/TMAs with CCO implemented as required.	100% by Dec. 2018 for the identified Aerodromes/TMAs

B0-CCO Status of implementation in the MID Region



Module	Elements	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen
B0-CCO	PBN SIDs															
	Intl ADs/TMAs with CCO															

The progress for B0-CCO is acceptable (with approximately 36% implementation).



3. ASBU BLOCK 0 IMPLEMENTATION OUTLOOK FOR 2020

3.1 Status of Implementation-2020

This section consolidates the outlook of the Block 0 Modules implementation in the MID States, by 2020. The table below presents the status of implementation of the 18 ASBU Block 0 Modules foreseen to be achieved by the end of 2020, in accordance with the planning dates reported by States in the ICAO MID Region. This would provide a good basis/prerequisite for the planning of ASBU Block 1 implementation (2019-2025).

Detailed status of implementation of the 18 ASBU Block 0 Modules foreseen to be achieved by the end of 2020, for each State is provided at **Appendix B**.

The following color scheme is used for the projection of the outlook status:

Legend

	Good (75%+)
	Acceptable (50%-75%)
	Slow (25%-50%)
	Very Slow (25%-)
	Missing Data

Module	Status of implementation December 2016 (approximate rate)	Status of implementation December 2017 (approximate rate)	Projected Status of implementation by 2020* (approximate rate)
B0-APTA	44%	52%	96%
B0-WAKE	(Priority 2)	(Priority 2)	71%
B0-RSEQ	(Priority 2)	(Priority 2)	55%
B0-SURF	48%	50%	67%
B0-ACDM	0%	23%	50%
B0-FICE	56%	58%	83%
B0-DATM	62%	63%	87%
B0-AMET	67%	73%	92%
B0-FRTO	43%	45%	71%
B0-NOPS	(Priority 2)	(Priority 2)	46%
B0-ASUR	(Priority 2)	(Priority 2)	70%
B0-ASEP	(Priority 2)	(Priority 2)	69%
B0-OPFL	(Priority 2)	(Priority 2)	60%
B0-ACAS	73%	73%	100%
B0-SNET	(Priority 2)	80%	100%
B0-CDO	34%	47%	67%
B0-TBO	(Priority 2)	(Priority 2)	44%
B0-CCO	28%	36%	63%

Note – projected status for 2020 is calculated based on information received from 12 States (out of 15).

4. ENVIRONMENTAL PROTECTION

4.1 Introduction

Environmental Protection, to minimize the adverse environmental effects of civil aviation activities, is one of the five strategic objectives of ICAO. With a view to minimizing the adverse effects of international civil aviation on the environment, ICAO formulates policies, develops and updates Standards and Recommended Practices (SARPs) on aircraft noise and aircraft engine emissions, and conducts outreach activities. Information related to the ICAO activities on environmental protection is available on the ICAO website at: <https://www.icao.int/environmental-protection/Pages/default.aspx>

This section provides an update on the States' Action Plans on CO₂ Emissions Reduction; and presents an estimation of environmental benefits, in terms of fuel saving / CO₂ emissions reduction, accrued from the implementation of some ASBU Block 0 Modules in the MID Region.

4.2 States' Action Plans on CO₂ Emissions Reduction

The ICAO Assembly 38 (24 September to 4 October 2013) endorsed the Resolution 38-18 Consolidated statement of continuing ICAO policies and practices related to environmental protection – Climate Change which encouraged States to voluntarily prepare and submit Action Plans on CO₂ emission reduction to ICAO. An ambitious work programme was further laid down for capacity building and assistance to States in the development and

implementation of their Action Plans to reduce emissions, which States were initially invited to submit by the 37th Session of the ICAO Assembly in October 2010.

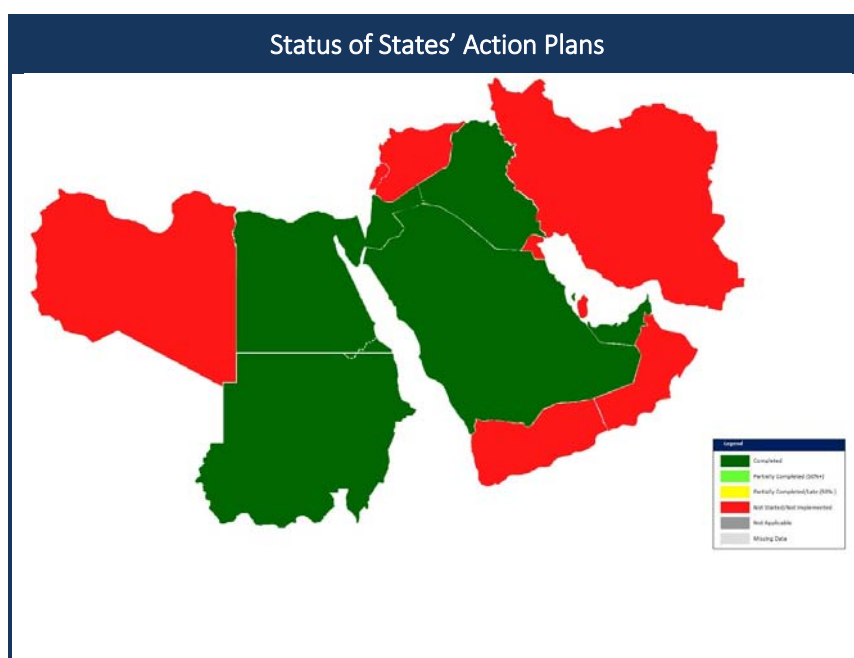
ICAO Assembly 39 (Montreal, Canada, 27 September – 6 October 2016) encouraged States, through Assembly Resolution 39-2 Consolidated statement of continuing ICAO policies and practices related to environmental protection – Climate change, to submit voluntary Action Plans outlining respective policies and actions, and annual reporting on international aviation CO₂ emissions to ICAO.

The MIDANPIRG/16 meeting (Kuwait, 13 - 16 February 2017) invited States to develop/update their Action Plans for CO₂ emissions reduction and submit them to ICAO through the APER website or the ICAO MID Regional Office.

An Action Plan is a means for States to communicate to ICAO information on activities to address CO₂ emissions from international aviation. The level of information contained in an action plan should be sufficient to demonstrate the effectiveness of actions and to enable ICAO to measure progress towards meeting the global goals set by Assembly Resolution A38-18. Action plans give States the ability to: establish partnerships; promote cooperation and capacity building; facilitate technology transfer; and provide assistance.

The Status of the provision of Action Plans on CO₂ emission in the MID Region is as follows:

State	Action Plans
Bahrain	June 2015
Egypt	July 2016
Iran	-
Iraq	June 2012
Jordan	September 2013
Kuwait	-
Lebanon	-
Libya	-
Oman	-
Qatar	-
Saudi Arabia	April 2018
Sudan	January 2015
Syria	-
UAE	June 2012 (update May 2018)
Yemen	-



4.3 Estimation of the Environmental Benefits accrued from implementation of ASBU Block 0 Modules

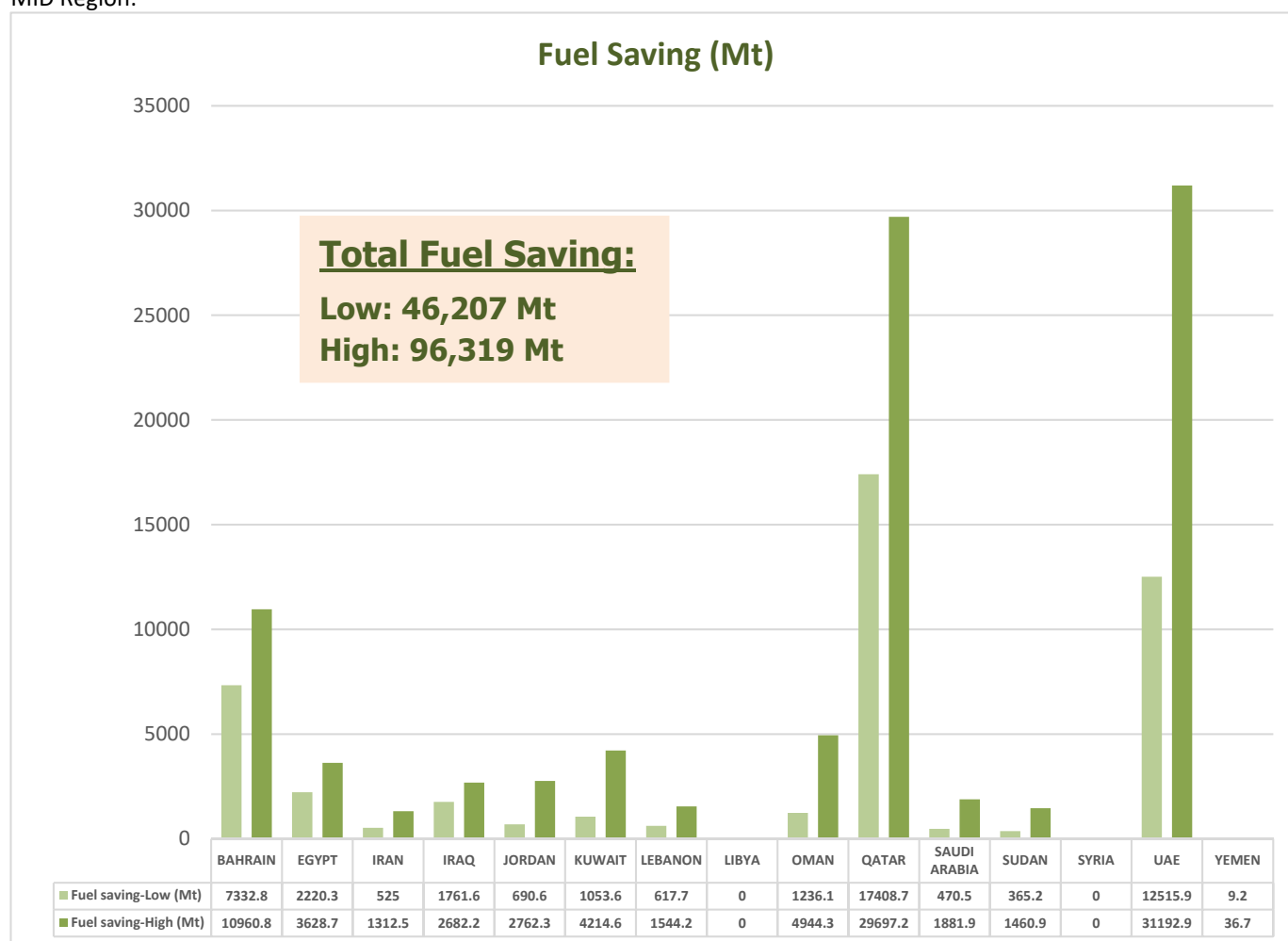
CAEP/10 conducted an assessment of the potential environmental benefits (fuel savings / CO₂) for the period between the start of implementation of ASBU Block 0 modules in 2013 and the planned implementation of such modules in 2018 (end of Block 0). In order to accomplish this task, CAEP developed sets of Rules-of-Thumb for each studied module with the overall intent to provide a conservative estimate of ASBU Block 0 fuel saving benefits. Rules-of-Thumb were developed using existing, publically available data, literature, and assumptions, together with the professional judgment of the analysts. A total of twenty three (23) rules of thumb have been developed for thirteen (13) ASBU Block 0 Modules.

The results of the ASBU Block 0 analysis conducted by CAEP highlight a potential reduction in fuel consumption by 2018 due to the implementation of ASBU Block 0 modules when compared to the 2013 baseline. The results show that the following Block 0 Modules (operational improvements) would have the biggest contribution to fuel saving in the MID Region:

- CCO 1 (CCO)
- CDO 1 (CDO)
- ACDM
- CDO 2 (PBN STARs)
- ASUR (ADS-B Surveillance)
- CCO 2 (PBN SIDs)
- APTA 1 (Radius to Fix)

As the status of implementation of B0-ACDM and B0-ASUR is still low in the MID Region, a Methodology for the Estimation of environmental benefits accrued from the implementation of priority 1 Block 0 Modules in the MID Region has been developed for B0-APTA, CCO and CDO, based on the Rules of Thumb and the available traffic data.

The estimation has shown a **total of 46,696 to 96,808 Mt** of fuel saving in the MID Region, as a result of the implementation of the selected Block 0 Modules (APTA, CDO and CCO), as shown below:



5. SUCCESS STORIES/BEST PRACTICES

5.1 NCLB ACTIVITIES IN THE MID REGION

I. Introduction

The ICAO Council identified that there is a large discrepancy among States in the implementation of ICAO Standards and Recommended Practices (SARPs). As a result, the ICAO “No Country Left Behind” (NCLB) Campaign was established by the Council to help ensure that SARPs implementation is better harmonized globally. To avoid this gap, ICAO should focus its activities on States lacking fundamental oversight capabilities for effective implementation of ICAO SARPs, particularly in the priority areas of safety, air navigation and efficiency, and security. Therefore, particular attention should be given to the assistance of those States with a higher safety and security risk.

In accordance with Assembly Resolution A39-23 “No Country Left Behind” (NCLB) Initiative, States should effectively implement ICAO’s Standards and Recommended Practices (SARPs) and policies so that all States have safe, secure, efficient, economically viable and environmentally sound air transport systems, which support sustainable development and socio-economic prosperity.

At the Regional Level; the MID Region NCLB Strategy supports the implementation of the Global Aviation Safety Plan (GASP) and its Roadmap as the basis to develop action plans that define the specific activities, which should take place in order to improve safety at the regional and national levels.

The MID Region NCLB Strategy is complemented by the MID Region NCLB Implementation Plan as a companion document. This Plan is a living document used for recording the NCLB activities in the MID Region (general and State-by-State), including the monitoring of the States’ NCLB Plan of Actions and States/Stakeholders’ contributions to support the NCLB initiative.



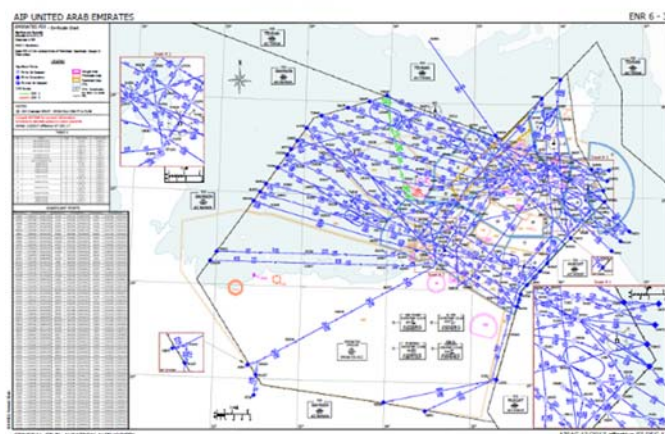
The Fourth meeting of the Directors General of Civil Aviation – Middle East Region (DGCA-MID/4), which was held in Muscat, Oman from 17 to 19 October 2017, through DGCA-MID/4 Conclusion 4/1, endorsed the NCLB Declaration (Muscat Declaration) in support of the ICAO NCLB Initiative; and invited States and Stakeholders to support the implementation of the MID Region NCLB Strategy.

It is to be highlighted that Kingdom of Saudi Arabia has kindly provided 400 K US\$ to support ICAO MID NCLB activities; and UAE provided 50 K US\$ to support the establishment of the MID Flight Procedure Programme (MID FPP). Other States and stakeholders, such as Egypt, Iran and EASA provided in-kind support to some MID States related to aviation safety and security, under the MID Region NCLB framework.

II. MID NCLB Activities related to Air Navigation

- 10 NCLB assistance missions in 2016 and 7 in 2017 (Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Sudan)
- 6 NCLB Seminars/Workshops in 2016 and 6 in 2017
- 1 ATM Inspectors Course (GSI-ANS/ATM)

On December 7th 2017, the General Civil Aviation Authority (GCAA) completed the implementation of the UAE Airspace Restructuring Project – Integration & Implementation (UAE ARP3). This airspace change saw the Emirates Flight Information Region (FIR) transformed into an airspace structure completely based on Performance Based Navigation (PBN) with a Navigation Specification of RNAV-1 (GNSS).



UAE ARP (Integration & Implementation) was the culmination of years of extensive analysis, development, collaboration and cooperation across the UAE Aviation Community including the GCAA Sheikh Zayed Air Navigation Centre (SZC), Dubai Air Navigation Services, Abu Dhabi Airports Company, Ras Al Khaimah Department of Civil Aviation, Sharjah Department of Civil Aviation, Fujairah Department of Civil Aviation as well as more than twenty further aviation stakeholders.

The UAE ARP (Integration & Implementation) was designed to meet multiple objectives, all of which were achieved in line with global best practices. Primarily the airspace change was designed to increase UAE Airspace capacity to meet the forecasted air traffic demand for 2020, as well as increased access to all UAE airports, improve efficiency for both aviation system customers and Air Navigation Service Providers (ANSP) and reduce the environmental impact of the increasing traffic through more effective Air Traffic Management operations.

UAE ARP3 Facts:

- Capability to safely meet capacity requirements for the forecasted 2040 air traffic demand through the UAE ARP3 Integrated Airspace Master Plan (IAMP).
- Annual fuel savings exceeding \$15 million to the airlines customers within the first year after implementation.
- Annual environmental efficiency exceeding 100,000 Mt of CO₂, supporting a 'Greener' aviation.
- Project Implementation Duration – 18 months
- Number of project Deliverables - 50
- Number of Workshops / Meetings – over 200
- Actual Man hours for design development – over 120,000 hours
- Number of UAE Air Navigation Service Providers involved – 6
- Number of Emirates of the United Arab Emirates involved - 5
- Number of Aviation Stakeholder organizations collaboratively involved - 26
- Number of Project Representatives – over 150
- Number of Air Traffic Controllers trained for UAE ARP3 - 250

The project directly involved five of the seven Emirates within the UAE and required over 120,000 man-hours to develop the airspace design network. Multiple Fast Time and Real Time simulations in Italy, UK and in the UAE formed critical activities for the design validation and verification of the revised airspace network.

The UAE ARP (Integration & Implementation) also required over 250 Air Traffic Controllers to take simulation and theoretical training on the redesign for over two hundred Instrument Flight Procedures and thirty new airways.



In 2012, prior to the launch of the UAE ARP the GCAA, in collaboration with the local Departments of Civil Aviation and ANSPs, undertook a 'UAE Airspace Study' which, among other recommendations, identified a requirement to 'develop a comprehensive airspace design that will accommodate transition to a full PBN airspace environment to support the increasing demand' and this laid the foundations of the UAE ARP.

Accordingly, UAE ARP adopted an industry wide collaborative approach, encompassing a three phased project which kicked off in 2013. In July 2016, the ARP activated Phase 3 (Integration & Implementation) and with the support of globally recognised consultants ensured the successful transformation of the chosen conceptual designs were integrated into an implementable solution. The first iteration of the design network delivered on 7th December 2017 enabled the airspace within the Emirates FIR sufficient capacity, capability and efficiency to support the forecasted traffic growth to 2020.



Communication of such a large scale change is a vital change management activity to ensure a smooth and successful transition. UAE ARP (Integration & Implementation) undertook months of cross industry stakeholder workshops and events culminating in an awareness campaign at the Dubai Airshow between November 17-21st.

A Communication and Engagement document was also generated to ensure clear and consistent messages were relayed by all stakeholders, whilst also leaflets and briefing material generated across the six ANSPs, National carriers and IATA. AICs and NOTAMs were used to promulgate further Global awareness prior to the December 7th transition.

Implementing a new network for the entire Emirates FIR airspace change without generating disruption to the aviation customers was a major and critical challenge which required significant stakeholder collaboration. To do this, UAE ARP (Integration & Implementation) created a Transition Plan Development Team (TPDT) encompassing ANSPs, airlines, IATA, military, NCMS and other appropriate aviation stakeholders. The ultimate focus of the team was to develop a harmonised Transition Plan for all agencies involved to ensure a complete synchronised and seamless transition. One of the first hurdles for the team to overcome was as a result of the traffic patterns of the Emirates FIR and the unsuitable timing associated with the AIRAC effectiveness. Through the TPDT a bespoke collaborative solution was found to delay the 'Operational Effective' time of implementation to 03:30 UTC (07:30 UAE) and therefore not utilising the 0000UTC effective time associated with AIRAC 13/17. The rationale ensured that the major arrival flows into the UAE airfields which would be operating predominantly to old FMS network data would have landed prior to the operational airspace change. The new airspace would then become operationally effective prior to the major UAE departure flow materializing and would encompass a majority of aircraft operating to the new AIRAC 13/17 FMS network.



To ensure that a synchronised airspace transition was enabled across the six ANSPs, a Transition Team was created with representation of six Transition Coordinators (one per ANSP, with also a deputy allocation) coordinating through a Transition Manager based at SZC. These Transition Coordinators and Transition Manager operated to an Operational Transition Event Schedule, containing major 'Check-Points' confirming that each unit's activities were operating in sync, whilst also in parallel. To enable rapid decision making capability, the UAE ARP (Integration & Implementation) also formed a Transition & Contingency Cell at SZC. This cell contained PSG representation from the ANSPs, military and also representation from the UAE Airline community. The Transition & Contingency Cell was activated several hours prior to the Operational Transition of the new airspace and their role was to ensure that if any major decisions were required at either an ANSP or project level, a resolution could be sought and acted upon quickly to enable minimal disruption to the Transition Event.

As part of the Transition Plan, UAE ARP (Integration & Implementation) adopted varying Transition timelines to provide regulatory assurance that each ANSP had implemented the airspace change successfully. In preparation for the airspace implementation, the project carried out a Transition Readiness Review which was held on November 23rd. The purpose of this review was to ensure that all ANSPs had satisfied specific 'Entry Criteria' prior to the Transition Event (December 7th). In the five day build up to the Transition Event, NCMS provided a daily weather forecast for December 7th across the UAE which was disseminated to the PSG and Transition Coordinators via the Transition Manager. From December 5th, this information was also supplemented with a fog forecast for the UAE airfields.

During the Transition Event four appropriately scheduled teleconferences were also held to provide a status check on the progress of the transition to the airline community and allow an opportunity for the airlines to provide pertinent information back to the Transition Manager. A final teleconference was held at 13:30 UTC (17:30 UAE) which confirmed that each ANSP had satisfied the Transition Event 'Exit Criteria'. This information was then relayed to the PSG for their approval to exit the Transition Event. At this stage, the UAE ARP transition was transferred from the Transition Event to a 10 day Transition Period. Any observations or feedback from each of the six ANSPs or from the airline community would then be fed into a 10/30/60/90 day review, with the project then supporting a six month Post Implementation Maintenance & Support period.



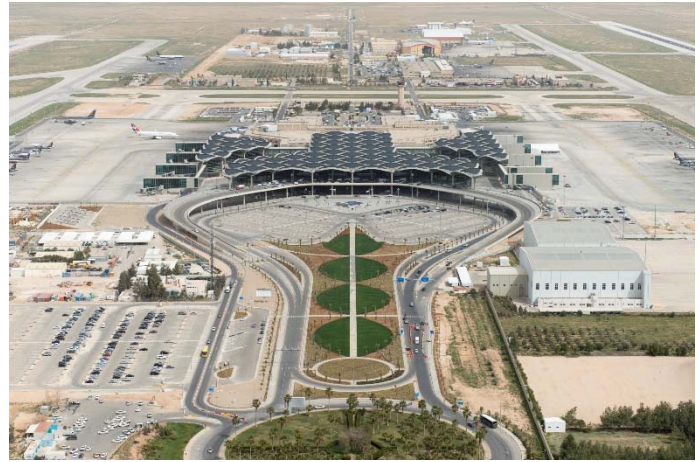
The output of the extensive planning and preparation by the TPDT in the generation of a Transition Delivery Document (TDD) and associated Transition Plans for the Transition Event ensured that on December 7th 2017, a seamless transition took place with no disruption or delay to the aviation community and no issues reported from any of the six ANSPs involved.

Through the development of an Integrated Airspace Master Plan (IAMP), the project will also create a Roadmap to future-proof the UAE's airspace network for the forecasted traffic growth until 2040. Design elements will need to incorporate such major airport expansion projects for both Dubai World Central Al Maktoum International Airport, Abu Dhabi International Airport as well as meeting the anticipated capacity increases for Dubai's Expo 2020. Moreover, it will ensure that aviation will continue to provide a vital contribution to the UAE Gross Domestic Product.



Amman/Queen Alia International Airport (QAIA) completed the requirements of the final level (level 3+ Neutrality) of the Airport Carbon Accreditation (ACA) program, which is a carbon management program developed by Airport Council International (ACI). QAIA is the first airport in the Middle East to achieve this accomplishment.

QAIA has demonstrated commitment to the aviation environmental protection, by implementing a comprehensive Environment Management Plan (EMP), which was developed to assess the probability of a multitude of risks, related to airport operations and activities, on the surrounding environment. This plan is reviewed annually to comply with the latest changes in national and international standards and requirements. QAIA's EMP is developed to minimize and control sources of environmental pollution such as carbon emissions, in addition to the monitoring of several environmental elements, through an integrated waste management program, in addition to air quality, water and biodiversity management, as well as noise control.



QAIA completed the first level of ACA Programme (Mapping) in March 2013, helping to determine the sources of harmful emissions on Airport grounds. This was followed in March 2015, by reaching level 2 (Reduction), as a result of the continuous efforts to reduce Carbon emissions, making QAIA the first airport to achieve this level in the region.

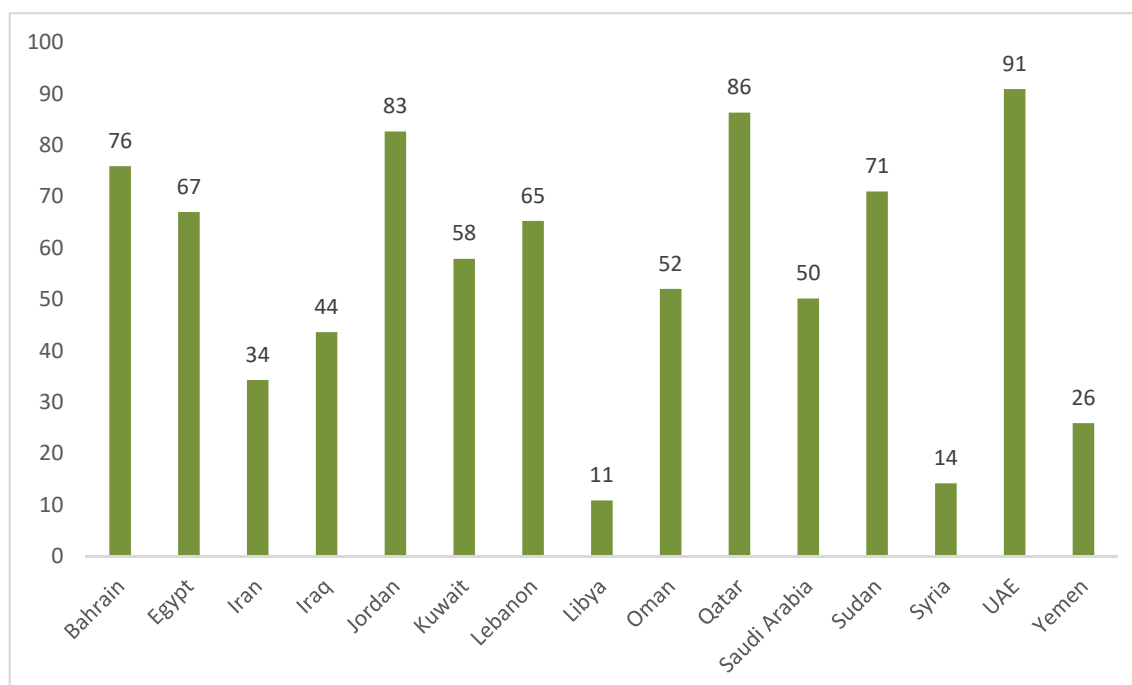
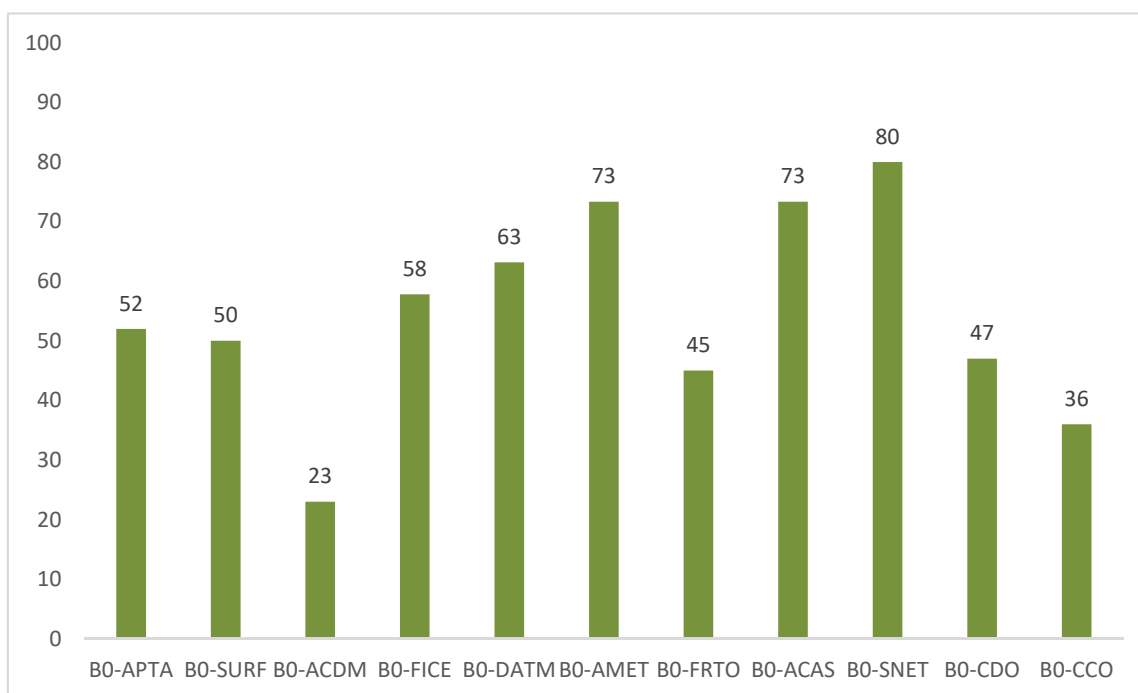
6. CONCLUSION

The progress for the implementation of some priority 1 Block0 Modules in the MID Region has been acceptable/good; such as B0-ACAS, B0-AMET and B0-DATM. Nevertheless, some States are still facing challenges to implement the majority of the Block 0 Modules.

The status of implementation of the ASBU Block 0 Modules also shows that Bahrain, Egypt, Jordan, Kuwait, Qatar, Saudi

Arabia and UAE made a good progress in the implementation of the priority 1 ASBU Block 0 Modules.

Looking into the States' plans for 2020 (outlook), the focus/priority of States is to complete the implementation of B0-APTA, B0-FICE, B0-DATM, B0-AMET, B0-CCO and B0-CDO.



Status of implementation of Doha Declaration Targets:

Doha Declaration was endorsed by the third meeting of Directors General of Civil Aviation (DGCA-MID/3) in Doha, Qatar from 27 to 29 April 2015. Doha Declaration set five Targets for the Air Navigation Capacity and Efficiency, as follows:

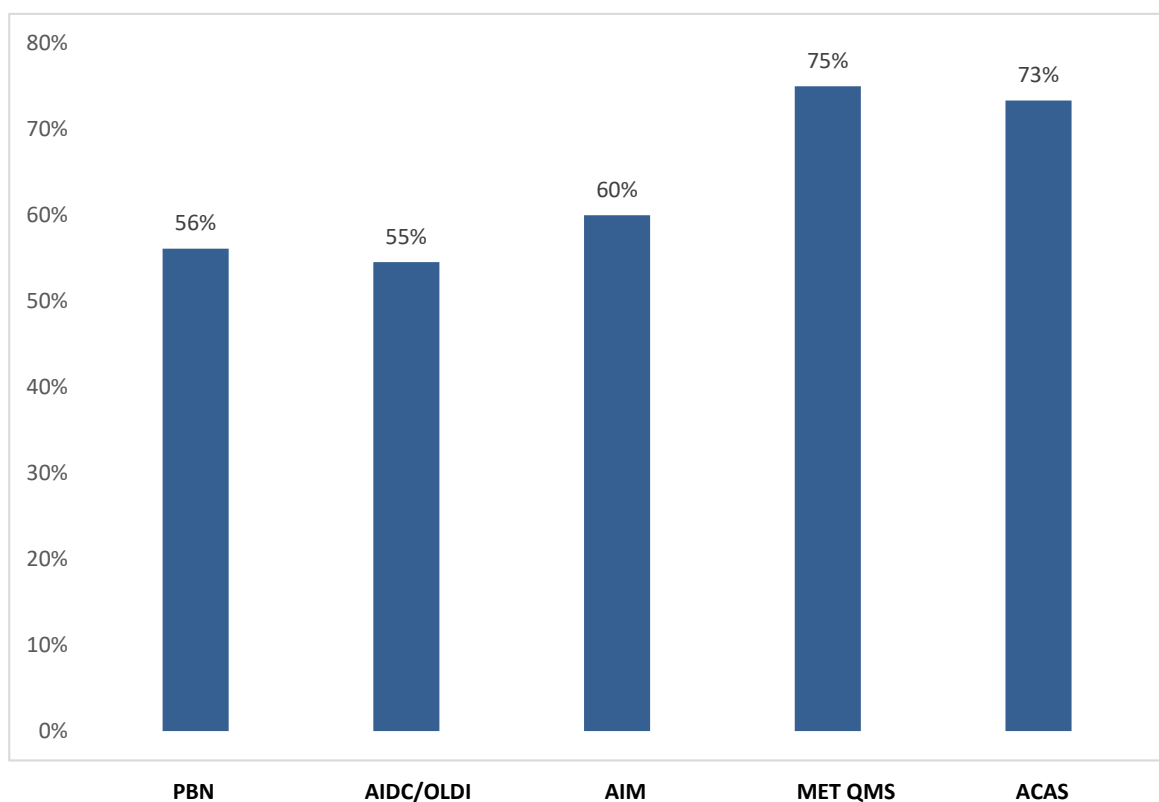
- 1- Optimization of Approach Procedures including vertical guidance (PBN): Implement PBN approach procedures with vertical guidance, for all runways ends at international aerodromes, either as the primary approach or as a back-up for the precision approaches by 2017
- 2- Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration: 11 States to implement AIDC/OLDI between their ACCs and at least one adjacent ACC by 2017

3- Service Improvement through Digital Aeronautical Information Management: All States to complete implementation of Phase I of the transition from AIS to AIM by 2017

4- Meteorological information supporting enhanced operational efficiency and safety: 12 States to complete the implementation of QMS for MET by 2017

5- ACAS Improvement: All States require carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons by 2017

Status of implementation by States related to the Targets of the Doha Declaration is as follows:



APPENDIX A: STATUS OF ASBU BLOCK 0 MODULES

	APTA				SURF			ACDM	FICE			DATM										AMET				FRTO			NOPS	ACAS	SNET		CDO			CCO																																					
State	PBN Plan	LNAV	LNAV/ NAV	TOTAL	A-SMGCS 1	A-SMGCS 2	TOTAL	TOTAL	AMHS Cap	AMHS Impl.	AIDC/OLDI	TOTAL	AIM Plans	AIXM	eAIP	QMS	WGS-84 H	WGS-84 V	area 1 T	area 1 O	area 4 T	area 4 O	TOTAL	SADIS FTP	QMS	SIGMET	TOTAL	FUA	Flex Routing	TOTAL	TOTAL	TOTAL	STCA	MSAW	TOTAL	PBN STARS	CDO	TOTAL	PBN SIDs	CCO	TOTAL																																
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APPENDIX B: ASBU BLOCK 0 STATUS OF IMPLEMENTATION OUTLOOK 2020

State	B0-APTA	B0-WAKE	B0-RSEQ	B0-SURF	B0-ACDM	B0-FICE	B0-DATM	B0-AMET	B0-FRTO	B0-NOPS	B0-ASUR	B0-ASEP	B0-OPFL	B0-ACAS	B0-SNET	B0-CDO	B0-TBO	B0-CCO
Bahrain	FI	PI	PI	FI	PI	FI	FI	FI	PI	PI	FI	PI	PI	FI	FI	FI	PI	FI
Egypt	FI	FI	PI	FI	PI	FI	FI	FI	FI	FI	FI	PI	PI	FI	FI	PI	PI	PI
Iran	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	FI	PI	FI
Iraq	PI	PI	PI	PI	NI	FI	FI	PI	PI	NI	NI	NI	PI	FI	FI	NI	NI	NI
Jordan	FI	PI	NI	NI	PI	PI	PI	FI	NI	NI	FI	PI	PI	FI	FI	PI	NI	PI
Kuwait	FI	PI	PI	PI	PI	PI	PI	FI	PI	PI	PI	PI	PI	FI	FI	PI	PI	PI
Lebanon	FI	PI	NI	PI	PI	PI	FI	PI	PI	NI	NI	FI	NI	FI	FI	PI	PI	NI
Libya	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD
Oman	FI	FI	FI	PI	PI	FI	FI	FI	FI	FI	PI	FI	PI	FI	FI	PI	PI	PI
Qatar	FI	NI	FI	FI	PI	FI	FI	FI	FI	PI	FI	PI	PI	FI	FI	FI	PI	FI
Saudi Arabia	FI	PI	PI	PI	PI	FI	FI	FI	FI	PI	FI	FI	FI	FI	FI	FI	FI	FI
Sudan	FI	PI	PI	PI	PI	PI	PI	FI	PI	PI	PI	FI	PI	FI	FI	PI	PI	PI
Syria	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD
UAE	FI	FI	PI	PI	PI	FI	FI	FI	FI	PI	FI	MD	PI	FI	FI	FI	PI	FI
Yemen	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	FI	MD	MD	MD	MD

Legend

FI	FI: Fully Implemented
PI	PI: Partially Implemented
NI	NI: Not Implemented
N/A	N/A: Not Applicable
MD	MD: Missing Data



International Civil Aviation Organization
Middle East Office
Cairo International Airport
Cairo 11776, EGYPT

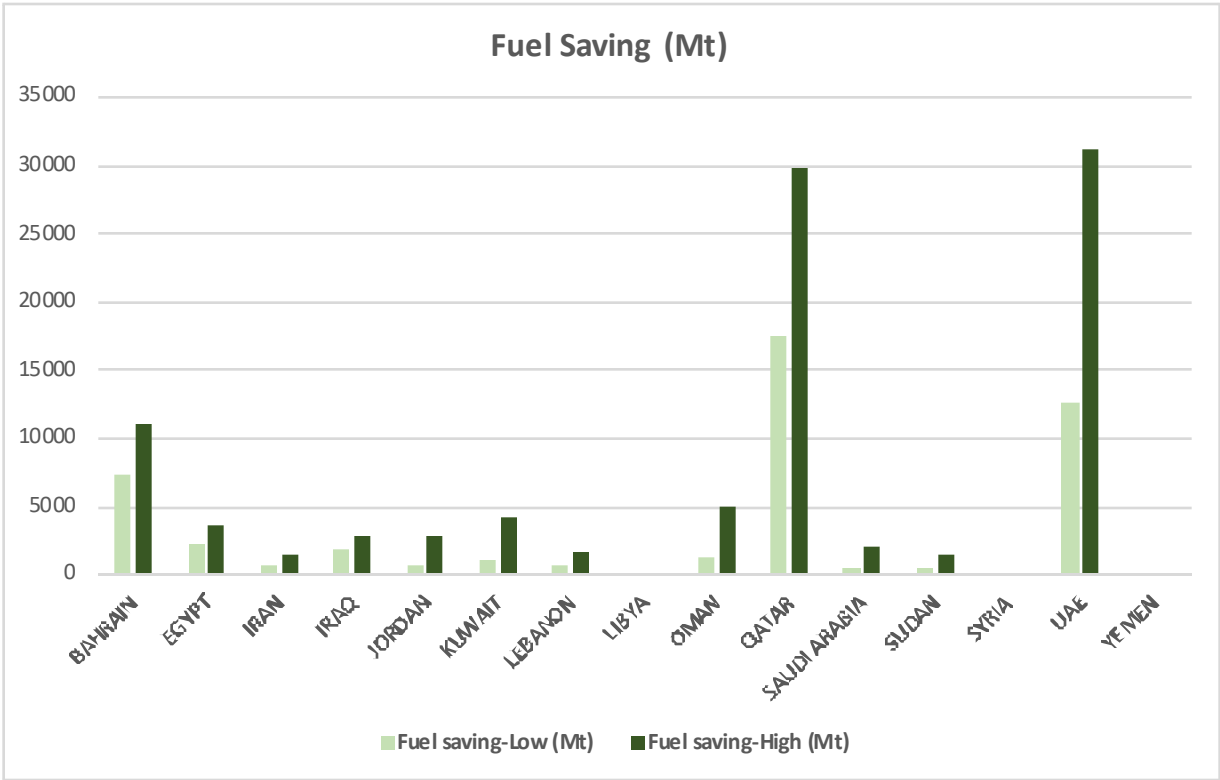
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State	Fuel saving-Low (Mt)	Fuel saving-High (Mt)
BAHRAIN	7332.8	10960.8
EGYPT	2220.3	3628.7
IRAN	525	1312.5
IRAQ	1761.6	2682.2
JORDAN	690.6	2762.3
KUWAIT	1053.6	4214.6
LEBANON	617.7	1544.2
LIBYA	0	0
OMAN	1236.1	4944.3
QATAR	17408.7	29697.2
SAUDI ARABIA	470.5	1881.9
SUDAN	365.2	1460.9
SYRIA	0	0
UAE	12515.9	31192.9
YEMEN	9.2	36.7

TOTAL	46207.2	96319.2



APPENDIX 5.2D

**Description of the Methodology for the Estimation of environmental benefits
accrued from the implementation of priority 1 Block 0 Modules in the MID Region**

- 1 The methodology was developed based on the studies carried out by the Committee on Aviation Environmental Protection (CAEP) and the defined Rules of Thumb (RoTs) agreed and endorsed by CAEP.
- 2 The objective of the Methodology is to carry out estimation of the environmental benefits (fuel savings/CO₂) accrued from the implementation of priority 1 ASBU Block 0 Modules in the MID Region.
- 3 The Methodology is focused on the Block 0 Priority 1 Modules that have shown the highest contribution to the environmental benefits in the MID Region and the implementation data for them is available. Accordingly, three (3) Modules (five RoTs) have been selected: B0-APTA, B0-CDO and B0-CCO.

Note 1 – CAEP studies have determined the contribution of each studied Block 0 Module at the Global and Regional Level, including those of the MID Region.

Note 2 – additional information on CAEP studies could be found in CAEP/10-WP/39. A summary of the studies is reflected in the ANSIG/3-WP/14.

- 4 Number of Departures were received from the traffic data available to the ICAO ATB. However, the traffic data for some International Airports was missing.
- 5 Percentage of traffic using APTA, CDO and CCO procedures represents percentage of the implementation of those procedures.

Note 3 – based on traffic data, around 70% of the traffic operated in the MID States' International Airports are Medium and 30% Heavy.

- 6 Fuel saving for each of the RoTs (elements) is based on a minimum and maximum estimate of the fuel saving (low to high). The following ranges have been applied, based on the CAEP studies on RoTs:
 - APTA (APTA 1 – PBN-enabled Radius to Fix approach)
 - Light/Small Airplanes (7000kg or less): 11kg/flight
 - Medium Airplanes (7000kg to 136000kg): 62kg/flight
 - Heavy Airplanes (136000kg or more): 95kg/flight
 - CCO (CCO1 – CCO)
 - Minimum saving (Low): 90kg/Departure
 - Maximum saving (High): 150kg/Departure
 - CCO (CCO2 – PBN SIDs)
 - Minimum saving (Low): 0kg/Departure
 - Maximum saving (High): 30kg/Departure
 - CDO (CDO1 – CDO)
 - Saving (Low): 60kg/Arrival
 - CDO (CDO2 – PBN STARs)
 - Minimum saving (Low): 20kg/Arrival
 - Maximum saving (High): 50kg/Arrival



INTERNATIONAL CIVIL AVIATION ORGANIZATION

MIDDLE EAST AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (MIDANPIRG)

MID REGION AIR NAVIGATION STRATEGY

EDITION DECEMBER, 2018

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.

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1. Introduction

1.1 As traffic volume increases throughout the world, the demands on air navigation service providers in a given airspace increase, and air traffic management becomes more complex.

1.2 It is foreseen that the implementation of the components of the ATM operational concept will provide sufficient capacity to meet the growing demand, generating additional benefits in terms of more efficient flights and higher levels of safety. Nevertheless, the potential of new technologies to significantly reduce the cost of services will require the establishment of clear operational requirements.

1.3 Taking into account the benefits of the ATM operational concept, it is necessary to make many timely decisions for its implementation. An unprecedented cooperation and harmonization will be required at both global and regional level.

1.4 ICAO introduced the Aviation System Block Upgrades (ASBU) framework as a systemic manner to achieve a harmonized implementation of the air navigation services. An ASBU designates a set of improvements that can be implemented globally from a defined point in time to enhance the performance of the ATM system.

1.5 Through Recommendation 6/1 - *Regional performance framework – planning methodologies and tools*, AN-Conf/12 urged States and PIRGs to harmonize the regional and national air navigation plans with the ASBU methodology in response to this, the MID region developed the MID Region Air Navigation Strategy, which is aligned with the GANP and ASBU Framework.

1.6 Stakeholders including service providers, regulators, airspace users and manufacturers are facing increased levels of interaction as new, modernized ATM operations are implemented. The highly integrated nature of capabilities covered by the block upgrades requires a significant level of coordination and cooperation among all stakeholders. Working together is essential for achieving global harmonization and interoperability.

2. Strategic Air Navigation Capacity and Efficiency Objective

2.1 To realize sound and economically-viable civil aviation system in the MID Region that continuously increases in capacity and improves in efficiency with enhanced safety while minimizing the adverse environmental effects of civil aviation activities.

3. MID Air Navigation Objectives

3.1 The MID Region air navigation objectives are set in line with the global air navigation objectives and address specific air navigation operational improvements identified within the framework of the Middle East Regional Planning and Implementation Group (MIDANPIRG).

3.2 Block ‘0’ features Modules are characterized by operational improvements, which have already been developed and implemented in many parts of the world. The MID Region priority 1 Block 0 Modules are reflected in **Table 1** below.

3.3 The MID Region Air Navigation Strategy aims to maintain regional harmonisation. The States should develop their National ASBU Implementation Plan, including action plans for the implementation of relevant priority 1 ASBU Modules and other Modules according to the States’ operational requirements.

3.4 The implementation of the ASBU Block 0 Modules in the MID Region started in 2013 and is continuing.

3.5 Blocks 1 features Modules are characterized by both existing and projected performance area solutions, with availability milestones beginning in 2019.

3.6 The Block Upgrades incorporate a long-term perspective matching that of the Regional Air Navigation Plan (eANP). They coordinate clear aircraft- and ground-based operational objectives together with the avionics, data link and ATM system requirements needed to achieve them. The overall strategy serves to provide industry wide transparency and essential investment certainty for operators, equipment manufacturers and ANSPs.

3.7 The implementation of Block 2 and Block 3 Modules is planned for 2025 and beyond.

4. MID Region ASBU Block 0 Modules Prioritization and Monitoring

4.1 On the basis of operational requirements and taking into consideration the associated benefits, **Table 1** below shows the priority for implementation of the 18 Block “0” Modules, as well as the MIDANPIRG subsidiary bodies that will be monitoring and supporting the implementation of the Modules:

Table 1. MID REGION ASBU BLOCK 0 MODULES PRIORITIZATION AND MONITORING

Module Code	Module Title	Priority	Start Date	Monitoring		Remarks
				Main	Supporting	
Performance Improvement Areas (PIA) 1: Airport Operations						
B0-APTA	Optimization of Approach Procedures including vertical guidance	1	2014	PBN SG	ATM SG, AIM SG, CNS SG	
B0-WAKE	Increased Runway Throughput through Optimized Wake Turbulence Separation	2				
B0-RSEQ	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	2				
B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	1	2014	ANSIG	CNS SG	Coordination with RGS WG
B0-ACDM	Improved Airport Operations through Airport-CDM	1	2014	ANSIG	CNS SG, AIM SG, ATM SG	Coordination with RGS WG
Performance Improvement Areas (PIA) 2 Globally Interoperable Systems and Data Through Globally Interoperable System Wide Information Management						
B0-FICE	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	1	2014	CNS SG	AIM SG, ATM SG	
B0-DATM	Service Improvement through Digital Aeronautical Information Management	1	2014	AIM SG		
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	1	2014	MET SG		

Performance Improvement Areas (PIA) 3 Optimum Capacity and Flexible Flights – Through Global Collaborative ATM						
B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	2014	ATM SG		
B0-NOPS	Improved Flow Performance through Planning based on a Network-Wide view	1	2015			
B0-ASUR	Initial capability for ground surveillance	2				
B0-ASEP	Air Traffic Situational Awareness (ATSA)	2				
B0-OPFL	Improved access to optimum flight levels through climb/descent procedures using ADS-B	2				
B0-ACAS	ACAS Improvements	1	2014	CNS SG		
B0-SNET	Increased Effectiveness of Ground-Based Safety Nets	1	2017	ATM SG		
Performance Improvement Areas (PIA) 4 Efficient Flight Path – Through Trajectory-based Operations						
B0-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDO)	1	2014	PBN SG		
B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	2		ATM SG	CNS SG	
B0-CCO	Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)	1	2014	PBN SG		

Priority 1: Modules that have the highest contribution to the improvement of air navigation safety and/or efficiency in the MID Region. These modules should be implemented where applicable and will be used for the purpose of regional air navigation monitoring and reporting for the period 2015-2018.

Priority 2: Modules recommended for implementation based on identified operational needs and benefits.

5. Measuring and Monitoring Air Navigation Performance

5.1 The monitoring of air navigation performance and its enhancement is achieved through identification of relevant air navigation Metrics and Indicators as well as the adoption and attainment of air navigation system Targets. The monitoring of the priority 1 ASBU modules is carried out through the MID eANP Volume III.

5.2 MIDANPIRG through its activities under the various subsidiary bodies will continue to update and monitor the implementation of the ASBU Modules to achieve the air navigation targets.

5.3 The priority 1 Modules along with the associated elements, applicability, performance Indicators, supporting Metrics, and performance Targets are shown in the **Table 2** below.

Note: The different elements supporting the implementation are explained in detail in the ASBU Document which is attached to the Global Plan (Doc 9750).

6. Governance

6.1 Progress report on the status of implementation of the different priority 1 Modules and other Modules, as appropriate, should be developed by the Air Navigation System Implementation Group (ANSIG) and presented to the MIDANPIRG Steering Group (MSG) and/or MIDANPIRG on regular basis.

6.2 The MIDANPIRG and its Steering Group (MSG) will be the governing body responsible for the review and update of the MID Region Air Navigation Strategy.

6.3 The MID Region Air Navigation Strategy will guide the work of MIDANPIRG and its subsidiary bodies and all its member States and partners.

6.4 Progress on the implementation of the MID Region Air Navigation Strategy and the achievement of the agreed air navigation targets will be reported to the ICAO Air Navigation Commission (ANC), through the review of the MIDANPIRG reports, MID Air navigation Report, etc.; and to the stakeholders in the Region within the framework of MIDANPIRG.

**Table 2. MONITORING THE IMPLEMENTATION OF THE ASBU BLOCK 0 MODULES
IN THE MID REGION**

B0 – APTA: Optimization of Approach Procedures including vertical guidance

Description and purpose:

The use of performance-based navigation (PBN) and ground-based augmentation system (GBAS) landing system (GLS) procedures will enhance the reliability and predictability of approaches to runways, thus increasing safety, accessibility and efficiency. This is possible through the application of Basic global navigation satellite system (GNSS), Baro vertical navigation (VNAV), satellite-based augmentation system (SBAS) and GLS. The flexibility inherent in PBN approach design can be exploited to increase runway capacity.

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
Y	Y	Y	Y	Y

Applicability consideration:

This module is applicable to all instrument, and precision instrument runway ends, and to a limited extent, non-instrument runway ends.

B0 – APTA: Optimization of Approach Procedures including vertical guidance

Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
LNAV	All RWYs Ends at International Aerodromes	Indicator: % of runway ends at international aerodromes with RNAV(GNSS) Approach Procedures (LNAV) Supporting metric: Number of runway ends at international aerodromes with RNAV (GNSS) Approach Procedures (LNAV)	100% (All runway ends at Int'l Aerodromes, either as the primary approach or as a back-up for precision approaches)	Dec. 2016
LNAV/VNAV	All RWYs ENDS at International Aerodromes	Indicator: % of runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV) Supporting metric: Number of runways ends at international aerodromes provided with Baro-VNAV approach procedures (LNAV/VNAV)	100% (All runway ends at Int'l Aerodromes, either as the primary approach or as a back-up for precision approaches)	Dec. 2017

Module B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)

Description and purpose:

Basic A-SMGCS provides surveillance and alerting of movements of both aircraft and vehicles on the aerodrome thus improving runway/aerodrome safety. ADS-B information is used when available (ADS-B APT).

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
Y	Y	Y	Y	Y

Applicability consideration:

A-SMGCS is applicable to any aerodrome and all classes of aircraft/vehicles. Implementation is to be based on requirements stemming from individual aerodrome operational and cost-benefit assessments. ADS-B APT, when applied is an element of A-SMGCS, is designed to be applied at aerodromes with medium traffic complexity, having up to two active runways at a time and the runway width of minimum 45 m.

B0-SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)				
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
A-SMGCS Level 1*	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEDF, OEJN, OERK, OMDB, OMAA, OMDW	Indicator: % of applicable international aerodromes having implemented A-SMGCS Level 1 Supporting Metric: Number of applicable international aerodromes having implemented A-SMGCS Level 1	70%	Dec. 2017
A-SMGCS Level 2*	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEJN, OERK, OMDB, OMAA, OMDW	Indicator: % of applicable international aerodromes having implemented A-SMGCS Level 2 Supporting Metric: Number of applicable international aerodromes having implemented A-SMGCS Level 2	50%	Dec. 2017

*Reference: Eurocontrol Document – “Definition of A-SMGCS Implementation Levels, Edition 1.2, 2010”.

B0 – ACDM: Improved Airport Operations through Airport-CDM**Description and purpose:**

To implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and maneuvering areas and enhance safety, efficiency and situational awareness.

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
N	Y	Y	Y	N

Applicability consideration:

Local for equipped/capable fleets and already established airport surface infrastructure.

B0 – ACDM: Improved Airport Operations through Airport-CDM

Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
A-CDM	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEJN, OERK, OMDB, OMAA	Indicator: % of applicable international aerodromes having implemented improved airport operations through airport-CDM Supporting metric: Number of applicable international aerodromes having implemented improved airport operations through airport-CDM	50%	Dec. 2018

B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration**Description and purpose:**

To improve coordination between air traffic service units (ATSUs) by using ATS Inter-facility Data Communication (AIDC) defined by the ICAO *Manual of Air Traffic Services Data Link Applications* (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process particularly for oceanic ATSUs.

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
N	Y	Y	N	Y

Applicability consideration:

Applicable to at least two area control centers (ACCs) dealing with enroute and/or terminal control area (TMA) airspace. A greater number of consecutive participating ACCs will increase the benefits.

B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration

Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
AMHS capability	All States	Indicator: % of States with AMHS capability Supporting metric: Number of States with AMHS capability	70%	Dec. 2017
AMHS implementation /interconnection	All States	Indicator: % of States with AMHS implemented (interconnected with other States AMHS) Supporting metric: Number of States with AMHS implemented (interconnections with other States AMHS)	60%	Dec. 2017
Implementation of AIDC/OLDI between adjacent ACCs	As per the AIDC/OLDI Applicability Table*	Indicator: % of priority 1 AIDC/OLDI Interconnection have been implemented Supporting metric: Number of AIDC/OLDI interconnections implemented between adjacent ACCs	70%	Dec. 2020

* Note – the required AIDC/OLDI connection is detailed in the MID eANP Volume II Part III

B0 – DATM: Service Improvement through Digital Aeronautical Information Management

Description and purpose:

The initial introduction of digital processing and management of information, through aeronautical information service (AIS)/aeronautical information management (AIM) implementation, use of aeronautical information exchange model (AIXM), migration to electronic aeronautical information publication (AIP) and better quality and availability of data

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
N	N	Y	Y	Y

Applicability consideration:

Applicable at State level, with increased benefits as more States participate

<i>B0 – DATM: Service Improvement through Digital Aeronautical Information Management</i>				
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
AIXM	All States	Indicator: % of States that have implemented an AIXM-based AIS database Supporting Metric: Number of States that have implemented an AIXM-based AIS database	80%	Dec. 2018
eAIP	All States	Indicator: % of States that have implemented an IAID driven AIP Production (eAIP) Supporting Metric: Number of States that have implemented an IAID driven AIP Production (eAIP)	80%	Dec. 2020
QMS	All States	Indicator: % of States that have implemented QMS for AIS/AIM Supporting Metric: Number of States that have implemented QMS for AIS/AIM	90%	Dec. 2018
WGS-84	All States	Indicator: % of States that have implemented WGS-84 for horizontal plan (ENR, Terminal, AD) Supporting Metric: Number of States that have implemented WGS-84 for horizontal plan (ENR, Terminal, AD) Indicator: % of States that have implemented WGS-84 Geoid Undulation Supporting Metric: Number of States that have implemented WGS-84 Geoid Undulation	Horizontal: 100% Vertical: 90%	Dec. 2018 Dec. 2018
Agreement with data originators	All States	Indicator: % of States that have signed Service Level Agreements (SLA) with at least 50% of their AIS data originators Supporting Metric: Number of States that have signed Service Level Agreements (SLA) with at least 50% of their AIS data originators	80%	Dec. 2020

B0 – AMET: Meteorological information supporting enhanced operational efficiency and safety

Description and purpose:

Global, regional and local meteorological information:

- a) forecasts provided by world area forecast centres (WAFC), volcanic ash advisory centres (VAAC) and tropical cyclone advisory centres (TCAC);
- b) aerodrome warnings to give concise information of meteorological conditions that could adversely affect all aircraft at an aerodrome including wind shear; and
- c) SIGMETs to provide information on occurrence or expected occurrence of specific en-route weather phenomena which may affect the safety of aircraft operations and other operational meteorological (OPMET) information, including METAR/SPECI and TAF, to provide routine and special observations and forecasts of meteorological conditions occurring or expected to occur at the aerodrome.

This module includes elements which should be viewed as a subset of all available meteorological information that can be used to support enhanced operational efficiency and safety.

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
N	Y	Y	Y	Y

Applicability consideration:

Applicable to traffic flow planning, and to all aircraft operations in all domains and flight phases, regardless of level of aircraft equipage.

<i>B0 – AMET: Meteorological information supporting enhanced operational efficiency and safety</i>				
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
SADIS FTP	All States	Indicator: % of States having implemented SADIS FTP service Supporting Metric: Number of States having implemented SADIS FTP service	100%	Dec. 2018
QMS	All States	Indicator: % of States having implemented QMS for MET Supporting metric: number of States having implemented QMS for MET	80%	Dec. 2018
SIGMET	All States with MWOs in MID Region	Indicator: % of States having implemented SIGMET Supporting metric: number of States having implemented SIGMET	100%	Dec. 2018
OPMET	All States	Indicator: % of States having implemented METAR and TAF Supporting metric: number of States having implemented METAR and TAF	95%	Dec. 2018
WIND SHEAR	TBD	Indicator: TBD Supporting metric: TBD	TBD	TBD

B0 – FRT0: Improved Operations through Enhanced En-Route Trajectories

Description and purpose:

To allow the use of airspace which would otherwise be segregated (i.e. special use airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight length and fuel burn.

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
Y	Y	Y	Y	N/A

Applicability consideration:

Applicable to en-route and terminal airspace. Benefits can start locally. The larger the size of the concerned airspace the greater the benefits, in particular for flex track aspects. Benefits accrue to individual flights and flows. Application will naturally span over a long period as traffic develops. Its features can be introduced starting with the simplest ones.

<i>B0 – FRT0: Improved Operations through Enhanced En-Route Trajectories</i>				
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
Flexible Use of Airspace (FUA) Level 1 Strategic	All States	Indicator: % of States that have implemented FUA Level 1 Supporting metric*: number of States that have implemented FUA Level 1	50%	Dec. 2019
FUA Level 2 Pre-tactical	All States	Indicator: % of States that have implemented FUA Level 2 Supporting metric*: number of States that have implemented FUA Level 2	60%	Dec. 2020
FUA Level 3 Tactical	All States	Indicator: % of States that have implemented FUA Level 3 Supporting metric*: number of States that have implemented FUA Level 3	60%	Dec. 2022

B0 – NOPS: Improved Flow Performance through Planning based on a Network-Wide view

Description and purpose:

Air Traffic Flow Management (ATFM) is used to manage the flow of traffic in a way that minimizes delay 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 crisis caused by human or natural phenomena.

Experience clearly shows the benefits related to managing flows consistently and collaboratively over an area of a sufficient geographical size to take into account sufficiently well the network effects. The concept for ATFM and demand and capacity balancing (DCB) should be further exploited wherever possible. System improvements are also about better procedures in these domains, and creating instruments to allow collaboration among the different actors.

Guidance on the implementation of ATFM service are provided in the ICAO Doc 9971– Manual on Collaborative Air Traffic Flow Management

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
Y	Y	Y	Y	N/A

Applicability consideration:

Applicable to en-route and terminal airspace. Benefits can start locally. The larger the size of the concerned airspace the greater the benefits. Application will naturally span over a long period as traffic develops.

<i>B0 – NOPS: Improved Flow Performance through Planning based on a Network-Wide view</i>				
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
ATFM Measures implemented in collaborative manner	All States	Indicator: % of States that have established a mechanism for the implementation of ATFM Measures based on collaborative decision Supporting metric: number of States that have established a mechanism for the implementation of ATFM Measures based on collaborative decision	100%	Dec. 2018
ATFM Structure	All States	Indicator: % of States that have established an ATFM Structure Supporting metric: number of States that have established an ATFM Structure	100 %	Dec. 2019

B0 – ACAS: ACAS Improvements

Description and purpose:

To provide short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
N/A	N/A	Y	N/A	Y

Applicability consideration:

Safety and operational benefits increase with the proportion of equipped aircraft.

<i>B0 – ACAS: ACAS Improvements</i>				
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
Avionics (TCAS V7.1)	All States	Indicator: % of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons Supporting metric: Number of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons	100%	Dec. 2017

B0 – SNET: Increased Effectiveness of Ground-based Safety Nets

Description and purpose:

To enable monitoring of flights while airborne to provide timely alerts to air traffic controllers of potential risks to flight safety. Alerts from short-term conflict alert (STCA), area proximity warnings (APW) and minimum safe altitude warnings (MSAW) are proposed. Ground-based safety nets make an essential contribution to safety and remain required as long as the operational concept remains human centered.

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
N/A	N/A	Y	N/A	Y

Applicability consideration:

Benefits increase as traffic density and complexity increase. Not all ground-based safety nets are relevant for each environment. Deployment of this Module should be accelerated.

<i>B0 – SNET: Increased Effectiveness of Ground-based Safety Nets</i>				
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
Short-Term Conflict Alert (STCA)	All States	Indicator: % of States that have implemented Short-term conflict alert (STCA) Supporting metric*: number of States that have implemented Short-term conflict alert (STCA)	80 %	Dec. 2018
Minimum Safe Altitude Warning (MSAW)	All States	Indicator: % of States that have implemented Minimum safe altitude warning (MSAW) Supporting metric*: number of States that have implemented Minimum safe altitude warning (MSAW)	80 %	Dec. 2018

B0 – CDO: Improved Flexibility and Efficiency in Descent Profiles (CDO)

Description and purpose:

To use performance-based airspace and arrival procedures allowing aircraft to fly their optimum profile using continuous descent operations (CDOs). This will optimize throughput, allow fuel efficient descent profiles and increase capacity in terminal areas.

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
N	Y	Y	Y	Y

Applicability consideration:

Regions, States or individual locations most in need of these improvements. For simplicity and implementation success, complexity can be divided into three tiers:

- a) least complex – regional/States/locations with some foundational PBN operational experience that could capitalize on near term enhancements, which include integrating procedures and optimizing performance;
- b) more complex – regional/States/locations that may or may not possess PBN experience, but would benefit from introducing new or enhanced procedures. However, many of these locations may have environmental and operational challenges that will add to the complexities of procedure development and implementation; and
- c) most complex – regional/States/locations in this tier will be the most challenging and complex to introduce integrated and optimized PBN operations. Traffic volume and airspace constraints are added complexities that must be confronted. Operational changes to these areas can have a profound effect on the entire State, region or location.

<i>B0 – CDO: Improved Flexibility and Efficiency in Descent Profiles (CDO)</i>				
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
PBN STARs	OBBI, HESN, HESH, HEMA, HEGN, HELX, OIIE, OISS, OIKB, OIMM, OIFM, ORER, ORNI, OJAM, OJAI, OJAQ, OKBK, OLBA, OOMS, OOSA, OTHH, OEJN, OEMA, OEDF, OERK, HSN, HSOB, HSSS, HSPN, OMAA, OMAD, OMDB, OMDW, OMSJ	Indicator: % of International Aerodromes/TMA with PBN STAR implemented as required. Supporting Metric: Number of International Aerodromes/TMAs with PBN STAR implemented as required.	100% (for the identified Aerodromes/TMAs)	Dec. 2018
International aerodromes/TMAs with CDO	OBBI, HESH, HEMA, HEGN, OIIE, OIKB, OIFM, OJAI, OJAQ, OKBK, OLBA, OOMS, OTHH, OEJN, OEMA, OEDF, OERK, HSSS, HSPN, OMAA, OMDB, OMDW, OMSJ	Indicator: % of International Aerodromes/TMA with CDO implemented as required. Supporting Metric: Number of International Aerodromes/TMAs with CDO implemented as required.	100% (by for the identified Aerodromes/TMAs)	Dec. 2018

B0 – CCO: Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)

Description and purpose:

To implement continuous climb operations in conjunction with performance-based navigation (PBN) to provide opportunities to optimize throughput, improve flexibility, enable fuel-efficient climb profiles and increase capacity at congested terminal areas.

Main performance impact:

KPA- 01 – Access and Equity	KPA-02 – Capacity	KPA-04 – Efficiency	KPA-05 – Environment	KPA-10 – Safety
N/A	N/A	Y	Y	Y

Applicability consideration:

Regions, States or individual locations most in need of these improvements. For simplicity and implementation success, complexity can be divided into three tiers:

- a) least complex: regional/States/locations with some foundational PBN operational experience that could capitalize on near-term enhancements, which include integrating procedures and optimizing performance;
- b) more complex: regional/States/locations that may or may not possess PBN experience, but would benefit from introducing new or enhanced procedures. However, many of these locations may have environmental and operational challenges that will add to the complexities of procedure development and implementation; and
- c) most complex: regional/States/locations in this tier will be the most challenging and complex to introduce integrated and optimized PBN operations. Traffic volume and airspace constraints are added complexities that must be confronted. Operational changes to these areas can have a profound effect on the entire State, region or location.

B0 – CCO: Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)				
Elements	Applicability	Performance Indicators/Supporting Metrics	Targets	Timelines
PBN SIDs	OBBI, HESN, HESH, HEMA, HEGN, HELX, OIIE, OIKB, OIFM, OIMM, OIFM, ORER, ORNI, OJAM, OJAI, OJAI, OKBK, OLBA, OOMS, OOSA, OTHH, OEJN, OEMA, OEDF, OERK, HSNM, HSOB, HSSS, HSPN, OMAA, OMAD, OMDB, OMDW, OMSJ	Indicator: % of International Aerodromes/TMA with PBN SID implemented as required. Supporting Metric: Number of International Aerodromes/ TMAs with PBN SID implemented as required.	100% (for the identified Aerodromes/TMAs)	Dec. 2018
International aerodromes/TMAs with CCO	OBBI, HESN, HESH, HEMA, HEGN, HELX, OIIE, OIKB, OIFM, ORER, ORNI, OJAM, OJAI, OJAI, OKBK, OLBA, OOMS, OOSA, OTHH, OEJN, OEMA, OEDF, OERK, HSNM, HSOB, HSSS, HSPN, OMAA, OMDB, OMDW, OMSJ	Indicator: % of International Aerodromes/TMA with CCO implemented as required. Supporting Metric: Number of International Aerodromes/TMAs with CCO implemented as required.	100% (for the identified Aerodromes/TMAs)	Dec. 2018

APPENDIX 5.3A

Airport Collaborative Decision Making (A-CDM) Survey Questionnaire

Name of the State/Administration:

Approach to implementation

1. Is the A-CDM implementation a national program/project or a local airport by airport project?
(Please select the applicable box)

It is a national program where A-CDM is being implemented at several airports with one entity managing the overall program to facilitate common procedures and approach to the implementations	
It is an "airport-by-airport" approach where each project is managed at "local" level	
It is a combination of a national program and separate airport projects manager at "local" level	
There is not yet an implementation plan for A-CDM	

Please add free text comments if needed:

2. If A-CDM has been/is going to be implemented, please indicate at which airports and by what year:

Airport	Year

Add additional lines as needed

For EACH airport mentioned above, please provide separate responses to QUESTIONS 3 to 22:

Status of A-CDM implementation

3. In which of the following phases is the A-CDM implementation?
(Please select the box that is the most suitable option)

No planning, i.e. nothing in relation to A-CDM has started yet	
Initial planning, i.e. collecting information about guidance material etc. to set the scope of the projects	
Planning well underway, i.e. scope set, engaged with stakeholders etc.	
Ready to launch A-CDM implementation project	
A-CDM implemented, i.e. procedures are in place and used in the "day-to-day" operations (Please indicate number of years for A-CDM used in day-to-day operations.	

A-CDM Project Scope

4. Which one of the A-CDM conceptual elements are being implemented as part of the A-CDM project? *(Please select the applicable box(es))*

Information sharing	
Milestone Management	
Variable Taxi Times	
Collaborative Management of Flight Updates	
Pre Departure Sequencing	
A-CDM in adverse conditions	
Integration with Air Traffic Flow Management (ATFM)	

Please add free text comments if needed:

5. How is Information sharing implemented as par to the solution/planned A-CDM solution? *(Please select the applicable box(es))*

Via Information Sharing platform collecting data in real-time from various systems.	
Via manual interaction and information exchange	
A combination of the two alternatives above	

Please add free text comments if needed:

6. What Milestones (based on the Eurocontrol model) are captured/planned to be captured for the Milestone Management? *(Please select the applicable box(es) and please indicate if the implementation/planned implementation uses any other names for the milestones)*

Eurocontrol Milestones	Applied	Alternative name
Milestone 1 - ATC Flight Plan Activated		
Milestone 2 - CTOT Allocation/EOBT – 2 Hrs		
Milestone 3 - Take off from Outstation		
Milestone 4 - Local Radar Update/FIR Entry		
Milestone 5 - Final Approach		
Milestone 6 - Landed		
Milestone 7 - In Block		
Milestone 8 - Aircraft at Gate		
Milestone 9 - TOBT Entered		
Milestone 10 - TSAT Issued		
Milestone 11 - Boarding Starts		
Milestone 12 - Aircraft Ready		
Milestone 13 - Start-up Request		
Milestone 14 - Start-up Approved		
Milestone 15 - Off Block		
Milestone 16 - Take Off		

Please add free text comments if needed:

5.3A-3

7. Are you planning to apply the concept of Target Off Block Times? *(Please select the applicable box)*

No	
Yes, and this will be the responsibility of the Airlines and/or appointed Ground Handlers to manage and update the Target Off Block Times (TOBT) in order to ensure that TOBT is accurate and reliable.	

- a. If yes, will the project provide a solution that facilitates predictive TOBT calculations? *(Please select the applicable box)*

No	
Yes	

8. What methodology is applied/going to be applied for calculating Variable Taxi Time? *(Please select the applicable box)*

“Table look up” utilizing fixed taxi time from gates to runways.	
Dynamic Variable Taxi Time using self-learning algorithms based on real-time and statistical surveillance data	

9. How is Target Start-Up Approval Time (TSAT) being calculated as part of Pre-Departure Sequencing? *(Please select the applicable box)*

Manual TSAT calculations	
Automatic TSAT calculations utilizing a Pre Departure Sequence or full Departure Management system/capability	

- a. If TSAT Is calculated automatically, at what key milestones are the TSAT calculated/re-calculated? *(Please select the applicable box(es))*

Milestone 1 - ATC Flight Plan Activated	
Milestone 2 - CTOT Allocation/EOBT – 2 Hrs	
Milestone 3 - Take off from Outstation	
Milestone 4 - Local Radar Update/FIR Entry	
Milestone 5 - Final Approach	
Milestone 6 - Landed	
Milestone 7 - In Block	
Milestone 8 - Aircraft at Gate	
Milestone 9 - TOBT Entered	
Milestone 10 - TSAT Issued	
Milestone 11 - Boarding Starts	

10. How TSAT information is shared to Airlines operators/Ground Handling Agencies? *(Please select the applicable box(es))*

Via A-CDM portal/web interface/application	
Via mobile application	
Via Automatic Parking Aid displays at gate	
Data link	
Radio communication	

11. What are the key parameters for data exchange between ACDM and ATFM? *(Please specify in free text in the text box)*

12. To establish the A-CDM project, has any guidance material been used to facilitate the scope and objectives? *(Please select the applicable box)*

Yes	
No	

- a. If yes, please indicate what guidance material has been used. *(Please select the applicable box(es))*

ICAO Doc 9971	
Eurocontrol A-CDM Manual	
CANSO A-CDM Guidance Material	
FAA Surface CDM material	
IATA Guidance material	
Specific airport “operational guidelines” materials	
Other material like Eurocae or ETSI standards for A-CDM <i>(Please specify)</i>	

Please add free text comments if needed:

Local Concept of Operations

13. Has a “Local Concept of Operations” document for the A-CDM implementation been established? *(Please select the applicable box)*

Yes	
No	

- a. If yes, please indicate the scope of the document. *(Please select the applicable box(es))*

It sets out the objectives that A-CDM is aiming to achieve	
It provides a common vocabulary with all definitions for A-CDM	
It provides information about information sharing and the sources for the information collected	
It provides information about the milestones used in the A-CDM process	
It defines each participating stakeholder’s role and responsibilities as part of the A-CDM process	
It provides how A-CDM shall operate during irregular operations	
It provides descriptions of the process steps for various regular and irregular operations	
It includes how to measure the success of A-CDM once implemented, i.e. Key Performance Indicators (KPIs)	

Please add free text comments if needed:

5.3A-5

Stakeholder Engagement

14. Which stakeholders are involved in the A-CDM implementation? *(Please select the applicable box(es))*

Airport operator	
Airline operators	
Ground handlers	
Air Navigation Service Provider	
Network Operations/ATFM unit	
Others <i>(Please specify)</i>	

15. Has a Memorandum of Understanding (MOU) been established between the stakeholders? *(Please select the applicable box)*

Yes	
No	

Please add free text comments if needed:

Project Implementation

16. Has a project group been established with all stakeholders involved? *(Please select the applicable box)*

Yes	
No	

Please add free text comments if needed:

17. Is there a shared leadership or is the project management led by one organization? *(Please select the applicable box)*

Shared leadership	
Leadership is appointed from one organization	

a. Please explain why one of the options is applied:

18. Is the project group meeting held on a regular basis or ad-hoc? *(Please select the applicable box)*

Regular	
Ad-hoc	

a. Please explain why one of the options is applied:

19. What are the objectives identified in the project that A-CDM is aiming to achieve?

(Please select the applicable box(es))

Increase predictability	
Increase on-time performance	
Improve resource utilization	
Reduce taxi times	
Increase airport efficiency	
Reduce environmental nuisance	
Optimise the use of available capacity	
Improved safety	
Other <i>(please indicate what other objectives are identified in box below)</i>	

Please add free text comments if needed:

20. Has the project identified a more detailed Key Performance Framework with Key Performance Indicators to facilitate the measurements of the A-CDM implementation? *(Please select the applicable box)*

Yes	
No	

a. If yes, would the project team be willing to share this work with the ICAO Regional officer for Aerodromes and Ground Aids (AGA) to aid in its future work such as the establishment of more detailed A-CDM guidelines? *(Please select the applicable box)*

Yes	
No	

Please add free text comments if needed:

Training

21. Has the project established training in any of the following areas for the implementation of A-CDM?

(Please select the applicable box(es))

Initial training for stakeholders to “what is A-CDM”	
Advanced training for stakeholders to “what is A-CDM”	
Training on how to operate under A-CDM procedures for all stakeholders	
Specialized/tailored training for each user in relation to “what do I need to do when A-CDM is operational at the airport”?	

Please add free text comments if needed:

Challenges

22. Please rank what hold most true in relation to your A-CDM implementation. (Please use 1-5 where 1 indicates “no, do not agree at all” and 5 is “yes, agree completely”).

A-CDM as a concept is too complicated and vague	

5.3A-7

Developed guidelines are not enough to understand how A-CDM shall be implemented successfully	
It is challenging to understand what an A-CDM implementation is, i.e. what has to be achieved to say “yes, we have A-CDM at our airport”	
The challenge is to understand what system(s) is(are) and information are needed to implement A-CDM	
It is challenging to get all stakeholders engaged and committed to the A-CDM project	
It is challenging to manage the A-CDM project	
It is challenging to understand what value A-CDM will bring	
It is very complicated to establish how to measure the success of A-CDM	

Please add free text comments if needed:

APPENDIX 5.3B

STATUS OF AERODROME CERTIFICATION IMPLEMENTATION IN MID REGION						
	State	Number of Intl Aerodromes (AOP Table 1-1 -MID ANP)	Number of Certified Intl Aerodromes	Percentage Certified	List of Intl Aerodromes having Certificates	Remarks
1	Bahrain	1	1	100%	BAHRAIN/Bahrain Intl (OBBI)	
2	Egypt	7	5	71%	- CAIRO/Cairo Intl (HECA) - SHARM EL-SHEIKH/Sharm El Sheikh Intl (HESH) - HURGADA/Hurghada Intl (HEGN) - MARSA ALAM /Marsa Alam Intl (HEMA) - ASWAN/Aswan Intl (HESN)	Certification of: - LUXER/Luxor Intl Airport (HELX) will be in Dec 2017 - ALEXANDRIA/Borg El-Arab Intl Airport (HEBA) will be in the first half of 2018
3	Iran	9	4	44%	- TEHRAN/Mehrabad Intl (OIII) - ZAHEDAN/Zahedan Intl (OIZH) - YAZD /Yazd Intl (OIYY) - ISFAHAN/Isfahan Int'l (OIFM)	Certification Status for: - TEHRAN/ IKIA Intl (OIIE) - BANDAR Abbas /Bandar Abbas Intl (OIKB) are waiting CAA final action for certification very soon
4	Iraq	6	2	33%	- BAGHDAD/Baghdad Intl (ORBI) - ERBIL/Erbil Intl (ORER)	
5	Jordan	2	2	100%	- AMMAN/Queen Alia Intl (OJAI) - AQABA/ King Hussein Intl (OJAQ)	
6	Kuwait	1	1	100%	KUWAIT/Kuwait Intl (OKBK)	

7	Lebanon	1	0	0%		
8	Libya	3	0	0%		
9	Oman	2	2	100%	- MUSCAT/Muscat Intl (OOMS) - SALALAH/Salalah (OOSA)	
10	Qatar	2	2	100%	- DOHA/Doha Intl (OTBD) - DOHA/Hamad Intl (OTHH)	
11	Saudi Arabia	4	4	100%	- DAMMAM/Kind Fahid Intl (OEDF) - JEDDAH/King Abdulaziz Intl (OEJN) - MADINAH/Prince Mohammad Bin Abdulaziz Intl (OEMA) - RIYADH/King Khalid Intl (OERK)	
12	Sudan	4	3	75%	- KHARTOUM/Khartoum (HSSS) - EL OBEID/El Obeid (HSOB) - PORT SUDAN/Port Sudan (HSPN)	Certification of NYALA/Nyala (HSNN) by the end of 2019
13	Syria	3	0	0%		
14	UAE	8	8	100%	- ABU DHABI/Abu -Dhabi Intl (OMAA) - ABU DHABI/Al Bateen Intl (OMAD) - DUBAI/Dubai Intl (OMDB) - DUBAI/Al Maktoum Intl (OMDW)	

5.3B-3

					- AL AIN/Al Ain Intl (OMAL) - FUJAIRAH/Fujairah Intl (OMFJ) - RAS AL KHAIMAH/Ras Al Khaimah Intl (OMRK) - SHARJAH/Sharjah Intl (OMSJ)	
15	Yemen	5	0	0%		
	Total Certified	58	34	59%		MID Region Safety Target 75% by end of 2017

CHAPTER 1: GENERAL

16th Edition		15th Edition		Assessment
Para No.	Text of Standard	Para. No.	Text of Standard	
1.2.1.1	The World Geodetic System — 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system for international air navigation. Consequently, published aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.	1.2.1.1	World Geodetic System — 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system for international air navigation. Consequently, published aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.	No significant change / minor editorial amendment
1.2.2.1	Mean sea level (MSL) datum shall be used as the vertical reference system for international air navigation.	1.2.2.1	Mean sea level (MSL) datum, which gives the relationship of gravity-related height (elevation) to a surface known as the geoid, shall be used as the vertical reference system for international air navigation.	No significant change / minor editorial amendment
1.2.2.2	The Earth Gravitational Model — 1996 (EGM-96) shall be used as the global gravity model for international air navigation.	1.2.2.2	The Earth Gravitational Model — 1996 (EGM-96), containing long wavelength gravity field data to degree and order 360, shall be used by international air navigation as the global gravity model.	No significant change / minor editorial amendment
1.2.2.3	At those geographical positions where the accuracy of EGM-96 does not meet the accuracy requirements for elevation and geoid undulation on the basis of EGM-96 data, regional, national or local geoid models containing high resolution (short wavelength) gravity field data shall be developed and used. When a geoid model other than the EGM-96 model is used, a description of the model used, including the parameters required for height transformation between the model and EGM-96, shall be provided in the Aeronautical Information Publication (AIP).	1.2.2.3	At those geographical positions where the accuracy of EGM-96 does not meet the accuracy requirements for elevation and geoid undulation specified in Annex 14, Volumes I and II, on the basis of EGM-96 data, regional, national or local geoid models containing high resolution (short wavelength) gravity field data shall be developed and used. When a geoid model other than the EGM-96 model is used, a description of the model used, including the parameters required for height transformation between the model and EGM-96, shall be provided in the Aeronautical Information Publication (AIP).	No significant change / minor editorial amendment
1.2.3.1	The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system for international air navigation.	1.2.3.1	The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system for international air navigation.	No significant change / minor editorial amendment
1.2.3.2	When a different temporal reference system is used for some applications, the feature catalogue, or the metadata associated with an application schema or a data set, as appropriate, shall include either a description of that system or a citation for a document that describes that temporal reference system.	1.2.3.2	When a different temporal reference system is used for some applications, the feature catalogue, or the metadata associated with an application schema or a data set, as appropriate, shall include either a description of that system or a citation for a document that describes that temporal reference system.	No significant change / minor editorial amendment
1.3.1	Aeronautical information products intended for international distribution shall include English text for those parts expressed in plain language.	1.3.1	Each element of the Integrated Aeronautical Information Package for international distribution shall include English text for those parts expressed in plain language.	Replacement of IAIP with "Aeronautical Information Products"
1.3.2	Place names shall be spelt in conformity with local usage, transliterated, when necessary, into the ISO-Basic Latin alphabet.	1.3.2	Place names shall be spelt in conformity with local usage, transliterated, when necessary, into the Latin alphabet.	No significant change / minor editorial amendment
1.3.4	ICAO abbreviations shall be used in aeronautical information products whenever they are appropriate and their use will facilitate distribution of aeronautical data and aeronautical information.	1.3.4	ICAO abbreviations shall be used in the AIS whenever they are appropriate and their use will facilitate distribution of aeronautical data and aeronautical information.	Replacement of AIS with "Aeronautical Information Products"

CHAPTER 2: RESPONSIBILITIES AND FUNCTIONS

16th Edition		15th Edition		Assessment
Para No.	Text of Standard	Para. No.	Text of Standard	
2.1.1	Each Contracting State shall: a) provide an aeronautical information service (AIS); or b) agree with one or more other Contracting State(s) for the provision of a joint service; or c) delegate the authority for the provision of the service to a non-governmental agency, provided the Standards and Recommended Practices of this Annex are adequately met.	2.1.1	Each Contracting State shall: a) provide an aeronautical information service (AIS); or b) agree with one or more other Contracting State(s) for the provision of a joint service; or c) delegate the authority for the provision of the service to a non-governmental agency, provided the Standards and Recommended Practices of this Annex are adequately met.	No significant change / minor editorial amendment
2.1.2	Each Contracting State shall ensure that the provision of aeronautical data and aeronautical information covers its own territory and those areas over the high seas for which it is responsible for the provision of air traffic services (ATS).	2.1.2	Each Contracting State shall ensure that the provision of aeronautical data and aeronautical information covers its own territory and those areas over the high seas for which it is responsible for the provision of air traffic services.	No significant change / minor editorial amendment
2.1.3	The State concerned shall remain responsible for the aeronautical data and aeronautical information provided in accordance with 2.1.2. Aeronautical data and aeronautical information provided for and on behalf of a State shall clearly indicate that they are provided under the authority of that State, irrespective of the format in which they are provided.	2.1.3	The State concerned shall remain responsible for the aeronautical data and aeronautical information provided in accordance with 2.1.2. Aeronautical data and aeronautical information provided for and on behalf of a State shall clearly indicate that they are provided under the authority of that State.	No significant change / minor editorial amendment
2.1.4	Each Contracting State shall ensure that the aeronautical data and aeronautical information provided are of required quality in accordance with 3.2.	2.1.4	Each Contracting State shall ensure that the aeronautical data and aeronautical information provided are complete, timely and of required quality in accordance with 3.3.	No significant change / minor editorial amendment
2.1.5	Each Contracting State shall ensure that formal arrangements are established between originators of aeronautical data and aeronautical information and the AIS in relation to the timely and complete provision of aeronautical data and aeronautical information.	2.1.5	Each Contracting State shall ensure that formal arrangements are established between originators of aeronautical data and aeronautical information and the AIS in relation to the timely and complete provision of aeronautical data and aeronautical information.	No significant change / minor editorial amendment
2.2.1	An AIS shall ensure that aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation are made available in a form suitable for the operational requirements of the air traffic management (ATM) community, including: a) those involved in flight operations, including flight crews, flight planning and flight simulators; and b) the ATS unit responsible for flight information service and the services responsible for pre-flight information.	2.2.1	An AIS shall ensure that aeronautical data and aeronautical information necessary for the safety, regularity or efficiency of air navigation are made available in a form suitable for the operational requirements of the air traffic management (ATM) community, including: a) those involved in flight operations, including flight crews, flight planning and flight simulators; and b) the air traffic services unit responsible for flight information service and the services responsible for pre-flight information.	No significant change / minor editorial amendment
2.2.2	An AIS shall receive, collate or assemble, edit, format, publish/store and distribute aeronautical data and aeronautical information concerning the entire territory of the State as well as those areas over the high seas for which the State is responsible for the provision of ATS. Aeronautical data and aeronautical information shall be provided as aeronautical information products.	2.2.2	An AIS shall receive, collate or assemble, edit, format, publish/store and distribute aeronautical data and aeronautical information concerning the entire territory of the State as well as those areas over the high seas in which the State is responsible for the provision of air traffic services. Aeronautical data and aeronautical information shall be provided as an Integrated Aeronautical Information Package.	Replacement of IAIP with "Aeronautical Information Products"
2.2.3	Where 24-hour service is not provided, service shall be available during the whole period an aircraft is in flight in the area of responsibility of the AIS, plus a period of at least two hours before and after such a period. Service shall also be available at such other time as may be requested by an appropriate ground organization.	2.2.3	Where 24-hour service is not provided, service shall be available during the whole period an aircraft is in flight in the area of responsibility of AIS, plus a period of at least two hours before and after such a period. Service shall also be available at such other time as may be requested by an appropriate ground organization.	No significant change / minor editorial amendment
2.2.4	An AIS shall, in addition, obtain aeronautical data and aeronautical information to enable it to provide pre-flight information service and to meet the need for in-flight information: a) from the AIS of other States; and b) from other sources that may be available.	2.2.4	An AIS shall, in addition, obtain aeronautical data and aeronautical information to enable it to provide pre-flight information service and to meet the need for in-flight information: a) from the AIS of other States; b) from other sources that may be available.	No significant change / minor editorial amendment
2.2.5	Aeronautical data and aeronautical information obtained under 2.2.4 a) shall, when distributed, be clearly identified as having the authority of the originating State.	2.2.5	Aeronautical data and aeronautical information obtained under 2.2.4 a) shall, when distributed, be clearly identified as having the authority of the originating State.	No significant change / minor editorial amendment
2.2.6	Aeronautical data and aeronautical information obtained under 2.2.4 b) shall, if possible, be verified before distribution and if not verified shall, when distributed, be clearly identified as such.	2.2.6	Aeronautical data and aeronautical information obtained under 2.2.4 b) shall, if possible, be verified before distribution and if not verified shall, when distributed, be clearly identified as such.	No significant change / minor editorial amendment
2.2.7	An AIS shall promptly make available to the AIS of other States any aeronautical data and aeronautical information necessary for the safety, regularity or efficiency of air navigation required by them, to enable them to comply with 2.2.1.	2.2.7	An AIS shall promptly make available to the AIS of other States any aeronautical data and aeronautical information necessary for the safety, regularity or efficiency of air navigation required by them, to enable them to comply with 2.2.1.	No significant change / minor editorial amendment

2.3.1	Each Contracting State shall designate the office to which all elements of aeronautical information products provided by other States shall be addressed. Such an office shall be qualified to deal with requests for aeronautical data and aeronautical information provided by other States.	2.3.1	Each State shall designate the office to which all elements of the Integrated Aeronautical Information Package originated by other States shall be addressed. Such an office shall be qualified to deal with requests for aeronautical data and aeronautical information originated by other States.	Replacement of IAIP with "Aeronautical Information Products"
2.3.3	Where more than one international NOTAM office is designated within a State, the extent of responsibility and the territory covered by each office shall be defined.	2.3.2	Where more than one international NOTAM office is designated within a State, the extent of responsibility and the territory covered by each office shall be defined.	No significant change / minor editorial amendment
2.3.4	An AIS shall arrange, as necessary, to satisfy operational requirements for the issuance and receipt of NOTAM distributed by telecommunication.	2.3.3	An AIS shall arrange, as necessary, to satisfy operational requirements for the issuance and receipt of NOTAM distributed by telecommunication.	No significant change / minor editorial amendment
2.3.5	Wherever practicable, direct contact between AIS shall be established in order to facilitate the international exchange of aeronautical data and aeronautical information.	2.3.4	Wherever practicable, direct contact between AIS shall be established in order to facilitate the international exchange of aeronautical data and aeronautical information.	No significant change / minor editorial amendment
2.3.6	Except as provided in 2.3.8, one copy of each of the following aeronautical information products (where available) that have been requested by the AIS of a Contracting State shall be made available by the originating State and provided in the mutually agreed form(s), without charge, even where authority for publication/storage and distribution has been delegated to a non-governmental agency: a) Aeronautical Information Publication (AIP), including Amendments and Supplements; b) Aeronautical Information Circulars (AIC); c) NOTAM; and d) aeronautical charts.	2.3.5	One copy of each of the elements of the Integrated Aeronautical Information Package that have been requested by the AIS of a Contracting State shall be made available by the originating State in the mutually-agreed form(s), without charge, even where authority for publication/storage and distribution has been delegated to a non-governmental agency.	Replacement of IAIP with "Aeronautical Information Products" / New standard indicates elements of AI Products that shall be available to other States' AIS
2.3.8	When aeronautical data and aeronautical information are provided in the form of digital data sets to be used by the AIS, they shall be provided on the basis of agreement between the Contracting States concerned.	---	---	NEW Standard
2.3.10	Globally interoperable aeronautical data and aeronautical information exchange models shall be used for the provision of data sets.	---	---	NEW Standard
2.4.1	Any aeronautical information product which has been granted copyright protection by the originating State and provided to another State in accordance with 2.3 shall only be made available to a third party on the condition that the third party is made aware that the product is copyright protected and provided that it is appropriately annotated that the product is subject to copyright by the originating State.	2.4	Any product of a State's AIS which has been granted copyright protection by that State and provided to another State in accordance with 2.3 shall only be made available to a third party on the condition that the third party is made aware that the product is copyright protected and provided that it is appropriately annotated that the product is subject to copyright by the originating State.	No significant change / minor editorial amendment
2.4.2	When aeronautical data and aeronautical information are provided to a State in accordance with 2.3.8, the receiving State shall not provide the digital data sets of the providing State to any third party without the consent of the providing State.	---	---	NEW Standard

CHAPTER 3: AERONAUTICAL INFORMATION MANAGEMENT

16th Edition		15th Edition		Assessment
Para No.	Text of Standard	Para. No.	Text of Standard	
3.1	The information management resources and processes established by an aeronautical information service (AIS) shall be adequate to ensure the timely collection, processing, storing, integration, exchange and delivery of quality-assured aeronautical data and aeronautical information within the air traffic management (ATM) system.	3.1	The information management resources and processes established by an aeronautical information service (AIS) shall be adequate to ensure the timely collection, processing, storing, integration, exchange and delivery of quality-assured aeronautical data and aeronautical information within the air traffic management (ATM) system.	No significant change / minor editorial amendment
3.2.1	The order of accuracy for aeronautical data shall be in accordance with its intended use.	3.3.1	The order of accuracy for aeronautical data shall be as specified in Annex 11, Chapter 2, and Annex 14, Volumes I and II, Chapter 2. ~~In that respect, three types of positional data shall be identified: surveyed points (runway thresholds, navigation aid positions, etc.), calculated points (mathematical calculations from the known surveyed points of points in space/fixes) and declared points (e.g. flight information region boundary points).~~	Reference of order of accuracy to Annex 11 and 14 removed Three types of positional data removed
3.2.2	The order of resolution of aeronautical data shall be commensurate with the actual data accuracy.	3.3.2.1	The order of publication resolution of aeronautical data shall be as specified in Appendix 7.	Reference of order of resolution to App 7 removed
3.2.3.1	The integrity of aeronautical data shall be maintained throughout the data chain from origination to distribution to the next intended user.	3.3.3.2	The integrity of aeronautical data shall be maintained throughout the data process from survey/origin to distribution to the next intended user (the entity that receives the aeronautical information from the AIS provider).	Using the term "Data Chain"
3.2.3.2	Based on the applicable integrity classification, procedures shall be put in place in order to: a) for routine data: avoid corruption throughout the processing of the data; b) for essential data: assure corruption does not occur at any stage of the entire process and include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and c) for critical data: assure corruption does not occur at any stage of the entire process and include additional integrity assurance processes to fully mitigate the effects of faults identified by thorough analysis of the overall system architecture as potential data integrity risks.		Based on the applicable integrity classification, the validation and verification procedures shall: a) for routine data: avoid corruption throughout the processing of the data; b) for essential data: assure corruption does not occur at any stage of the entire process and include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and c) for critical data: assure corruption does not occur at any stage of the entire process and include additional integrity assurance processes to fully mitigate the effects of faults identified by thorough analysis of the overall system architecture as potential data integrity risks.	Replacement of the term "verification procedure" instead of "procedure"
3.2.4	Traceability of aeronautical data shall be ensured and retained as long as the data is in use.	---	---	NEW Standard
3.2.5	Timeliness of aeronautical data shall be ensured by including limits on the effective period of the data elements.	---	---	NEW Standard
3.2.6	Completeness of aeronautical data shall be ensured in order to support its intended use.	---	---	NEW Standard
3.2.7	The format of delivered aeronautical data shall be adequate to ensure that the data is interpreted in a manner that is consistent with its intended use.	---	---	NEW Standard
3.3.1	Material to be issued as part of an aeronautical information product shall be thoroughly checked before it is submitted to the AIS in order to ensure that all necessary information has been included and that it is correct in detail.	3.2.1	Material to be issued as part of the Integrated Aeronautical Information Package shall be thoroughly checked before it is submitted to the AIS, in order to make certain that all necessary information has been included and that it is correct in detail prior to distribution.	Replacement of IAIP with "Aeronautical Information Products"
3.3.2	An AIS shall establish verification and validation procedures which ensure that upon receipt of aeronautical data and aeronautical information, quality requirements are met.	3.2.2	An AIS shall establish verification and validation procedures which ensure that upon receipt of aeronautical data and aeronautical information, quality requirements (accuracy, resolution, integrity and traceability) are met.	The parentheses deleted (elements of quality requirements deleted, as they are expanded in the new provisions)
3.4.1	Digital data error detection techniques shall be used during the transmission and/or storage of aeronautical data and digital data sets.	3.5.1	Aeronautical data and data sets shall be protected in accordance with data error detection, security, and authentication techniques.	re-worded + "data" replaced by "digital data"
3.4.2	Digital data error detection techniques shall be used in order to maintain the integrity levels as specified in 3.2.3.	3.5.2	Electronic aeronautical data sets shall be protected by the inclusion in the data sets of a 32-bit cyclic redundancy check (CRC) implemented by the application dealing with the data sets. This shall apply to the protection of the integrity classification of data sets as specified in 3.3.3.	CRC has been removed
3.5.1	Automation shall be applied in order to ensure the quality, efficiency and cost-effectiveness of aeronautical information services.	3.6.1	Automation shall be introduced with the objective of improving the timeliness, quality, efficiency and costeffectiveness of aeronautical information services.	Automation shall be <u>"applied"</u> (instead of "introduced")
3.5.2	Due consideration to the integrity of data and information shall be given when automated processes are implemented and mitigating steps taken where risks are identified.	---	---	NEW Standard

3.5.3	In order to meet the data quality requirements, automation shall: a) enable digital aeronautical data exchange between the parties involved in the data processing chain; and b) use aeronautical information exchange models and data exchange models designed to be globally interoperable.	3.6.3	In order to meet the data quality requirements, automation shall: a) enable digital aeronautical data exchange between the parties involved in the data processing chain; and b) use aeronautical information exchange models and data exchange models designed to be globally interoperable.	No significant change / minor editorial amendment
3.6.1	Quality management systems shall be implemented and maintained encompassing all functions of an AIS, as outlined in 2.2. The execution of such quality management systems shall be made demonstrable for each function stage.	3.7.1	Quality management systems shall be implemented and maintained encompassing all functions of an AIS, as outlined in 2.2. The execution of such quality management systems shall be made demonstrable for each function stage.	No significant change / minor editorial amendment
3.6.4	Within the context of the established quality management system, the competencies and the associated knowledge, skills and abilities required for each function shall be identified, and personnel assigned to perform those functions shall be appropriately trained. Processes shall be in place to ensure that personnel possess the competencies required to perform specific assigned functions. Appropriate records shall be maintained so that the qualifications of personnel can be confirmed. Initial and periodic assessments shall be established that require personnel to demonstrate the required competencies. Periodic assessments of personnel shall be used as a means to detect and correct shortfalls in knowledge, skills and abilities.	3.7.4	Within the context of the established quality management system, the competencies and the associated knowledge, skills and abilities required for each function shall be identified, and personnel assigned to perform those functions shall be appropriately trained. Processes shall be in place to ensure that personnel possess the competencies required to perform specific assigned functions. Appropriate records shall be maintained so that the qualifications of personnel can be confirmed. Initial and periodic assessments shall be established that require personnel to demonstrate the required competencies. Periodic assessments of personnel shall be used as a means to detect and correct shortfalls.	No significant change / minor editorial amendment
3.6.5	Each quality management system shall include the necessary policies, processes and procedures, including those for the use of metadata, to ensure and verify that aeronautical data is traceable throughout the aeronautical information data chain so as to allow any data anomalies or errors detected in use to be identified by root cause, corrected and communicated to affected users.	3.7.5	Each quality management system shall include the necessary policies, processes and procedures, including those for the use of metadata, to ensure and verify that aeronautical data are traceable throughout the aeronautical information data chain so as to allow any data anomalies or errors detected in use to be identified by root cause, corrected and communicated to affected users.	No significant change / minor editorial amendment
3.6.6	The established quality management system shall provide users with the necessary assurance and confidence that distributed aeronautical data and aeronautical information satisfy the aeronautical data quality requirements.	3.7.6	The established quality management system shall provide users with the necessary assurance and confidence that distributed aeronautical data and aeronautical information satisfy the aeronautical data quality requirements ~~for accuracy, resolution and integrity as specified in 3.2 and 3.3 and that the data traceability requirements are met through the provision of appropriate metadata as specified in 3.4. The system shall also provide assurance of the applicability period of intended use of aeronautical data and aeronautical information as well as that the agreed distribution dates will be met.~~	Second part removed
3.6.7	All necessary measures shall be taken to monitor compliance with the quality management system in place.	3.7.7	All necessary measures shall be taken to monitor compliance with the quality management system in place.	No significant change / minor editorial amendment
3.6.8	Demonstration of compliance of the quality management system applied shall be by audit. If nonconformity is identified, initiating action to correct its cause shall be determined and taken without undue delay. All audit observations and remedial actions shall be evidenced and properly documented.	3.7.8	Demonstration of compliance of the quality management system applied shall be by audit. If nonconformity is identified, initiating action to correct its cause shall be determined and taken without undue delay. All audit observations and remedial actions shall be evidenced and properly documented.	No significant change / minor editorial amendment
3.7.1	The organization of an AIS as well as the design, contents, processing and distribution of aeronautical data and aeronautical information shall take into consideration human factors principles which facilitate their optimum utilization.	3.8.1	The organization of an AIS as well as the design, contents, processing and distribution of aeronautical data and aeronautical information shall take into consideration human factors principles which facilitate their optimum utilization.	No significant change / minor editorial amendment
3.7.2	Due consideration shall be given to the integrity of information where human interaction is required and mitigating steps taken where risks are identified.	3.8.2	Due consideration shall be given to the integrity of information where human interaction is required and mitigating steps taken where risks are identified.	No significant change / minor editorial amendment

CHAPTER 4: SCOPE OF AERONAUTICAL DATA AND AERONAUTICAL INFORMATION

16th Edition		15th Edition		Assessment
Para No.	Text of Standard	Para. No.	Text of Standard	
4.1.1	The aeronautical data and aeronautical information to be received and managed by the aeronautical information service (AIS) shall include at least the following sub-domains: a) national regulations, rules and procedures; b) aerodromes and heliports; c) airspace; d) air traffic services (ATS) routes; e) instrument flight procedures; f) radio navigation aids/systems; g) obstacles; h) terrain; and i) geographic information.	---	---	NEW Standard
4.1.2	Determination and reporting of aeronautical data shall be in accordance with the accuracy and integrity classification required to meet the needs of the end-user of aeronautical data.	---	---	NEW Standard
4.2.1	Metadata shall be collected for aeronautical data processes and exchange points.	3.4.1	Metadata shall be collected for aeronautical data processes and exchange points. This metadata collection shall be applied throughout the aeronautical information data chain, from survey/origin to distribution to the next intended user.	No significant change / minor editorial amendment
4.2.2	Metadata collection shall be applied throughout the aeronautical information data chain, from origination to distribution to the next intended user.			No significant change / minor editorial amendment

CHAPTER 5: AERONAUTICAL INFORMATION PRODUCTS AND SERVICES

16th Edition		15th Edition		Assessment
Para No.	Text of Standard	Para No.	Text of Standard	
5.1.1	Aeronautical information shall be provided in the form of aeronautical information products and associated services.	---	---	NEW Standard
5.1.2	When aeronautical data and aeronautical information are provided in multiple formats, processes shall be implemented to ensure data and information consistency between formats.	3.6.2	Where aeronautical data and aeronautical information are provided in multiple formats, processes shall be implemented to ensure data and information consistency between formats.	No significant change / minor editorial amendment
5.2.1	Aeronautical information provided in a standardized presentation shall include the aeronautical information publication (AIP), AIP Amendments, AIP Supplements, AIC, NOTAM and aeronautical charts.	---	---	NEW Standard
5.2.1.1	The AIP, AIP Amendment, AIP Supplement and AIC shall be provided on paper and/or as an electronic document.	---	---	NEW Standard
5.2.2	AIP shall include: a) a statement of the competent authority responsible for the air navigation facilities, services or procedures covered by the AIP; b) the general conditions under which the services or facilities are available for international use; c) a list of significant differences between the national regulations and practices of the State and the related ICAO Standards, Recommended Practices and Procedures, given in a form that would enable a user to differentiate readily between the requirements of the State and the related ICAO provisions; d) the choice made by a State in each significant case where an alternative course of action is provided for ICAO Standards, Recommended Practices and Procedures.	4.1.2	AIP shall include in Part 1 — General (GEN): a) a statement of the competent authority responsible for the air navigation facilities, services or procedures covered by the AIP; b) the general conditions under which the services or facilities are available for international use; c) a list of significant differences between the national regulations and practices of the State and the related ICAO Standards, Recommended Practices and Procedures, given in a form that would enable a user to differentiate readily between the requirements of the State and the related ICAO provisions; d) the choice made by a State in each significant case where an alternative course of action is provided for in ICAO Standards, Recommended Practices and Procedures.	No significant change / minor editorial amendment
5.2.3	A checklist of valid AIP Supplements shall be regularly provided.	4.4.6	A checklist of valid AIP Supplements shall be issued at intervals of not more than one month. This information shall be issued through the medium of the monthly plain-language list of valid NOTAM required by 5.2.13.3.	Frequency of the checklist of AIP Supplements changed from "not more than one month" to "regularly". Second part (related to List of Valid NOTAM) removed.
5.2.4.1	An AIC shall be used to provide: a) a long-term forecast of any major change in legislation, regulations, procedures or facilities; or b) information of a purely explanatory or advisory nature liable to affect flight safety; or c) information or notification of an explanatory or advisory nature concerning technical, legislative or purely administrative matters.	7.1.1.1	7.1.1.1 An AIC shall be originated whenever it is desirable to promulgate: a) a long-term forecast of any major change in legislation, regulations, procedures or facilities; b) information of a purely explanatory or advisory nature liable to affect flight safety; c) information or notification of an explanatory or advisory nature concerning technical, legislative or purely administrative matters. ~~This shall include: 1) forecasts of important changes in the air navigation procedures, services and facilities provided; 2) forecasts of implementation of new navigation systems; 3) significant information arising from aircraft accident/incident investigation which has a bearing on flight safety; 4) information on regulations relating to the safeguarding of international civil aviation against acts of unlawful interference; 5) advice on medical matters of special interest to pilots; 6) warnings to pilots concerning the avoidance of physical hazards; 7) effect of certain weather phenomena on aircraft operations; 8) information on new hazards affecting aircraft handling techniques; 9) regulations relating to the carriage of restricted articles by air; 10) reference to the requirements of, and publication of changes in, national legislation; 11) aircrew licensing arrangements; 12) training of aviation personnel; 13) application of, or exemption from, requirements in national legislation; 14) advice on the use and maintenance of specific types of equipment; 15) actual or planned availability of new or revised editions of aeronautical charts; 16) carriage of communication equipment; 17) explanatory information relating to noise abatement; 18) selected airworthiness directives; 19) changes in NOTAM series or distribution, new editions of AIP or major changes in their contents, coverage or format; 20) advance information on the snow plan (see 7.1.1.2); 21) other information of a similar nature.~~	No significant change / minor editorial amendment
5.2.4.2	An AIC shall not be used for information that qualifies for inclusion in AIP and NOTAM.	7.1.1	An AIC shall be originated whenever it is necessary to promulgate aeronautical information which does not qualify: a) under the specifications in 4.1 for inclusion in an Aeronautical Information Publication (AIP); or b) under the specifications in 5.1 for the origination of a NOTAM.	No significant change / minor editorial amendment
5.2.4.3	The validity of AIC currently in force shall be reviewed at least once a year.	---	---	NEW Standard

5.2.4.4	A checklist of currently valid AIC shall be regularly provided.	7.2.5	A checklist of AIC currently in force shall be issued at least once a year, with distribution as for the AIC.	Frequency of the checklist of AIC changed from "at least once a year" to "regularly". Second part (related to distribution as AIC) removed.
5.2.5.1	The aeronautical charts listed below shall, when available for designated international aerodromes/heliports, form part of the AIP, or be provided separately to recipients of the AIP: a) Aerodrome/Heliport Chart — ICAO; b) Aerodrome Ground Movement Chart — ICAO; c) Aerodrome Obstacle Chart — ICAO Type A; d) Aerodrome Obstacle Chart — ICAO Type B (when available); e) Aerodrome Terrain and Obstacle Chart — ICAO (Electronic); f) Aircraft Parking/Docking Chart — ICAO; g) Area Chart — ICAO; h) ATC Surveillance Minimum Altitude Chart — ICAO; i) Instrument Approach Chart — ICAO; j) Precision Approach Terrain Chart — ICAO; k) Standard Arrival Chart — Instrument (STAR) — ICAO; l) Standard Departure Chart — Instrument (SID) — ICAO; and m) Visual Approach Chart — ICAO.	4.1.3	The aeronautical charts listed alphabetically below shall, when available for designated international aerodromes/heliports, form part of the AIP, or be distributed separately to recipients of the AIP: a) Aerodrome/Heliport Chart — ICAO; b) Aerodrome Ground Movement Chart — ICAO; c) Aerodrome Obstacle Chart — ICAO Type A; d) Aerodrome Terrain and Obstacle Chart — ICAO (Electronic); e) Aircraft Parking/Docking Chart — ICAO; f) Area Chart — ICAO; g) ATC Surveillance Minimum Altitude Chart — ICAO; h) Instrument Approach Chart — ICAO; i) Precision Approach Terrain Chart — ICAO; j) Standard Arrival Chart — Instrument (STAR) — ICAO; k) Standard Departure Chart — Instrument (SID) — ICAO; l) Visual Approach Chart — ICAO.	Added: Aerodrome Obstacle Chart — ICAO Type B (when available);
5.2.5.2	The Enroute Chart — ICAO shall, when available, form part of the AIP, or be provided separately to recipients of the AIP.	---	---	NEW Standard
5.2.5.3	The aeronautical charts listed below shall, when available, be provided as aeronautical information products: a) World Aeronautical Chart — ICAO 1:1 000 000; b) Aeronautical Chart — ICAO 1:500 000; c) Aeronautical Navigation Chart — ICAO Small Scale; and d) Plotting Chart — ICAO chart.	---	---	NEW Standard
5.2.5.5	The chart resolution of aeronautical data shall be that as specified for a particular chart.	---	---	NEW Standard
5.2.6	A checklist of valid NOTAM shall be regularly provided.	5.2.13	A checklist of valid NOTAM shall be issued as a NOTAM over the aeronautical fixed service (AFS) at intervals of not more than one month using the NOTAM Format specified in Appendix 6. One NOTAM shall be issued for each series.	Frequency of the checklist of valid NOTAM changed from "not more than one month" to "regularly". Part related to distribution as NOTAM removed.
5.3.1.1	Digital data shall be in the form of the following data sets: a) AIP data set; b) terrain data sets; c) obstacle data sets; d) aerodrome mapping data sets; and e) instrument flight procedure data sets.	---	---	NEW Standard
5.3.1.2	Each data set shall be provided to the next intended user together with at least the minimum set of metadata that ensures traceability.	---	---	NEW Standard
5.3.1.3	A checklist of valid data sets shall be regularly provided.	---	---	NEW Standard
5.3.2.3	The AIP data set shall contain the digital representation of aeronautical information of lasting character (permanent information and long duration temporary changes) essential to air navigation.	---	---	NEW Standard

5.3.3.1	The coverage areas for terrain and obstacle data sets shall be specified as: — Area 1: the entire territory of a State; — Area 2: within the vicinity of an aerodrome, subdivided as follows: — Area 2a: a rectangular area around a runway that comprises the runway strip plus any clearway that exists; Note.— See Annex 14, Volume I, Chapter 3, for dimensions for runway strips. — Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side; — Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a; and — Area 2d: an area outside Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing terminal control area (TMA) boundary, whichever is nearest; — Area 3: the area bordering an aerodrome movement area that extends horizontally from the edge of a runway to 90 m from the runway centre line and 50 m from the edge of all other parts of the aerodrome movement area; and — Area 4: the area extending 900 m prior to the runway threshold and 60 m each side of the extended runway centre line in the direction of the approach on a precision approach runway, Category II or III.	10.1.1	The coverage areas for sets of electronic terrain and obstacle data shall be specified as: — Area 1: the entire territory of a State; — Area 2: within the vicinity of an aerodrome, subdivided as follows: — Area 2a: a rectangular area around a runway that comprises the runway strip plus any clearway that exists; Note.— See Annex 14, Volume I, Chapter 3, for dimensions for runway strip. — Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side; — Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a; and — Area 2d: an area outside the Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing terminal control area (TMA) boundary, whichever is nearest; — Area 3: the area bordering an aerodrome movement area that extends horizontally from the edge of a runway to 90 m from the runway centre line and 50 m from the edge of all other parts of the aerodrome movement area; and — Area 4: The area extending 900 m prior to the runway threshold and 60 m each side of the extended runway centre line in the direction of the approach on a precision approach	No significant change / minor editorial amendment
5.3.3.3.1	Terrain data sets shall contain the digital representation of the terrain surface in the form of continuous elevation values at all intersections (points) of a defined grid, referenced to common datum.	10.2.1	A terrain data set shall contain digital sets of data representing terrain surface in the form of continuous elevation values at all intersections (points) of a defined grid, referenced to common datum. ~~A terrain grid shall be angular or linear and shall be of regular or irregular shape.~~	No significant change / minor editorial amendment
5.3.3.3.2	Terrain data shall be provided for Area 1.	10.1.3	Electronic terrain data shall be provided for Area 1.	No significant change / minor editorial amendment
5.3.3.3.3	For aerodromes regularly used by international civil aviation, terrain data shall be provided for:	10.1.5	At aerodromes regularly used by international civil aviation, electronic terrain data shall be provided for:	No significant change / minor editorial amendment
	a) Area 2a; b) the take-off flight path area; and c) an area bounded by the lateral extent of the aerodrome obstacle limitation surfaces.		a) Area 2a; b) the take-off flight path area; and c) an area bounded by the lateral extent of the aerodrome obstacle limitation surfaces.	
5.3.3.3.8	For aerodromes regularly used by international civil aviation, terrain data shall be provided for Area 4 for all runways where precision approach Category II or III operations have been established and where detailed terrain information is required by operators to enable them to assess the effect of terrain on decision height determination by use of radio altimeters.	10.1.9	At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data shall be provided for Area 4 for terrain and obstacles that penetrate the relevant obstacle data collection surface specified in Appendix 8, for all runways where precision approach Category II or III operations have been established and where detailed terrain information is required by operators to enable them to assess the effect of terrain on decision height determination by use of radio altimeters.	No significant change / minor editorial amendment
5.3.3.4.1	Obstacle data sets shall contain the digital representation of the vertical and horizontal extent of obstacles.	10.3.1	Obstacle data shall comprise the digital representation of the vertical and horizontal extent of the obstacle. Obstacles shall not be included in terrain data sets. ~~Obstacle data elements are features that shall be represented in the data sets by points, lines or polygons.~~	No significant change / minor editorial amendment
5.3.3.4.2	Obstacle data shall not be included in terrain data sets.			
5.3.3.4.3	Obstacle data shall be provided for obstacles in Area 1 whose height is 100 m or higher above ground.	10.1.3	The obstacle data shall be provided for obstacles in Area 1 higher than 100 m above ground.	No significant change / minor editorial amendment
5.3.3.4.4	For aerodromes regularly used by international civil aviation, obstacle data shall be provided for all obstacles within Area 2 that are assessed as being a hazard to air navigation.	10.1.4	At aerodromes regularly used by international civil aviation, electronic obstacle data shall be provided for all obstacles within Area 2 that are assessed as being a hazard to air navigation.	No significant change / minor editorial amendment

5.3.3.4.5	For aerodromes regularly used by international civil aviation, obstacle data shall be provided for: a) Area 2a for those obstacles that penetrate an obstacle data collection surface outlined by a rectangular area around a runway that comprises the runway strip plus any clearway that exists. The Area 2a obstacle collection surface shall have a height of 3 m above the nearest runway elevation measured along the runway centre line, and for those portions related to a clearway, if one exists, at the elevation of the nearest runway end; b) objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area; and c) penetrations of the aerodrome obstacle limitation surfaces.	10.1.6	At aerodromes regularly used by international civil aviation, electronic obstacle data shall be provided for: a) Area 2a for those obstacles that penetrate the relevant obstacle data collection surface specified in Appendix 8; b) objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area; and c) penetrations of the aerodrome obstacle limitation surfaces.	No significant change / minor editorial amendment
5.3.3.4.10	For aerodromes regularly used by international civil aviation, obstacle data shall be provided for Area 4 for all runways where precision approach Category II or III operations have been established.	10.1.9	At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data shall be provided for Area 4 for terrain and obstacles that penetrate the relevant obstacle data collection surface specified in Appendix 8, for all runways where precision approach Category II or III operations have been established and where detailed terrain information is required by operators to enable them to assess the effect of terrain on decision height determination by use of radio altimeters.	No significant change / minor editorial amendment
5.3.4.1	Aerodrome mapping data sets shall contain the digital representation of aerodrome features.	11.3.2	Aerodrome mapping data sets shall contain aerodrome mapping data consisting of aerodrome features.	No significant change / minor editorial amendment
5.3.5.1	Instrument flight procedure data sets shall contain the digital representation of instrument flight procedures.	---	---	NEW Standard
5.4.1.1	Aeronautical information products shall be distributed to authorized users who request them.	---	---	NEW Standard
5.4.1.2	AIP, AIP Amendments, AIP Supplements and AIC shall be made available by the most expeditious means.	4.5	AIP, AIP Amendments and AIP Supplements shall be made available by the most expeditious means.	No significant change / minor editorial amendment
5.4.2.1	NOTAM shall be distributed on the basis of a request.	5.3.1	NOTAM shall be distributed on the basis of a request.	No significant change / minor editorial amendment
5.4.2.2	NOTAM shall be prepared in conformity with the relevant provisions of the ICAO communication procedures.	5.3.2	NOTAM shall be prepared in conformity with the relevant provisions of the ICAO communication procedures.	No significant change / minor editorial amendment
5.4.2.3	The aeronautical fixed service (AFS) shall, whenever practicable, be employed for NOTAM distribution.	5.3.2.1	The AFS shall, whenever practicable, be employed for NOTAM distribution.	No significant change / minor editorial amendment
5.4.2.4	When a NOTAM is sent by means other than the AFS, a six-digit date-time group indicating the date and time of NOTAM origination, and the identification of the originator shall be used, preceding the text. The originating State shall select the NOTAM that are to be given international distribution.	5.3.2.2	When a NOTAM exchanged as specified in 5.3.4 is sent by means other than the AFS, a six-digit date-time group indicating the date and time of NOTAM origination, and the identification of the originator shall be used, preceding the text.	No significant change / minor editorial amendment
		5.3.3	The originating State shall select the NOTAM that are to be given international distribution.	No significant change / minor editorial amendment
5.4.2.5	International exchange of NOTAM shall take place only as mutually agreed between the international NOTAM offices concerned, and between the NOTAM offices and multinational NOTAM processing units.	5.3.4	International exchange of NOTAM shall take place only as mutually agreed between the international NOTAM offices concerned. ~~The international exchange of ASHTAM (see 5.2.4), and NOTAM where States continue to use NOTAM for distribution of information on volcanic activity, shall include volcanic ash advisory centres and the centres designated by regional air navigation agreement for the operation of AFS satellite distribution systems (satellite distribution system for information relating to air navigation (SADIS) and international satellite communications system (ISCS)), and shall take account of the requirements of long range operations.~~	Added: "and between the NOTAM offices and multinational NOTAM processing units."
5.4.2.6	The originating State shall, upon request, grant distribution of NOTAM series other than those distributed internationally.	---	---	NEW Standard
5.5.1	For any aerodrome/heliport used for international air operations, aeronautical information relative to the route stages originating at the aerodrome/heliport shall be made available to flight operations personnel, including flight crews and services responsible for pre-flight information.	8.1.1	At any aerodrome/heliport normally used for international air operations, aeronautical information essential for the safety, regularity and efficiency of air navigation and relative to the route stages originating at the aerodrome/heliport shall be made available to flight operations personnel, including flight crews and services responsible for pre-flight information.	Re-worded
5.5.2	Aeronautical information provided for pre-flight planning purposes shall include information of operational significance from the elements of aeronautical information products.	8.1.2	Aeronautical information provided for pre-flight planning purposes at the aerodromes/heliports referred to in 8.1.1 shall include relevant: a) elements of the Integrated Aeronautical Information Package; b) maps and charts.	Replacement of IAIP with "Aeronautical Information Products"

5.6.1	For any aerodrome/heliport used for international air operations, arrangements shall be made to receive information concerning the state and operation of air navigation facilities or services noted by flight crews.	8.3.1	Arrangements shall be made to receive at aerodromes/heliports information concerning the state and operation of air navigation facilities or services noted by aircrews and shall ensure that such information is made available to the AIS for such distribution as the circumstances necessitate.	re-worded
5.6.2	The arrangements specified in 5.6.1 shall ensure that such information is made available to the aeronautical information service (AIS) for distribution as the circumstances necessitate.			re-worded
5.6.3	For any aerodrome/heliport used for international air operations, arrangements shall be made to receive information concerning the presence of wildlife hazards observed by flight crews.	8.3.2	Arrangements shall be made to receive at aerodromes/heliports information concerning the presence of birds observed by aircrews and shall ensure that such information is made available to the AIS for such distribution as the circumstances necessitate.	re-worded
5.6.4	The information about presence of wildlife hazards shall be made available to the aeronautical information service for distribution as the circumstances necessitate.			re-worded

CHAPTER 6: AERONAUTICAL INFORMATION UPDATES

16th Edition		15th Edition		Assessment
Para No.	Text of Standard	Para. No.	Text of Standard	
6.1	Aeronautical data and aeronautical information shall be kept up to date.	---	---	NEW Standard
6.2.1	Information concerning the following circumstances shall be distributed under the regulated system (AIRAC), i.e. basing establishment, withdrawal or significant changes upon a series of common effective dates at intervals of 28 days, including 8 November 2018: a) limits (horizontal and vertical), regulations and procedures applicable to: 1) flight information regions; 2) control areas; 3) control zones; 4) advisory areas; 5) air traffic services (ATS) routes; 6) permanent danger, prohibited and restricted areas (including type and periods of activity when known) and air defence identification zones (ADIZ); 7) permanent areas or routes or portions thereof where the possibility of interception exists; b) positions, frequencies, call signs, identifiers, known irregularities and maintenance periods of radio navigation aids, and communication and surveillance facilities; c) holding and approach procedures, arrival and departure procedures, noise abatement procedures and any other pertinent ATS procedures; d) transition levels, transition altitudes and minimum sector altitudes; e) meteorological facilities (including broadcasts) and procedures; f) runways and stopways; g) taxiways and aprons; h) aerodrome ground operating procedures (including low visibility procedures); i) approach and runway lighting; and j) aerodrome operating minima if published by a State.	6.1.1	Information concerning the circumstances listed in Appendix 4, Part 1, shall be distributed under the regulated system (AIRAC), i.e. basing establishment, withdrawal or significant changes upon a series of common effective dates at intervals of 28 days, including 14 January 2010.	re-worded & Appendix 4 added to the standard
		App. 4	Appendix 4 (Information to be notified by AIRAC)	
6.2.2	The information notified under the AIRAC system shall not be changed further for at least another 28 days after the effective date, unless the circumstance notified is of a temporary nature and would not persist for the full period.	6.1.1	The information notified therein shall not be changed further for at least another 28 days after the effective date, unless the circumstance notified is of a temporary nature and would not persist for the full period.	No significant change / minor editorial amendment
6.2.3	Information provided under the AIRAC system shall be made available by the aeronautical information service (AIS) so as to reach recipients at least 28 days in advance of the effective date.	6.2.1	Information provided under the AIRAC system in paper copy form shall be distributed by the AIS unit at least 42 days in advance of the effective date with the objective of reaching recipients at least 28 days in advance of the effective date.	The statement of 42 days removed & for any kind of information provided under AIRAC system, the standard is to reach recipients at least 28 days in advance of the effective date.
		6.3.2	Information provided as electronic media, concerning the circumstances listed in Appendix 4, Part 1, shall be distributed/made available by the AIS unit so as to reach recipients at least 28 days in advance of the AIRAC effective date.	
6.2.4	When information has not been submitted by the AIRAC date, a NIL notification shall be distributed not later than one cycle before the AIRAC effective date concerned.	6.1.3	When information has not been submitted by the AIRAC date, a NIL notification shall be originated and distributed by NOTAM or other suitable means, not later than one cycle before the AIRAC effective date concerned.	No significant change / minor editorial amendment
6.2.5	Implementation dates other than AIRAC effective dates shall not be used for pre-planned operationally significant changes requiring cartographic work and/or for updating of navigation databases.	6.1.4	Implementation dates other than AIRAC effective dates shall not be used for pre-planned operationally significant changes requiring cartographic work and/or for updating of navigation databases.	No significant change / minor editorial amendment
6.3.1.1	The aeronautical information publication (AIP) shall be amended or reissued at such regular intervals as may be necessary to keep it up to date.	4.2.9	AIP shall be amended or reissued at such regular intervals as may be necessary to keep them up to date. ~~Recourse to hand amendments or annotations shall be kept to the minimum. The normal method of amendment shall be by means of replacement sheets.~~	No significant change / minor editorial amendment
6.3.1.2	Permanent changes to the AIP shall be published as AIP Amendments.	4.3.1	Permanent changes to the AIP shall be published as AIP Amendments.	No significant change / minor editorial amendment
6.3.1.3	Temporary changes of long duration (three months or longer) and information of short duration which contains extensive text and/or graphics shall be published as AIP Supplements.	4.4.1	Temporary changes of long duration (three months or longer) and information of short duration which contains extensive text and/or graphics shall be published as AIP Supplements.	No significant change / minor editorial amendment
6.3.2.1	When an AIP Amendment or an AIP Supplement is published in accordance with AIRAC procedures, a Trigger NOTAM shall be originated.	5.1.1.6	When an AIP Amendment or an AIP Supplement is published in accordance with AIRAC procedures, a NOTAM shall be originated giving a brief description of the contents, the effective date and time, and the reference number of the amendment or supplement. This NOTAM shall come into force on the same effective date and time as the amendment or supplement and shall remain valid in the pre-flight information bulletin for a period of fourteen days.	The term "Trigger NOTAM" is used instead of explanation.
6.3.2.2	A NOTAM shall be originated and issued promptly whenever the information to be distributed is of a temporary nature and of short duration, or when operationally significant permanent changes or temporary changes of long duration are made at short notice, except for extensive text and/or graphics.	5.1.1	A NOTAM shall be originated and issued promptly whenever the information to be distributed is of a temporary nature and of short duration or when operationally significant permanent changes, or temporary changes of long duration are made at short notice, except for extensive text and/or graphics.	No significant change / minor editorial amendment

6.3.2.3	A NOTAM shall be originated and issued concerning the following information: a) establishment, closure or significant changes in operation of aerodrome(s) or heliport(s) or runways; b) establishment, withdrawal or significant changes in operation of aeronautical services (aerodromes, AIS, ATS, communications, navigation and surveillance (CNS), meteorology (MET), search and rescue (SAR), etc.); c) establishment, withdrawal or significant changes in operational capability of radio navigation and air-ground communication services. This includes: interruption or return to operation, change of frequencies, change in notified hours of service, change of identification, change of orientation (directional aids), change of location, power increase or decrease amounting to 50 per cent or more, change in broadcast schedules or contents, or irregularity or unreliability of operation of any radio navigation and air-ground communication services or limitations of relay stations including operational impact, affected service, frequency and area; d) unavailability of back-up and secondary systems, having a direct operational impact; e) establishment, withdrawal or significant changes to visual aids; f) interruption of or return to operation of major components of aerodrome lighting systems; g) establishment, withdrawal or significant changes to procedures for air navigation services; h) occurrence or correction of major defects or impediments in the manoeuvring area; i) changes to and limitations on availability of fuel, oil and oxygen; j) major changes to search and rescue facilities and services available; k) establishment, withdrawal or return to operation of hazard beacons marking obstacles to air navigation; l) changes in regulations requiring immediate action, e.g. prohibited areas for SAR action; m) presence of hazards which affect air navigation (including obstacles, military exercises, displays, fireworks, sky lanterns, rocket debris, races and major parachuting events outside promulgated sites); n) planned laser emissions, laser displays and search lights if pilots' night vision is likely to be impaired; o) erecting or removal of, or changes to, obstacles to air navigation in the take-off/climb, missed approach, approach areas and runway strip; p) establishment	5.1.1.1	A NOTAM shall be originated and issued concerning the following information: a) establishment, closure or significant changes in operation of aerodrome(s)/heliport(s) or runways; b) establishment, withdrawal and significant changes in operation of aeronautical services (AGA, AIS, ATS, CNS, MET, SAR, etc.); c) establishment, withdrawal and significant changes in operational capability of radio navigation and air-ground communication services. This includes: interruption or return to operation, change of frequencies, change in notified hours of service, change of identification, change of orientation (directional aids), change of location, power increase or decrease amounting to 50 per cent or more, change in broadcast schedules or contents, or irregularity or unreliability of operation of any radio navigation and air-ground communication services; d) establishment, withdrawal or significant changes made to visual aids; e) interruption of or return to operation of major components of aerodrome lighting systems; f) establishment, withdrawal or significant changes made to procedures for air navigation services; g) occurrence or correction of major defects or impediments in the manoeuvring area; h) changes to and limitations on availability of fuel, oil and oxygen; i) major changes to search and rescue facilities and services available; j) establishment, withdrawal or return to operation of hazard beacons marking obstacles to air navigation; k) changes in regulations requiring immediate action, e.g. prohibited areas for SAR action; l) presence of hazards which affect air navigation (including obstacles, military exercises, displays, races and major parachuting events outside promulgated sites); m) erecting or removal of, or changes to, obstacles to air navigation in the take-off/climb, missed approach, approach areas and runway strip; n) establishment or discontinuance (including activation or deactivation) as applicable, or changes in the status of prohibited, restricted or danger areas; o) establishment or discontinuance of areas or routes or portions thereof where the possibility of interception exists and where the maintenance of guard on the VHF emergency frequency 121.5 MHz is required; p) allocation, cancellation or change of location indicators; q) significant changes in the level of protection normally	Added: items d & n Change/amendment in Items m, s & v (old items: l, 1 &t)
6.3.2.4	The following information shall not be notified by NOTAM: a) routine maintenance work on aprons and taxiways which does not affect the safe movement of aircraft; b) runway marking work, when aircraft operations can safely be conducted on other available runways, or the equipment used can be removed when necessary; c) temporary obstructions in the vicinity of aerodromes/heliports that do not affect the safe operation of aircraft; d) partial failure of aerodrome/heliport lighting facilities where such failure does not directly affect aircraft operations; e) partial temporary failure of air-ground communications when suitable alternative frequencies are known to be available and are operative; f) the lack of apron marshalling services and road traffic control; g) the unserviceability of location, destination or other instruction signs on the aerodrome movement area; h) parachuting when in uncontrolled airspace under VFR (see 6.3.2.3 m)), when controlled, at promulgated sites or within danger or prohibited areas; i) training activities by ground units; j) unavailability of back-up and secondary systems if these do not have an operational impact; k) limitations to airport facilities or general services with no operational impact; l) national regulations not affecting general aviation; m) announcement or warnings about possible/potential limitations, without any operational impact; n) general reminders on already published information; o) availability of equipment for ground units without containing information on the operational impact for airspace and facility users; p) information about laser emissions without any operational impact and fireworks below minimum flying heights; q) closure of movement area parts in connection with planned work locally coordinated of duration of less than one hour; r) closure or unavailability of, or changes in, operation of aerodrome(s)/heliport(s) outside the aerodrome(s)/heliport(s) operational hours; and s) other non-operational information of a similar temporary nature.	5.1.1.3	5.1.1.3 The following information shall not be notified by NOTAM: a) routine maintenance work on aprons and taxiways which does not affect the safe movement of aircraft; b) runway marking work, when aircraft operations can safely be conducted on other available runways, or the equipment used can be removed when necessary; c) temporary obstructions in the vicinity of aerodromes/heliports that do not affect the safe operation of aircraft; d) partial failure of aerodrome/heliport lighting facilities where such failure does not directly affect aircraft operations; e) partial temporary failure of air-ground communications when suitable alternative frequencies are known to be available and are operative; f) the lack of apron marshalling services and road traffic control; g) the unserviceability of location, destination or other instruction signs on the aerodrome movement area; h) parachuting when in uncontrolled airspace under VFR (see 5.1.1.1 l)), when controlled, at promulgated sites or within danger or prohibited areas; i) other information of a similar temporary nature.	Added items i to r
6.3.3.1	Data sets shall be amended or reissued at such regular intervals as may be necessary to keep them up to date.	---	---	NEW Standard

6.3.3.2	Permanent changes and temporary changes of long duration (three months or longer) made available as digital data shall be issued in the form of a complete data set or a subset that includes only the differences from the previously issued complete data set.	---	---	NEW Standard
6.3.3.5	Updates to AIP and digital data sets shall be synchronized.	---	---	NEW Standard

APPENDIX 5.3D

MID RDWG Scope, Terms of Reference, Composition, and Working Procedures

SCOPE:

The MID Route Development Working Group (RDWG) works on matters related to ATS route planning and implementation in the Middle East Region.

In order to achieve its mandate, The RDWG builds on previous work aiming at enhancing the regional ATS route network, including but not limited to: MIDRAR, CNS/ATM study, work of the Advanced Inter-regional ATS Routes Development Task Force (AIRARD TF), work of the Middle East ATM Enhancement Programme (MAEP), work of ICAO ARN Task Force, etc.

TERMS OF REFERENCE:

1. Based on airspace users' needs and in coordination with stakeholders (States, Regional and International Organizations, and other ICAO Regions), identify requirements and improvements for achieving and maintaining an efficient ATS route network in the MID Region.
2. Recommend measures and support the ATM SG in the development and maintenance of working procedures to plan and implement requirements/improvements to the MID ATS route network.
3. Facilitate the implementation of agreed ATS routes by engaging concerned parties including the Military Authorities.
4. In coordination with the MIDRMA, carry out safety assessment of the proposed changes to the ATS route network.
5. Support the implementation of the approved amendments to the ATS route network and MID ANP;
6. Coordinate and support implementation of the ATS routes over the high seas;
7. Address inter-regional ATS routes improvements with adjacent ICAO Regions, through the AIRARD Task Force, RDGE, AAMA SCM etc.
8. Report, regularly, to the ATM Sub Group and to MAEP Board the work progress of the RDWG.

COMPOSITION:

The RDWG will be composed of:

- a) experts nominated by Middle East States from both Civil Aviation and Military Authorities;
- b) Concerned Regional and International Organizations; and
- c) Other representatives from adjacent States and Organizations as required.

In addition, the RDWG will have a core team composed of AACO, IATA and ICAO. The core team will be responsible for developing the activities of the RDWG through effective coordination between airspace users and RDWG members.

WORKING PROCEDURES:

The RDWG will meet as required and under the format of Task Forces gathering concerned States and stakeholders to carry its work, with the following work procedures:

- The Core Team will coordinate users' requirements based on trunk routes and city-pair priorities.
- For each set of requirements, concerned airspace users will submit proposals which will be communicated to the concerned States for review.
- Coordination will be carried out with concerned State(s) through correspondence and teleconferences and, if required, face-to-face meetings with stakeholders on case-by-case basis.
- The Core Team will continue to follow up with concerned States to ensure implementation of the agreed proposals and their migration to the MID ANP.
- The Core Team will follow-up with the concerned State(s) and air operators the conduct of post implementation review of the implemented ATS route improvements, to assess the impact and estimate the benefit accrued from the implementation.



**International Civil Aviation Organization
Middle East Region**

Route Catalogue

Edition May 2018

I. Introduction

1. The Middle East Route Catalogue was approved by MIDANPIRG/11 meeting (Cairo, Egypt 9-13 February 2009) developed within the context of the ARN TF, as an ATS route development/planning tool. It was agreed that the Catalogue should contain a list of ATS route proposals that have been agreed within the framework of the ATM SG that did not reach a level of maturity to be moved to the MID Air Navigation Plan.
2. The sixteenth meeting of the MID Air Navigation Planning and Implementation Regional Group (MIDANPIRG/16, Kuwait, 13-16 February 2016), under decision 16/17, established the ICAO MID ATS Route Development Working Group (RDWG) under the ICAO ATM Sub-Group. The RDWG mandate is to be a platform for all stakeholders to discuss and implement enhancements to the MID ATS Route Network.
3. Recognizing the value of a consolidated reference document for the regional ATS routes, the RDWG decided to maintain the Middle East Route Catalogue as the primary repository for proposals emanating from States and/or airspace users. The Route Catalogue will be maintained by IATA MENA in close collaboration with the RDWG Core Team.
4. Any State or airspace user which identifies a need for a new route requirement to be included in the catalogue or to change an existing route contained in the catalogue, may submit respectively an amendment proposal to the ICAO MID Office or IATA MENA. The RDWG will periodically survey concerned stakeholders for new/amended requirements to be added/amended in the Route Catalogue.
5. IATA MENA, will keep the Route Catalogue up-to date as proposals are added or amended. The Route Catalogue will be posted on IATA MENA and ICAO MID websites and presented to the ATM SG meeting or other relevant meetings.

II. Structure

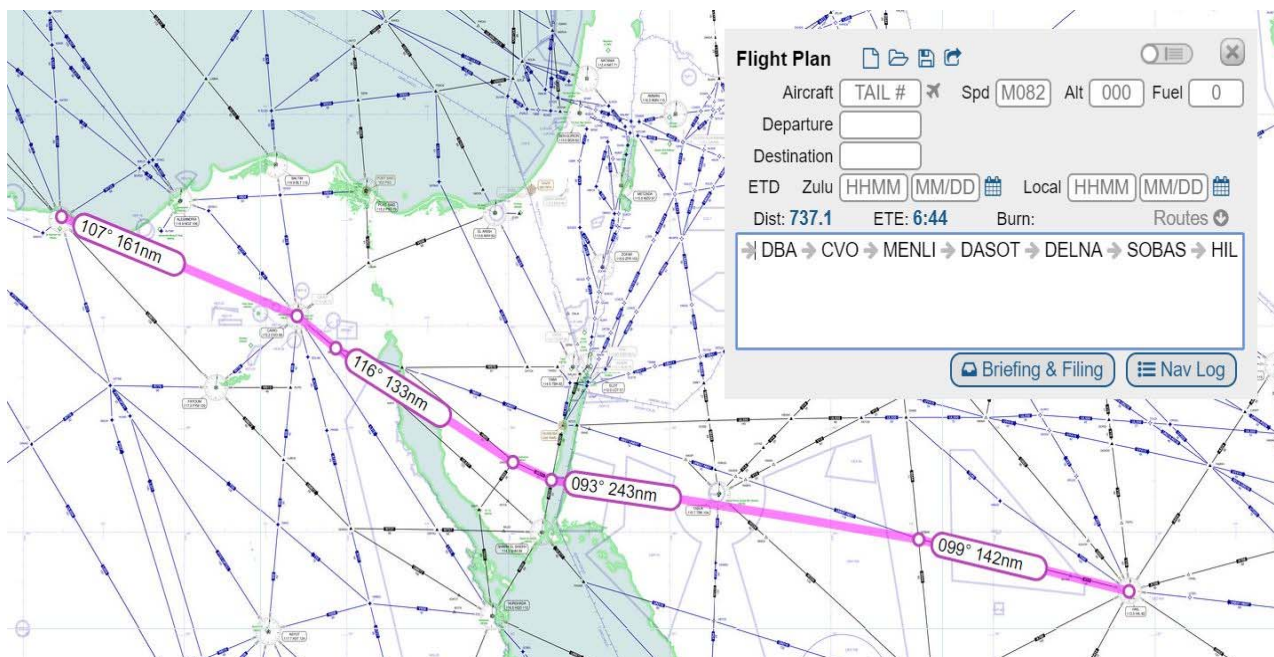
6. The Catalogue is divided into 2 elements:
 1. Current proposals for implementation
 2. Proposals on hold due to regional limitations on implementation

III. Processes

7. ICAO MID Office will send proposals included in the Catalogue to concerned States for their input:
 - If a proposal is accepted by all concerned States, it shall be moved to the MID ANP for implementation through the processing of Proposal for Amendment.
 - If any State has any comment on the proposal, a conference call or meeting (depending on the comments received) will be held with the concerned States and airspace users to reach a consensus on the proposal:
 - If a compromise is reached, the amended proposal will be moved to the ANP for implementation.
 - If a compromise was not possible, the proposal is returned to its originator for further study and removed from the Route Catalogue. The originator would then be able to review the proposal and submit a new one taking into consideration the limitations restricting the proposal from being implemented.

5.3E-3

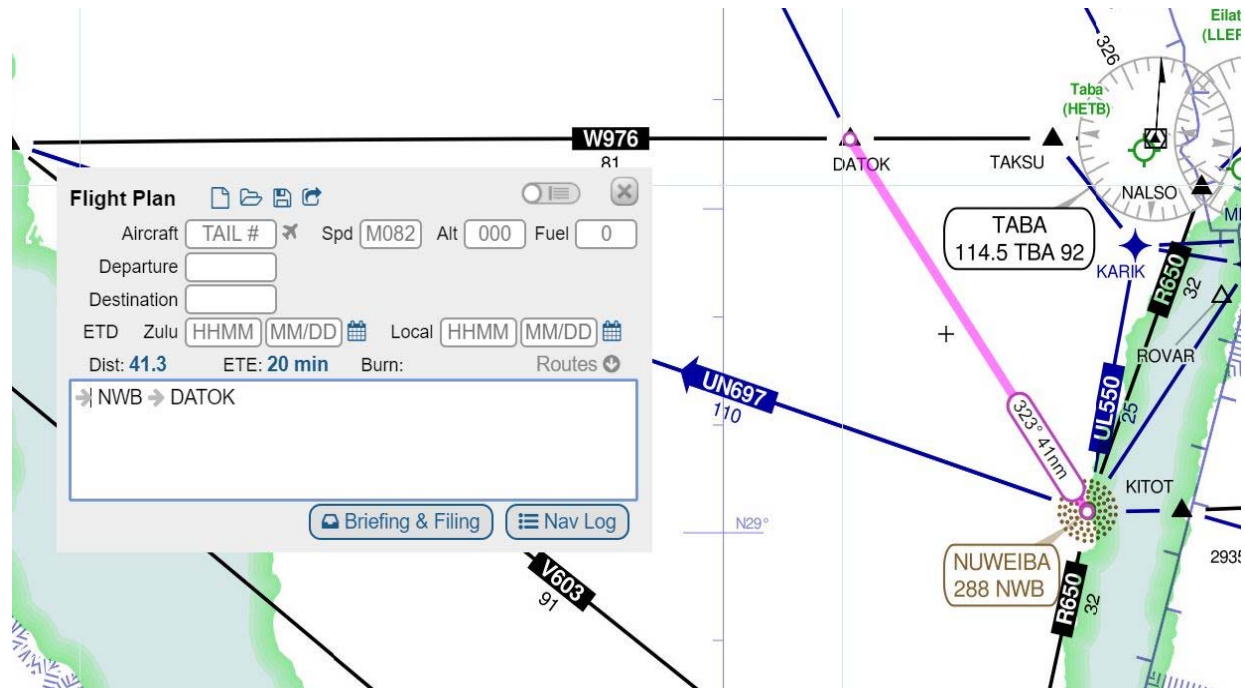
MID/RC-1	ATS Route Name: New Route	Inter-Regional Cross Reference if any	N/A	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action
DBA-CVO-MENLI-DASOT-DELNA-SOBAS		Egypt Saudi Arabia	Not Implemented		Not in the Plan		To be addressed with Egypt and Saudi Arabia		- Quarter 4-2017
Flight Level Band: Eastbound									
Potential traffic flow: North Africa and South Europe to MID Region and beyond									
Justification									
Benefits									
Remarks									



MSG/6-REPORT
APPENDIX 5.3E

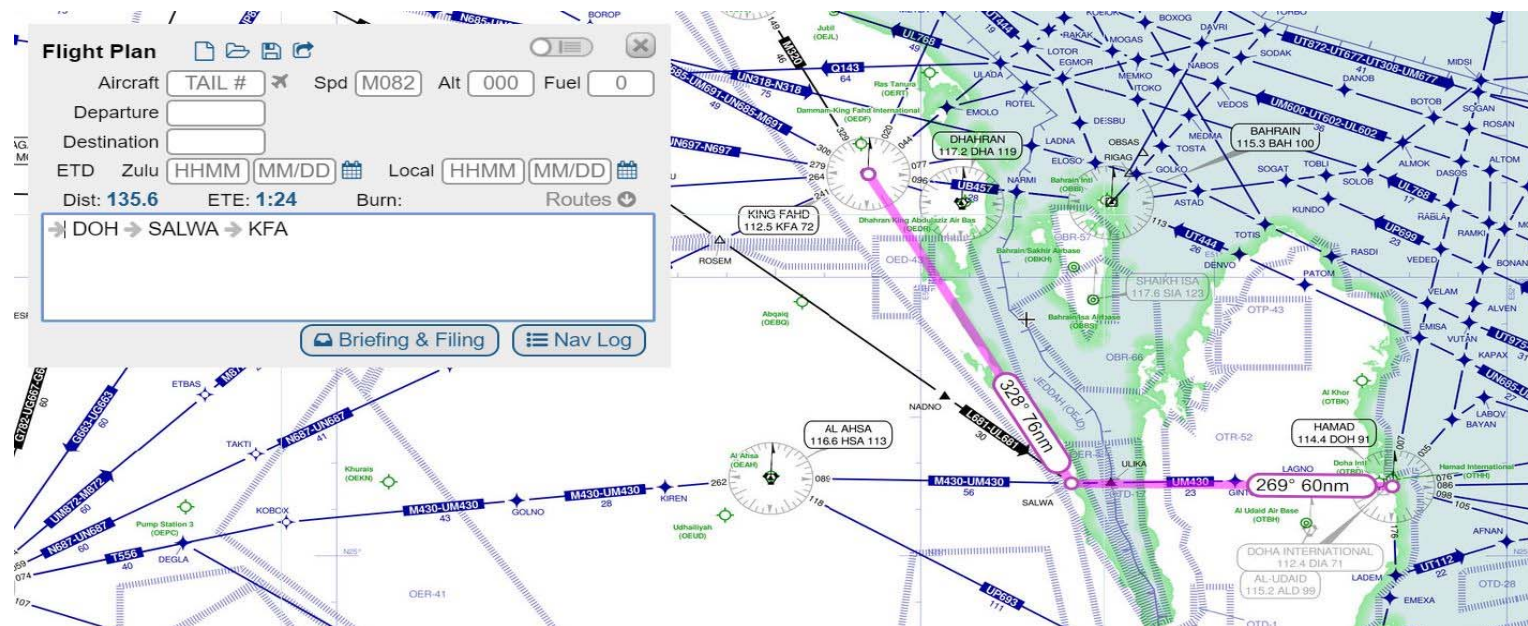
5.3E-4

MID/RC-2	ATS Route Name: New Route	Inter-Regional Cross Reference if any	N/A	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action
NWB-DATOK		Egypt	Not Implemented		Not in the Plan		To be addressed with Egypt		- Quarter 4-2017
Flight Level Band: Westbound									
Potential traffic flow: Asia and Middle East traffic to Europe									
Justification									
Benefits									
Remarks									



5.3E-5

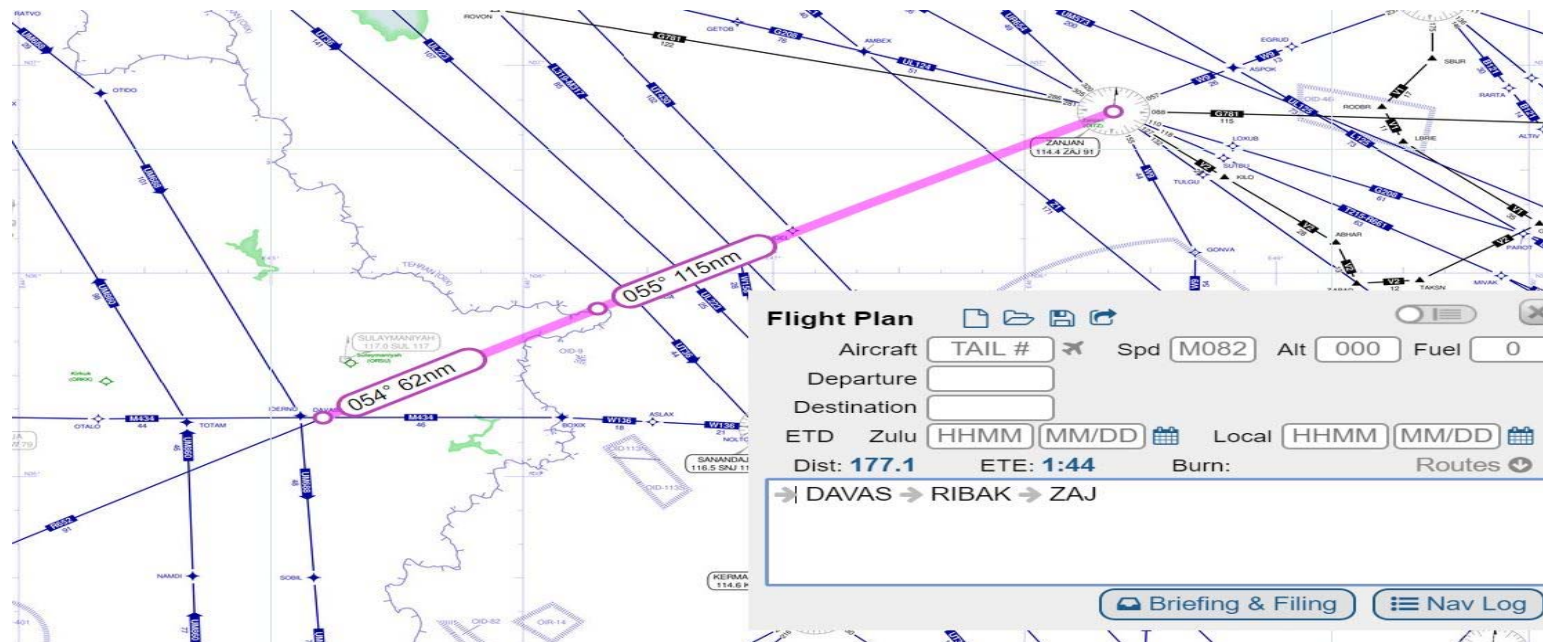
MID/RC-3	ATS Route Name: New Route	Inter-Regional Cross Reference if any	N/A	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action
DOH-SALWA (M430)-KFA		Bahrain Qatar Saudi Arabia	Not Implemented		Not in the Plan		To be addressed with Bahrain, Qatar and Saudi Arabia		- Quarter 4-2017
Flight Level Band: Westbound									
Potential traffic flow: Doha Departures to North Africa and West Europe									
Justification									
Benefits									
Remarks		ON HOLD							



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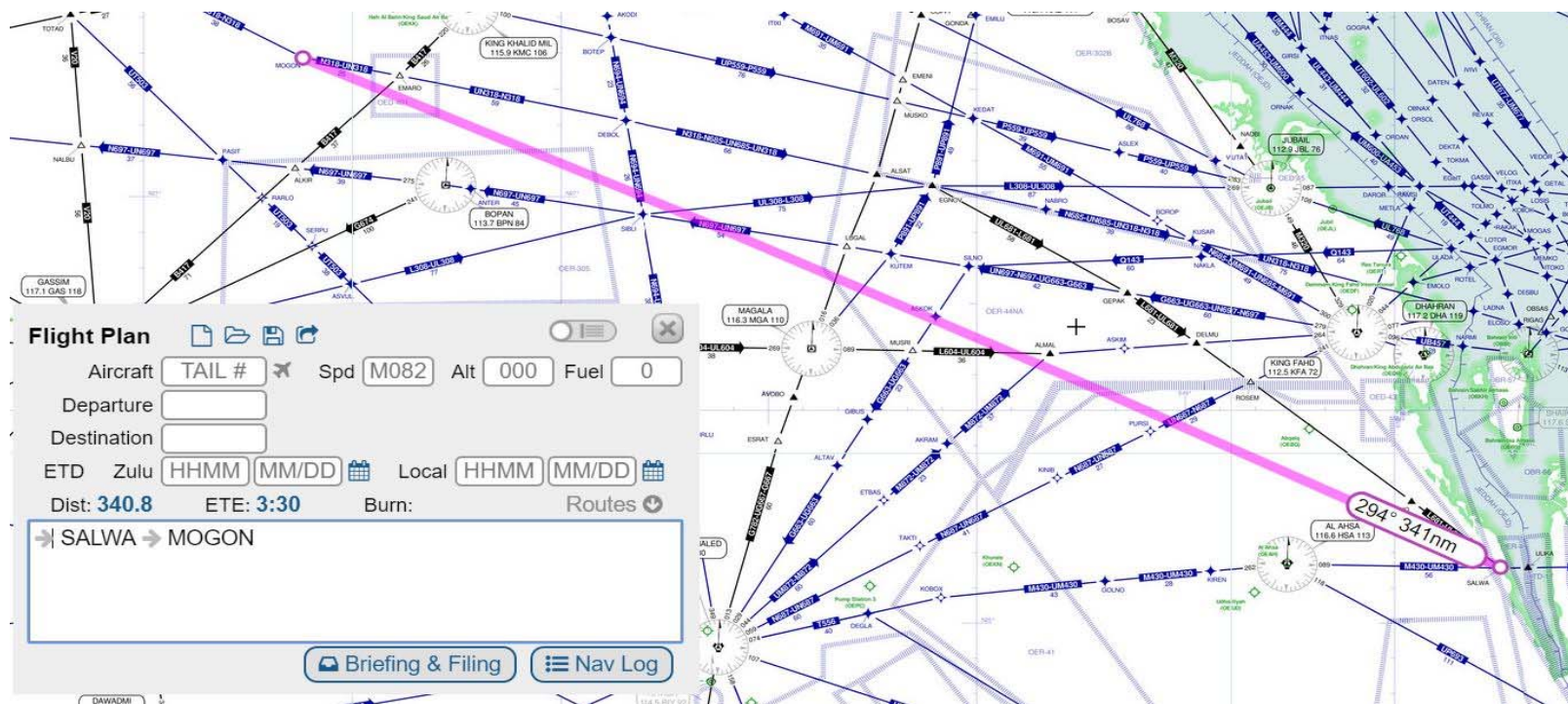
5.3E-6

MID/RC-4	ATS Route Name: New Route	Inter-Regional Cross Reference if any	N/A	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action
DAVAS-RIBAK-ZANJAN (ZAJ) extension to R652		Iran Iraq	Not Implemented		Not in the Plan		To be addressed with Iran and Iraq		- Quarter 4-2017
Flight Level Band: Westbound									
Potential traffic flow: traffic to/from Tehran FIR through Amman and Baghdad FIRs									
Justification									
Benefits									
Remarks									



5.3E-7

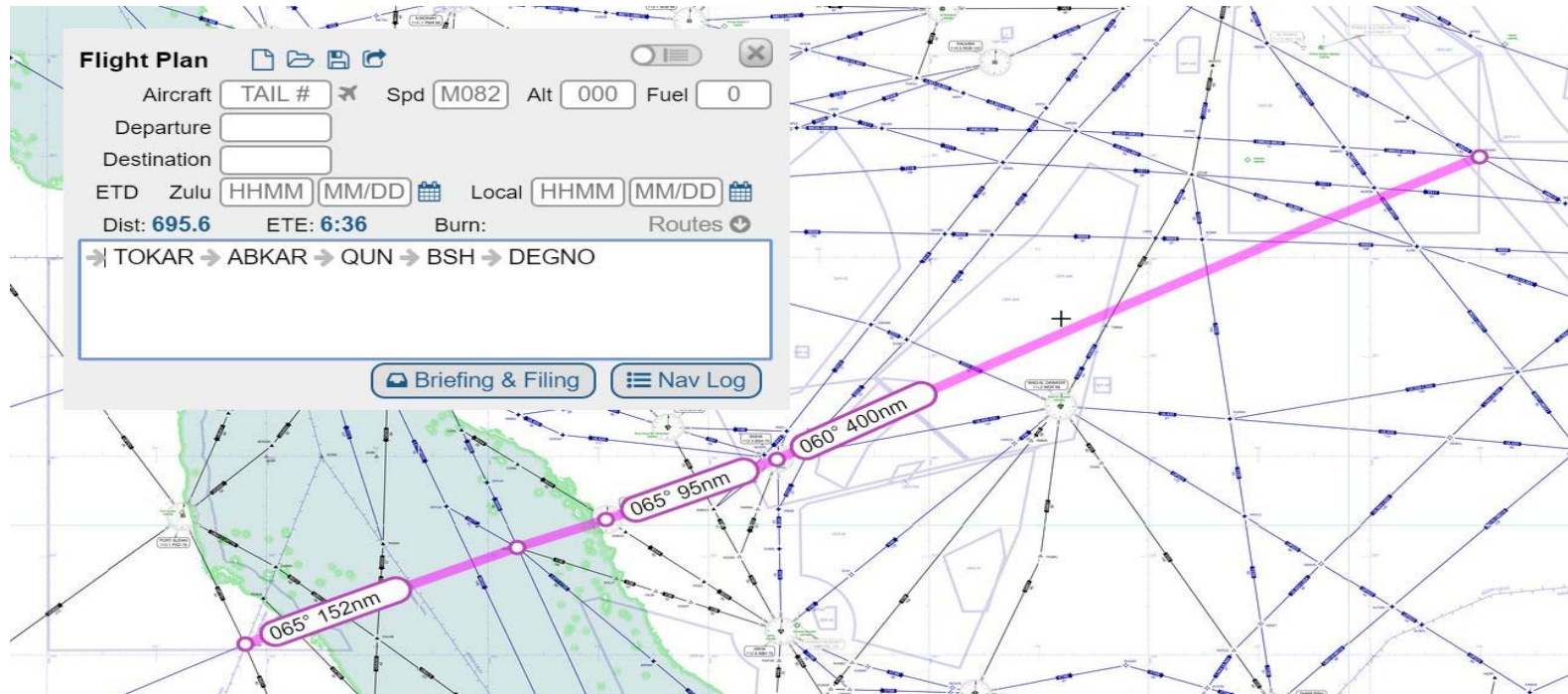
MID/RC-5	ATS Route Name: New Route	Inter-Regional Cross Reference if any	N/A	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action
SALWA-MOGON		Bahrain Qatar Saudi Arabia	Not Implemented		Not in the Plan		To be addressed with Bahrain, Qatar and Saudi Arabia		- Quarter 4-2017
Flight Level Band: Westbound									
Potential traffic flow:									
Justification									
Benefits									
Remarks		ON HOLD							



MSG/6-REPORT
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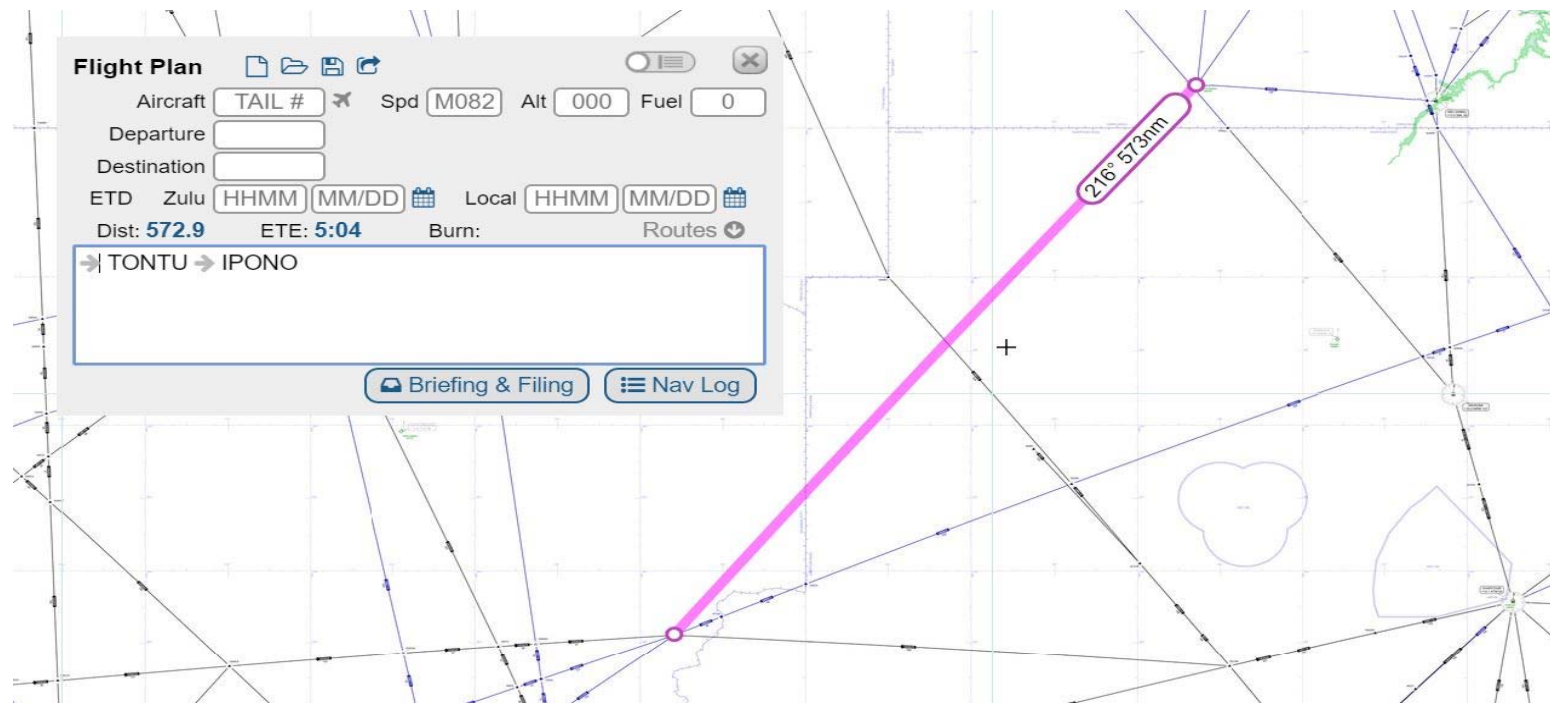
5.3E-8

MID/RC-6	ATS Route Name: New Route	Inter-Regional Cross Reference if any	N/A	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action
TOKAR-ABKAR-QUN-BSH-DEGNO		Eretria Saudi Arabia	Not Implemented		Not in the Plan		To be addressed with Eretria and Saudi Arabia		- Quarter 4-2017
Flight Level Band: Bidirectional									
Potential traffic flow:									
Justification									
Benefits									
Remarks									



5.3E-9

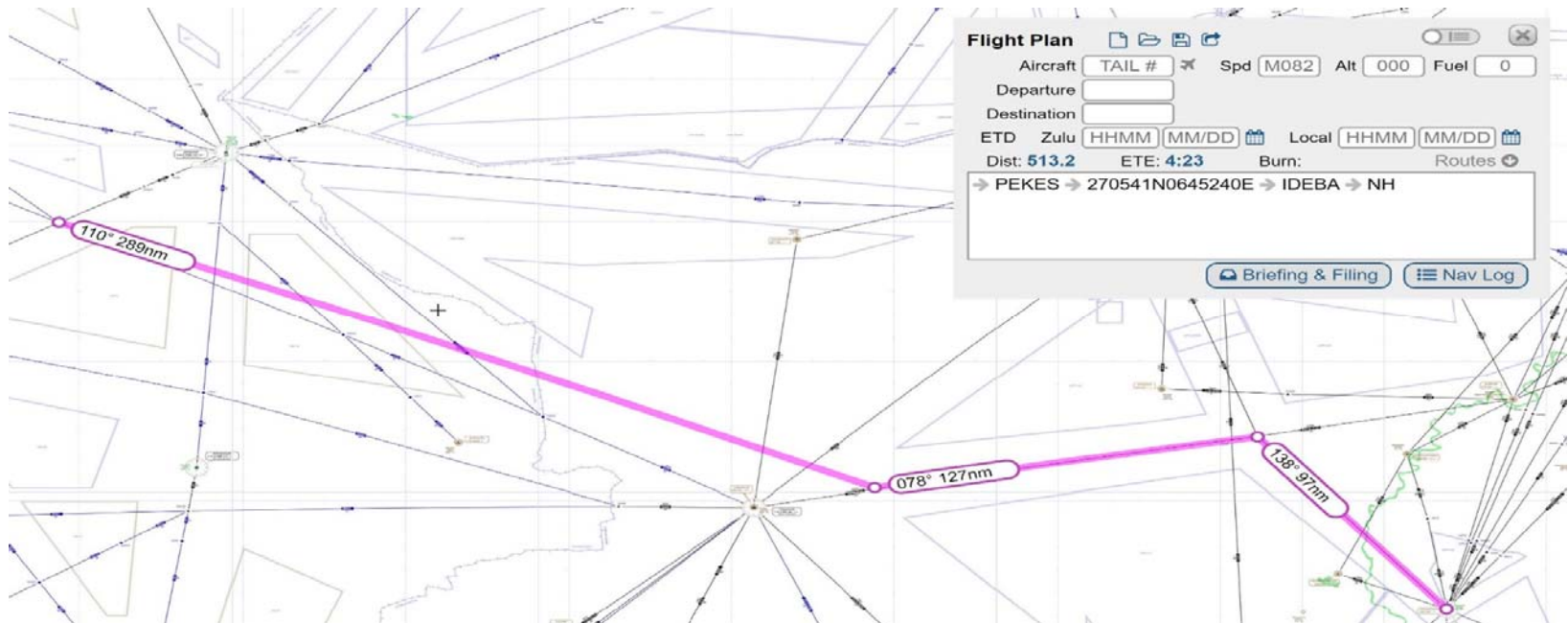
MID/RC-7	ATS Route Name: New Route	Inter-Regional Cross Reference if any	N/A	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action
TONTU-IPONO		Egypt Sudan	Not Implemented		Not in the Plan		To be addressed with Egypt and Sudan		- Quarter 4-2017
Flight Level Band: Bidirectional									
Potential traffic flow: from Egypt, Jordan and Lebanon, etc. to Chad and west/south Africa									
Justification									
Benefits									
Remarks									



MSG/6-REPORT
APPENDIX 5.3E

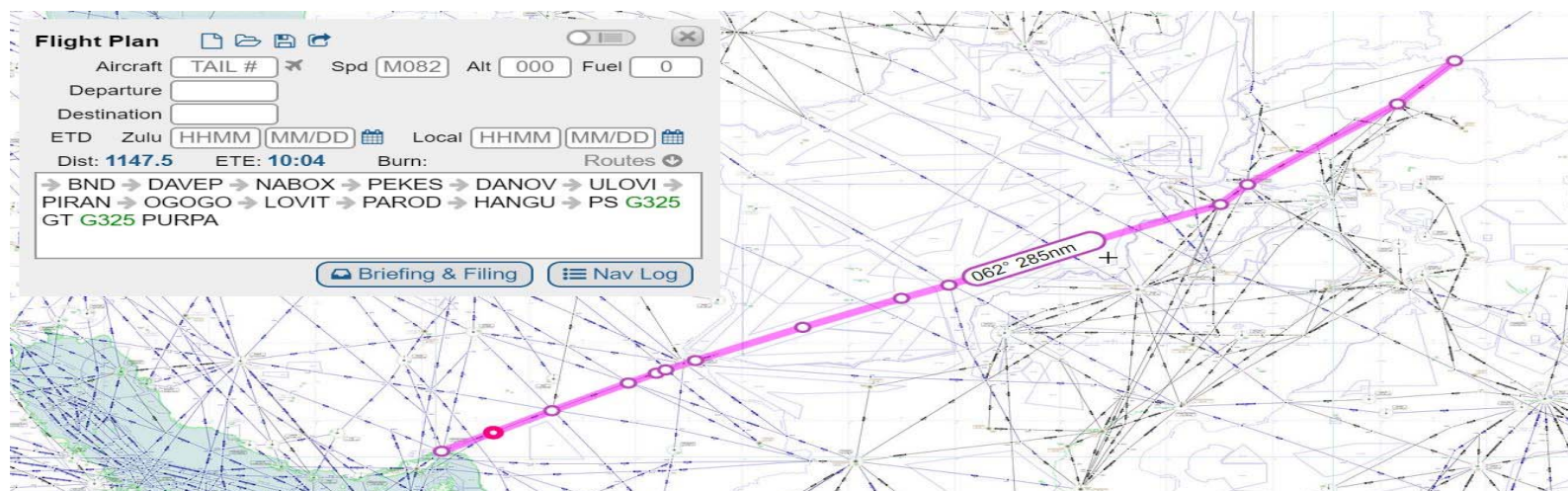
5.3E-10

MID/RC-8	ATS Route Name: New Route	Inter-Regional Cross Reference if any	APAC	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal		
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action		
PEKES-NH		Iran Pakistan	Not Implemented		Not in the Plan		To be addressed with Iran and Pakistan To be addressed ta the AIRARD TF/2 meeting		- Quarter 4-2017		
Flight Level Band: Bidirectional											
Potential traffic flow: Europe to East through Tehran FIR.											
Justification	Agreed upon during the Afghanistan Contingency Coordination meeting										
Benefits											
Remarks											



5.3E-11

MID/RC-9a	ATS Route Name: New Route	Inter-Regional Cross Reference if any	APAC	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal		
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action		
A453-PAROD-HANGU-G325-PURPA		Afghanistan	Not Implemented		Not in the Plan		To be addressed with Afghanistan. To be addressed to AIRARD TF/2 meeting		- Quarter 4-2017		
Flight Level Band: FLAS TBD											
Potential traffic flow: Gulf Traffic from/to Fareast											
Justification											
Benefits											
Remarks		9a and 9b are high priority. However, in case only one option could be implemented 9a has preference									



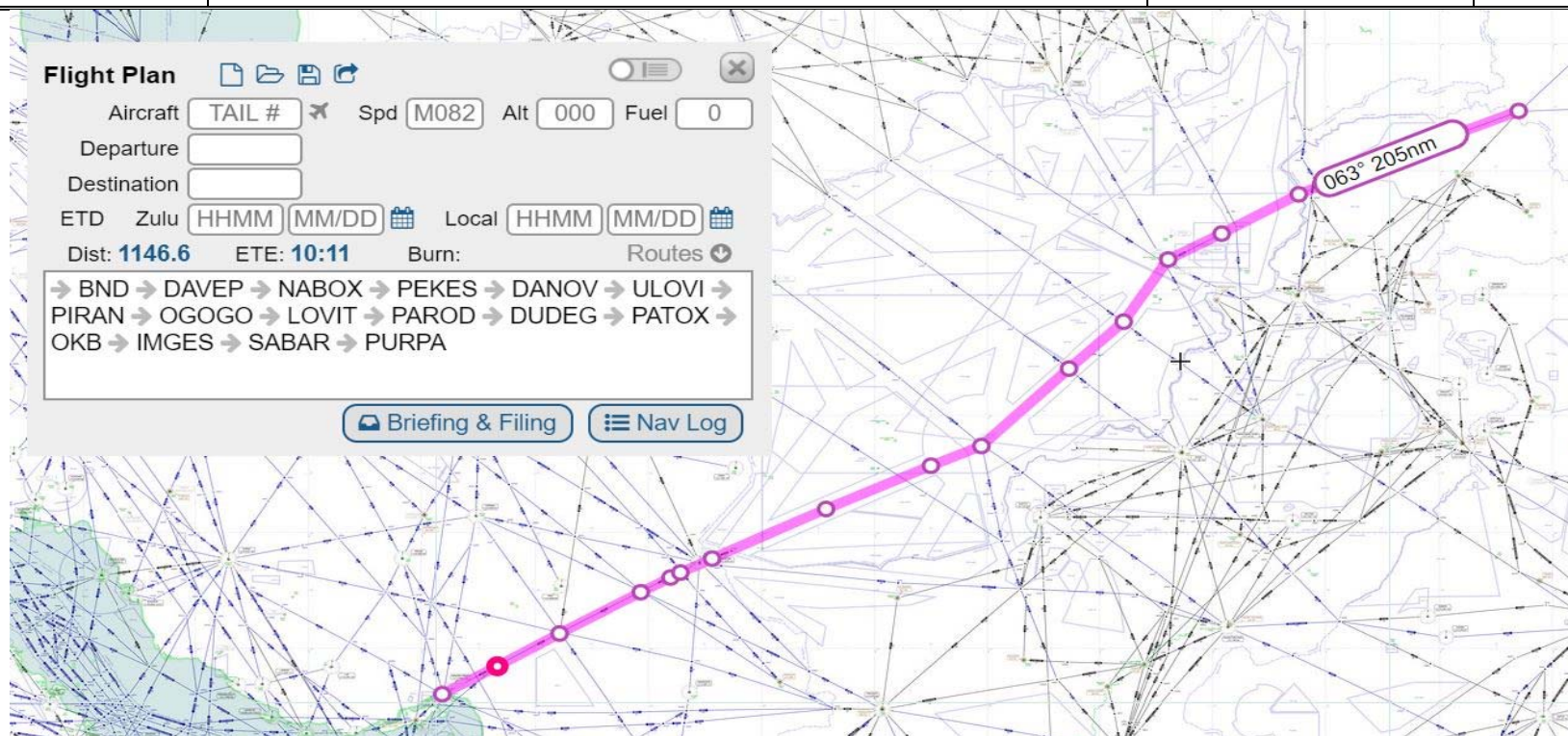
MSG/6-REPORT
APPENDIX 5.3E

5.3E-12

MID/RC-9b	ATS Route Name: New Route	Inter-Regional Cross Reference if any	APAC	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action
A453-PAROD-DUDEG-PATOX-OKB-IMGES-SABAR then G206 to PURPA		Afghanistan	Not Implemented		Not in the Plan				- Quarter 4-2017

5.3E-13

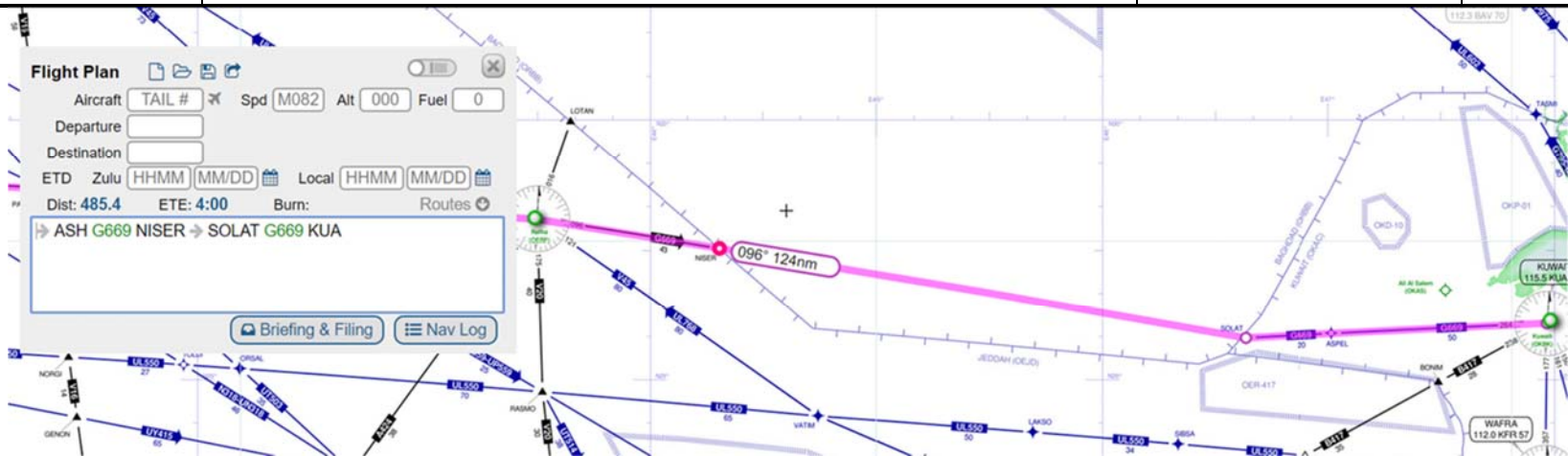
Flight Level Band: FLAS TBD				To be addressed with Afghanistan. To be addressed to the AIRARD TF/2 meeting	
Potential traffic flow: Gulf Traffic from/to Fareast					
Justification					
Benefits					
Remarks					



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5.3E-14

MID/RC-11	ATS Route Name: G669 New Route	Inter-Regional Cross Reference if any		Users Priority	MID	Originator/Date		Last updated	New Proposal
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action
G669 between NISER and SOLAT		Saudi Arabia Iraq and Kuwait	Not Implemented		Not in the Plan		To be addressed with Saudi, Iraq and Kuwait		- Quarter 2-2018
Flight Level Band: FLAS TBD									
Potential traffic flow: Levant to/from North Gulf Levant to/from Iran/Far East									
Justification		Re-instate G669 as it used to be active for certain flows in certain periods of the year							
Benefits		Reduce track miles and air miles due to avoidance of seasonal jet-stream Enable optimum descents in Kuwait							
Remarks									



5.3E-15

MID/RC-xx	ATS Route Name: New Route	Inter-Regional Cross Reference if any	APAC	Users Priority	High	Originator/Date	RDWG/1	Last updated	New Proposal
Route Description		States Concerned	Implementation Status		MID ANP Status		Action Taken / Required		Expected time frame for each Action
			Not Implemented		Not in the Plan		To be addressed with		- Quarter 4-2017
Flight Level Band: FLAS TBD									
Potential traffic flow: Gulf Traffic from/to Fareast									
Justification									
Benefits									
Remarks									

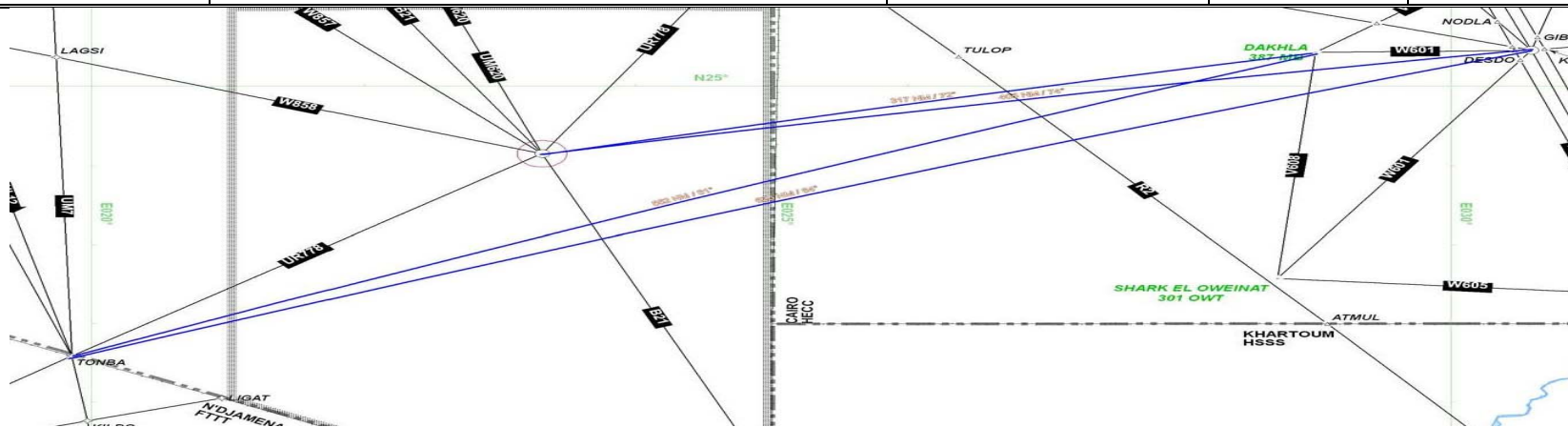
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5.3E-16

ATS Route proposals on hold

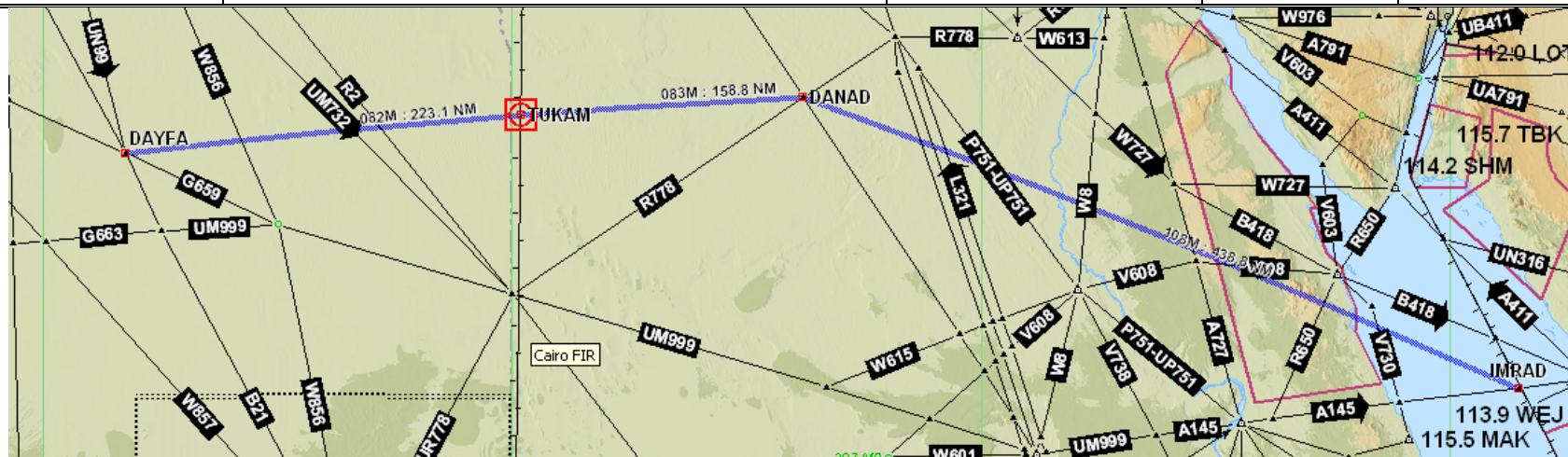
MID ATS ROUTES CATALOGUE

MID/RC-002 (Option1,2 ,3)	ATS Route Name:	Entry-Exit:	Inter-Regional Cross Reference if any		Users Priority	Hold	Originator of Proposal	IATA	
	New AWY Proposed between TONBA-KHG and KFR to MB (Dakhla) Or KHG	TONBA to KHG (Dakhla) Libya to Egypt FIR					Date of Proposal	ARN TF/I	
Route Description		States Concerned	Expected Impl. date	Implementation Status		ANP Status		Action Taken/Required	Deadline for each Action
(Opt 1) TONBA N2135.3 E01951.2 KHG (N2526.9 E03035.4) (Opt 2) TONBA (N21 35.3 E 0-19 51.2) MB (N25 25.2 E029 00.1) (Opt 3) KFR (N24 09.2 E023 18.5) MB (N25 25.2 E029 00.1) Or KHG (N25 26.9 E030 35.4)		Libya Egypt		No Progress reported.				- Egypt highlighted that UM999 already exists and is used by 3 to 5 flights a day also that communication is being upgraded with a new station at Dakhla. - To be considered with and similarly to Proposal 2 & 4. - Egypt unable to accept route due to safety issues. - Differed for the future	TBD
Flight Level Band: FL290 – FL410									
Potential City Pairs: West Africa airports-Doha									
Expect 50 eastbound wkly flights, saving 91000Kg of fuel and 282T of CO2 wkly. The number may double if used westbound.									
Conclusions/Remarks	ON HOLD-RDWG-1						Last updated	ATM SG/1 June 2014	



5.3E-17

MID/RC-081	ATS Route Name: New Route UQ596	Entry-Exit: DAYFA – DANAD – IMRAD then A145 Eastbound Only	Inter-Regional Cross Reference if any		Users Priority	High	Originator of Proposal	IATA iFLEX Proposal
							Date of Proposal	17 May 2011
Route Description		States Concerned	Expected Impl. date	Implementation Status		ANP Status	Action Taken/Required	Deadline for each Action
SEB HORUJ DAYFA DANAD IMRAD ALMAL		Libya Egypt Saudi Arabia		No progress reported		Not in the ANP	Needs to be discussed with Libya Needs to be discussed with Egypt Needs to be discussed with Jeddah FIR if A145 can be bidirectional East of LXR Implement if possible Priority Routes	TBD
Flight Level Band:								
Potential City Pairs: Dakar FIR, Algiers FIR, Tripoli FIR, Cairo FIR, Jeddah FIR								
Conclusions/Remarks		Proposals agreed to by some State during the iFLEX workshop Dubai ON HOLD-RDWG-1					Last updated	ATM SG/1 June 2014

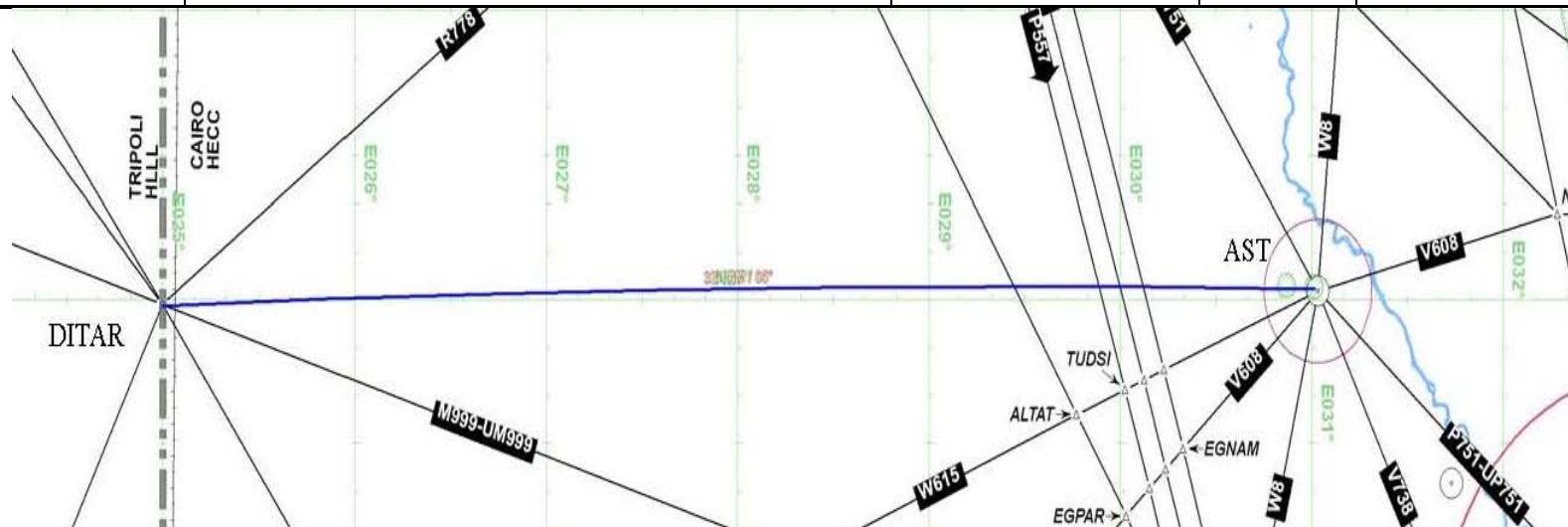


3. MID/RC-081-on hold

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APPENDIX 5.3E

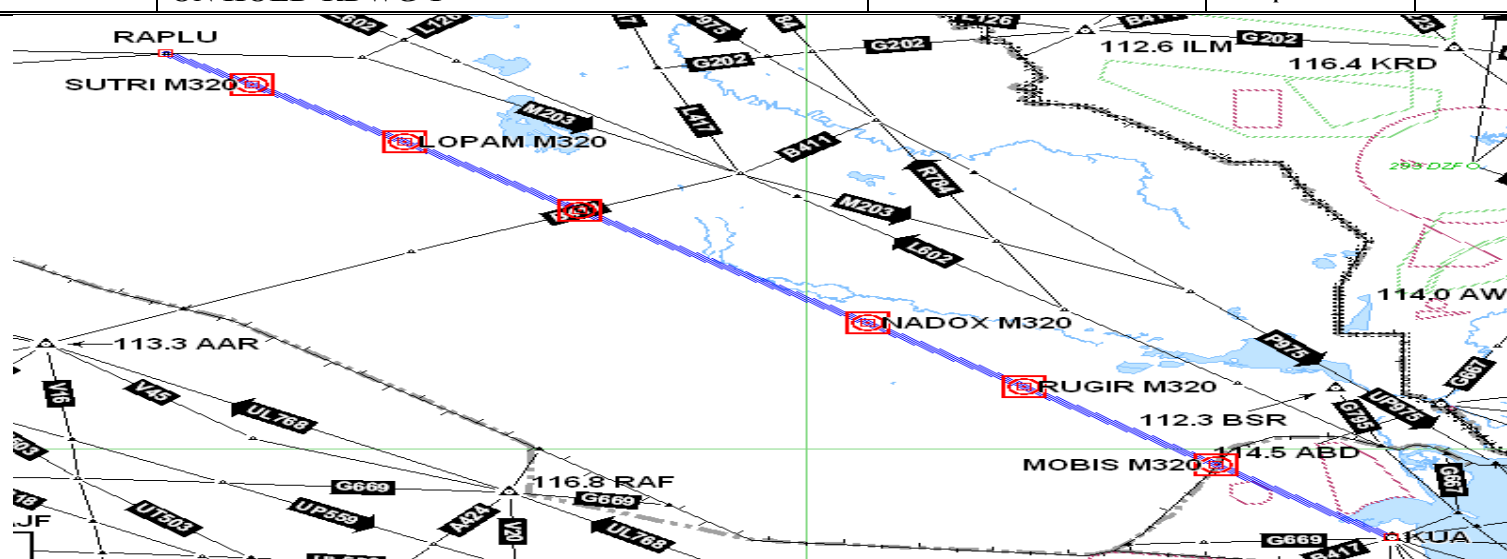
5.3E-18

ID/RC-083	ATS Route Name: New Route UQ598 Westbound		Entry-Exit: DITAR – AST		Inter-Regional Cross Reference if any		TOP TEN	Users Priority		High	Originator of Proposal		IATA iFLEX Proposal	
	Date of Proposal		17 May 2011											
Route Description				States Concerned	Expected Impl. date	Implementation Status			ANP Status		Action Taken/Required			Deadline for each Action
AST DITAR 26 59 03N 025 00 00E		Libya Egypt									Important Segment HGD-PASAM move d to ANP Egypt advised that DITAR-AST not possible currently.			TBD
Flight Level Band:														
Potential City Pairs:														
Conclusions/Remarks		ON HOLD-RDWG-1								Last updated		ATM SG/1 June 2014		



5.3E-19

MID/RC-027	ATS Route Name: M320	Entry-Exit: KUA-RAPLU	Inter-Regional Cross Reference if any		Users Priority	URGENT	Originator of Proposal	Iraq
							Date of Proposal	RDGE/11 (Oct 2009)
Route Description		States Concerned	Expected Impl. date	Implementation Status	ANP Status		Action Taken / Required	Deadline for each Action
KUA MOBIS 295109N 0470457E RUGIR 303219N 0460618E NADOX 310505N 0451851E ELODI 320256N 0435126E LOPAM 323757N 0425806E SUTRI 330701N 0421128E RAPLU 332300N 0414530E		Kuwait <						



4. MID/RC-027-hold

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5.3E-20

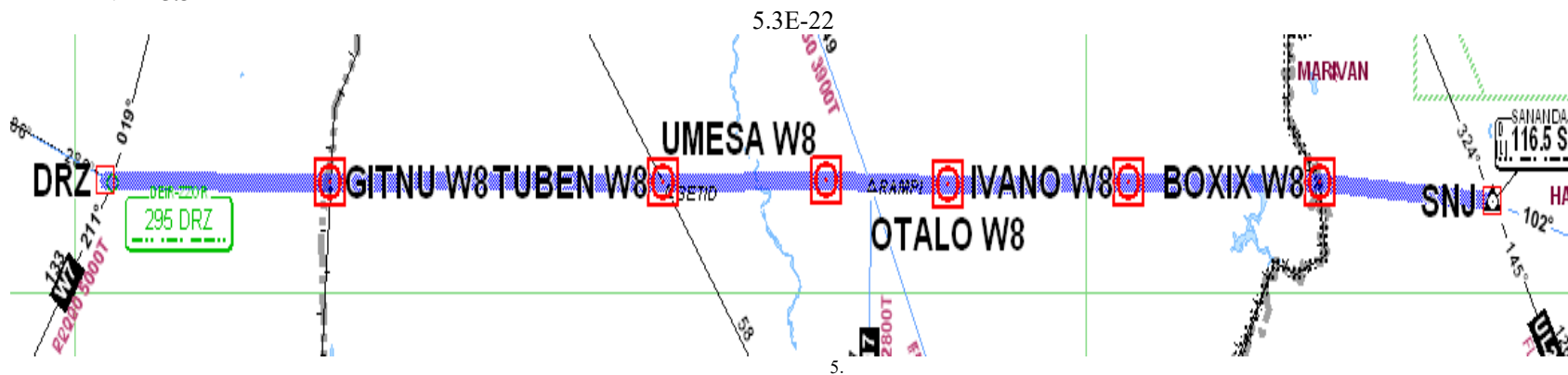
MID/RC-028	ATS Route Name: J222	Entry-Exit: BASEM-KMS	Inter-Regional Cross Reference if any		Users Priority	URGENT	Originator of Proposal	Iraq
							Date of Proposal	RDGE/11 (Oct 2009)
Route Description		States Concerned	Expected Impl, date	Implementation Status	ANP Status	Action Taken / Required		Deadline for each Action
BASEM 333318N 0373906E ALSOX 333700N 0392000N GEPAP 334906N 0422851E SOKAD 341051N 0453226E KMS KERMANSHAH		Syria Iraq Iran		1. Points highlighted in yellow are new. 2. Coordination with Syria and Iran required for the continuation of route within their airspace. 3. New route in the Baghdad (FIR)	Not available in ATS.1 Table. Implemented in Syria Change of Route Designator Required	Points highlighted in yellow are new. - Not supported by Syria - ATS route J222 is in close proximity with ATS route UR785 that would cause traffic conflict - Iraq was asked to reconsider to join the ATS route with G202 and change the route designator. - Syria to review the proposal and will inform ICAO.		TBD
Flight Level Band: FL200-FL410				No progress reported				
Potential City Pairs:								
Conclusions/Remarks		ON HOLD-RDWG-1					Last updated	ATM SG/1 June 2014

5.3E-21



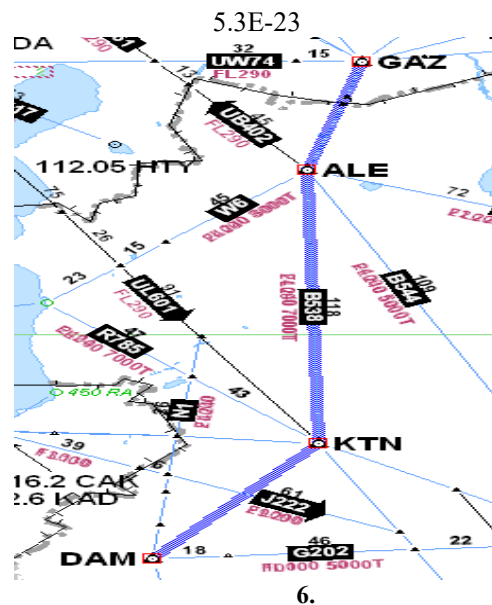
MID/RC-029	ATS Route Name: W8	Entry-Exit: GITNU-HAB	Inter-Regional Cross Reference if any		Users Priority	URGENT	Originator of Proposal	Iraq
							Date of Proposal	RDGE/11 (Oct 2009)
Route Description		States Concerned	Expected Impl. date	Implementation Status	ANP Status	Action Taken / Required		Deadline for each Action
DRZ GITNU 351724N 0411553E TUBEN 351724N 0425434E UMESA 351741N 0434307E OTALO 351700N 0441900E DAVAS 351724N 0451235E BOXIX 351724N 0460921E SNJ		Syria Iraq Iran		1. Change route designator to regional RNAV route designator (L, M, N or P requested). 2. Points highlighted in yellow are new. 3. Coordination with Syria and Iran required for the continuation of route within their airspace. 4. New route in the Baghdad (FIR)		Points highlighted in yellow are new. - Syria requested additional time to examine the proposal for the establishment of the ATS route.		TBD
Flight Level Band: FL200-FL410				No progress reported				
Potential City Pairs:								
Conclusions/Remarks		ON HOLD-RDWG-1				Last updated		ATM SG/1 June 2014

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APPENDIX 5.3E



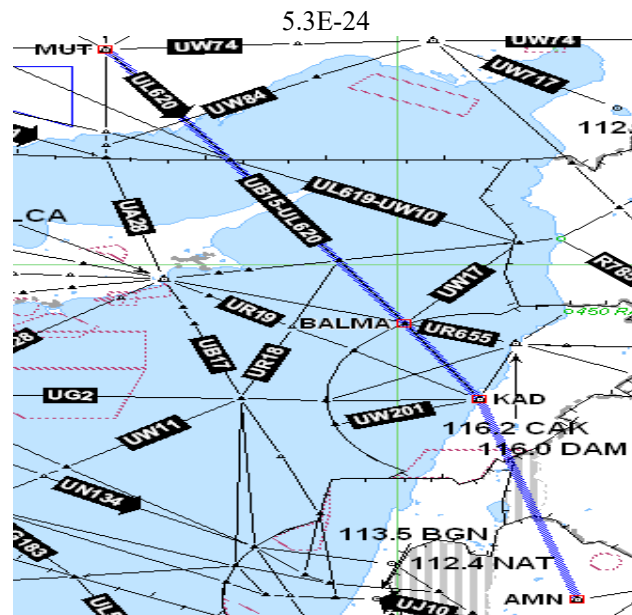
5.

MID/RC-062 (ex B538)	ATS Route Name: New Route	Entry-Exit: GAZIANTEP DAMASCUS		Inter-Regional Cross Reference if any		Users Priority	High	Originator of Proposal	IATA	
								Date of Proposal	MIDANPIRG/10	
Route Description		States Concerned	Expected Implemen- tation date	Implementation Status		ANP Status		Action Taken/Required		Deadline for each Action
(GAZIANTEP) ALEPPO KARIATAIN DAMASCUS		Syria		GAZIANTEP – ALEPPO Established as (B544) ALEPPO – KARIATAIN Established as (B538) KARIATAIN – DAMASCUS not established				No updates		
Flight Level Band:				No progress reported						
Potential City Pairs:										
Conclusions/Remarks		Segment GAZIANTEP-ALEPPO implemented (B544) ON HOLD-RDWG-1						Last updated	ATM SG/1 June 2014	



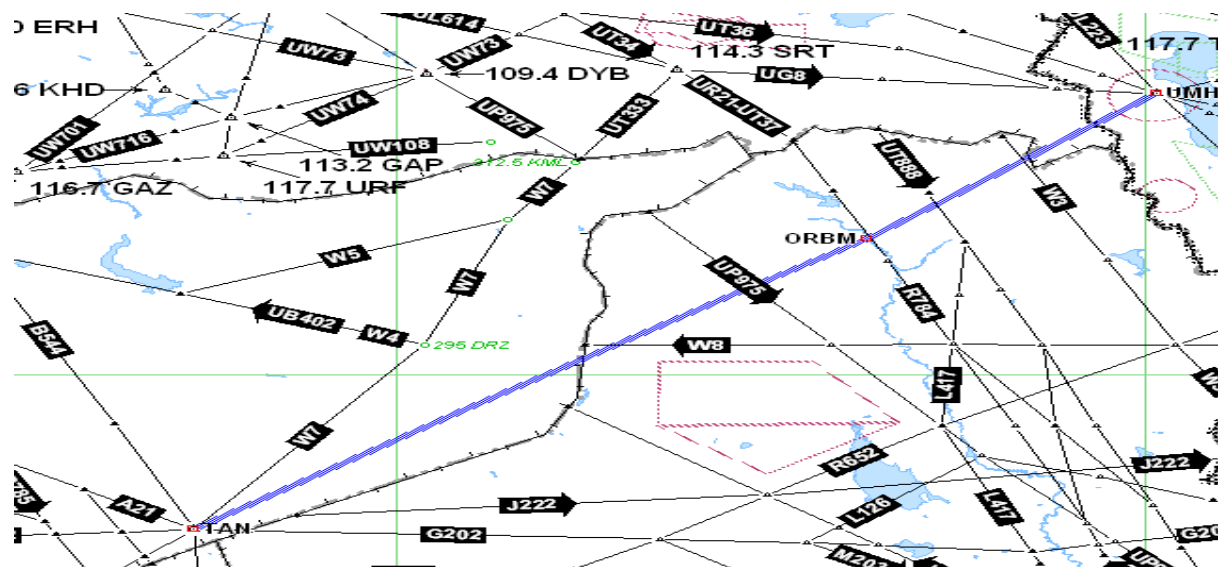
MID/RC-063 (ex B545)	ATS Route Name: New Route	Entry-Exit: BALMA-AMMAN	Inter-Regional Cross Reference if any		Users Priority	High	Originator of Proposal	IATA
							Date of Proposal	MIDANPIRG/10
Route Description		States Concerned	Expected Impl. date	Implementation Status		ANP Status	Action Taken/Required	Deadline for each Action
KHALDEH AMMAN		Jordan Lebanon Syria		MUT – BALMA – KAHLDE Implemented as (UB15/UL620)			Not feasible currently	
				KHALDE – AMMAN not implemented				
Flight Level Band:				No progress reported				
Potential City Pairs:								
Conclusions/Remarks	ON HOLD-RDWG-1						Last updated	ATM SG/1 June 2014

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5.3E-25

MID/RC-067 (ex G671)	ATS Route Name:	Entry-Exit: TANF-UMH	Inter-Regional Cross Reference if any		Users Priority	High	Originator of Proposal	IATA	
							Date of Proposal	MIDANPIRG/10	
Route Description		States Concerned	Expected Impl. date	Implementation Status		ANP Status		Action Taken/Required	Deadline for each Action
TANF MOSUL UMH		Syria Iraq Iran		No progress reported				No update	
Flight Level Band:									
Potential City Pairs:									
Conclusions/Remarks		ON HOLD-RDWG-1					Last updated	ATM SG/1 June 2014	



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5.3E-26

MID/RC-077	ATS Route Name: New route	Entry-Exit: BINKO - RASNO - LOSUL	Inter-Regional Cross Reference if any		Users Priority	High	Originator of Proposal	IATA	
							Date of Proposal	ARN TF/2	
Route Description		States Concerned	Expected Impl. date	Implementation Status		ANP Status		Action Taken/Required	Deadline for each Action
BINKO RASNO LOSUL		Egypt Lybia Malta						Egypt has no objection to establish the route as Uni- directional	
Flight Level Band: Upper Airspace				No progress reported					
Potential City Pairs:									
Conclusions/Remarks		ON HOLD-RDWG-1					Last updated		ATM SG/1 June 2014

5.3E-27

MID/RC-080	ATS Route Name: New Route	Entry-Exit: BUSRA - KTN	Inter-Regional Cross Reference if any		Users Priority	High	Originator of Proposal	ICAO EUR/NAT	
							Date of Proposal	17 May 2011	
Route Description		States Concerned	Expected Implemen- tion date	Implementation Status		ANP Status	Action Taken/Required		Deadline for each Action
BUSRA 322000N 0363700E KARIATAIN (KTN)		Syria		No progress reported		Not in ANP	State letter to be sent to Syria for input.		
Flight Level Band:							Awaiting final approval for implementation		
Potential City Pairs: HEGN - UDD									
Conclusions/Remarks		Shortens the distance by 85NM. ON HOLD-RDWG-1						Last updated	ATM SG/1 June 2014

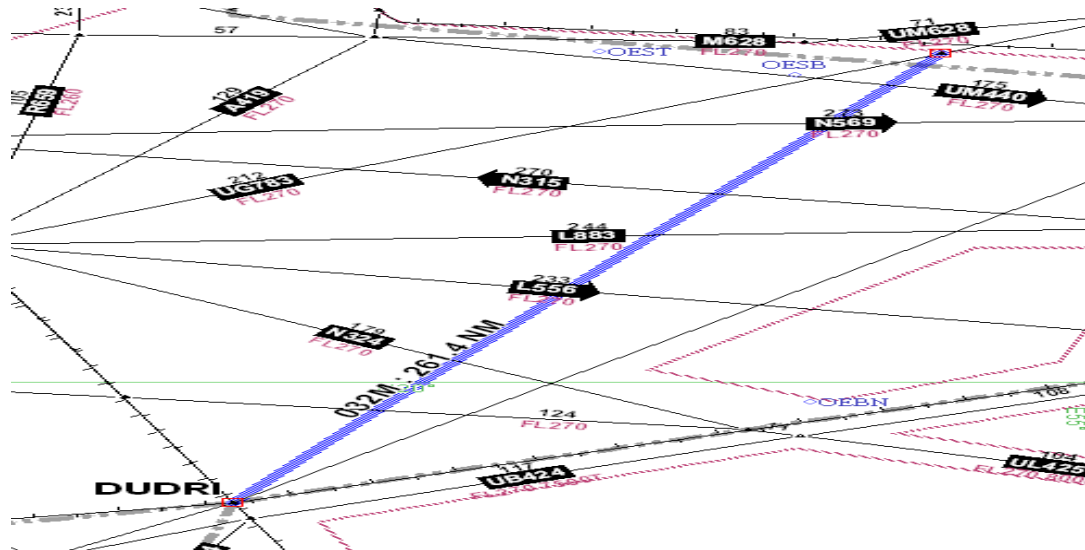


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5.3E-28

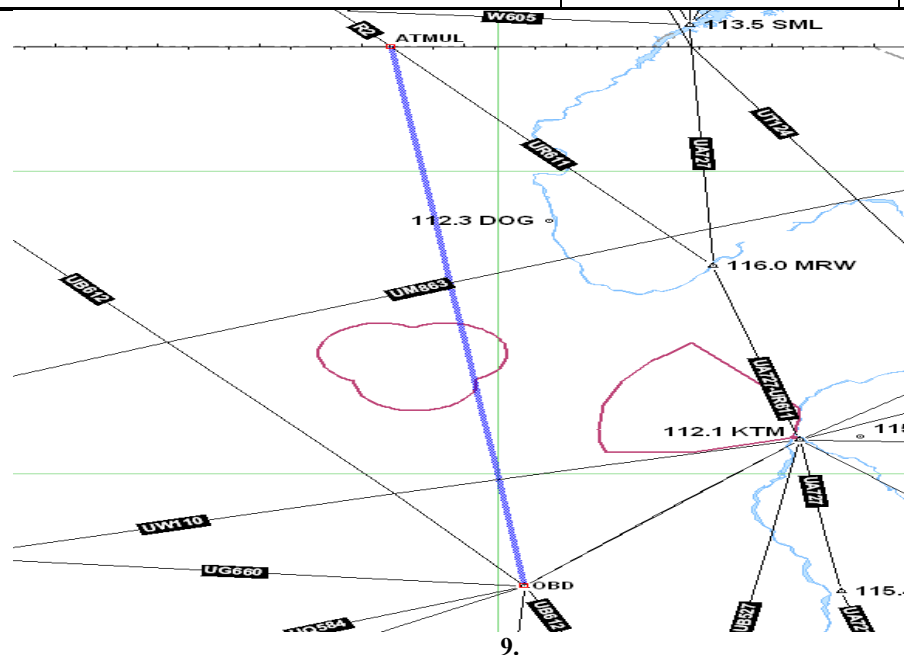
8.

MID/RC-096	ATS Route Name: New Route UQ578; Bidirectional		Entry-Exit: DUDRI - TANSU		Inter-Regional Cross Reference if any		Users Priority	High	Originator of Proposal	IATA iFLEX Proposal	
									Date of Proposal	17 May 2011	
Route Description			States Concerned	Expected Impl. date	Implementation Status		ANP Status		Action Taken/Required		Deadline for each Action
DUDRI 190000N 0520000E TANSU 224136N 0542828E		Bahrain UAE			No progress reported				Level Restriction FL300/320		TBD
Flight Level Band:											
Potential City Pairs:											
Conclusions/Remarks		ON HOLD-RDWG-1							Last updated		ATM SG/1 June 2014



5.3E-29

MID/RC-099	ATS Route Name: New Route ATMUL-OBD		Entry-Exit: ATMUL-OBD	Inter-Regional Cross Reference if any		Users Priority	High	Originator of Proposal	IATA
								Date of Proposal	
Route Description			States Concerned	Expected Implemen- tation date	Implementation Status	ANP Status		Action Taken/Required	Deadline for each Action
ATMUL		Egypt		No progress reported		ATS Route Segment from point ATMUL to OBD in the Khartoum FIR Sudan has no objection		TBD	
OBD		Sudan							
Flight Level Band:									
Potential City Pairs:									
Conclusions/Remarks		ON HOLD-RDWG-1						Last updated	ATM SG/1 June 2014



STATUS OF CONTINGENCY AGREEMENTS IN THE MID REGION
As of December 2018

STATE	CORRESPONDING STATES			Status
BAHRAIN	☒ Iran ☒ Kuwait	☒ Qatar ☒ Saudi Arabia	☒ UAE	Completed
EGYPT	☒ Jordan ☒ Libya	☒ Saudi Arabia ☒ Sudan	☒ Cyprus (Recommended) ☒ Greece (Recommended) ☐ Israel (Recommended)	Completed
IRAN	☒ Bahrain ☒ Iraq	☐ Kuwait ☒ Oman	☒ UAE	4/5
	☒ Armenia ☐ Afghanistan	☐ Azerbaijan ☐ Turkmenistan	☒ Pakistan ☒ Turkey	Recommended
IRAQ	☒ Iran ☒ Jordan	☒ Kuwait ☒ Saudi Arabia	☐ Syria ☒ Turkey (Recommended)	4/5
JORDAN	☒ Egypt ☒ Iraq	☒ Saudi Arabia ☐ Syria	☐ Israel (Recommended)	3/4
KUWAIT	☒ Bahrain ☐ Iran	☒ Iraq	☒ Saudi Arabia	3/4
LEBANON	☐ SYRIA	☐ CYPRUS (Recommended)		0/1
LIBYA	☒ Egypt ☐ Sudan	(Recommended) ☐ Algeria ☐ Chad	☐ Tunis ☐ Niger ☐ Malta	1/2
OMAN	☒ Iran ☐ Saudi Arabia	☒ UAE ☒ Yemen	☐ India (Recommended) ☐ Pakistan (Recommended)	3/4
QATAR	☒ BAHRAIN	☐ SAUDI ARABIA	☐ UAE	1/3
SAUDI ARABIA	☒ Bahrain ☒ Egypt ☒ Iraq ☒ Jordan	☒ Kuwait ☐ Oman ☐ Qatar ☐ Sudan	☒ UAE ☐ Yemen ☐ Eritrea(Recommended)	6/10
SUDAN	☒ Egypt ☐ Libya ☐ Saudi Arabia	(Recommended) ☐ Central African ☐ Chad	☐ Eritrea ☐ Ethiopia ☐ South Sudan	1/3
SYRIA	☐ Iraq ☐ Jordan	☐ Lebanon	☐ Cyprus (Recommended) ☐ Turkey (Recommended)	0/3
UAE	☒ Bahrain ☒ Iran	☒ Oman ☐ Qatar	☒ Saudi Arabia	4/5
YEMEN	☒ Oman ☐ Saudi Arabia	(Recommended) ☐ India ☐ Djibouti	☐ Eritrea ☐ Ethiopia ☐ Somalia	1/2

☒ Agreement Signed ☐ Agreement NOT Signed Signed Agreements / Total No. of required Agreements

APPENDIX 5.3G

MID Region AIDC/OLDI Applicability Area (Priority 1 and 2 for Implementation)

As of July 2018

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)	Athens (2)	Jeddah (1)	Khartoum (1)	Nicosia (1)	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 color 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 5.3H

MID Region SSR Codes Allocation

Code	AMMAN	BAGHDAD	BAHRAIN	BEIRUT	CAIRO	DAMASCUS	DOHA TMA	EMIRATES	JEDDAH	KHARTOUM	KUWAIT	MUSCAT	SANAA	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															
2100-2177 ¹			D												
2200-2277 ¹			T												
2300-2377 ¹					D		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						

Code	AMMAN	BAGHDAD	BAHRAIN	BEIRUT	CAIRO	DAMASCUS	DOHA TMA	EMIRATES	JEDDAH	KHARTOUM	KUWAIT	MUSCAT	SANA'A	TEHRAN	TRIPOLI
4300-4377 ¹				T											
4400-4477 ¹			T												
4500-4577 ¹									T						
4600-4677 ¹										D		D			
4700-4777 ¹												T			
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															T
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



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APPENDIX 5.3I

MID Doc 005

INTERNATIONAL CIVIL AVIATION ORGANIZATION

**MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)**

**MIDDLE EAST SECONDARY SURVEILLANCE RADAR CODE
MANAGEMENT PLAN
(SSR CMP)**

EDITION DECEMBER, 2018

THE DESIGNATIONS 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 OF ITS AUTHORITIES, OR CONCERNING THE DELIMITATION OF ITS FRONTIERS OR BOUNDARIES.

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1 SCOPE

1.1 RELATIONSHIP TO MID AIR NAVIGATION PLAN (DOC 9708)

- 1.1.1 The *Middle East Secondary Surveillance Radar Code Management Plan* has been produced on behalf of the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG).
- 1.1.2 The purpose of MID CMP is to detail the requirements to be met by the MID States to comply with the provisions of the *Middle East Air Navigation Plan* (MID ANP) (ICAO Doc 9708) as it pertains the management of Secondary Surveillance Radar (SSR) codes in the ICAO MID Region.
- 1.1.3 The technical requirements and associated procedures may also be adopted by States in adjoining ICAO Regions which elect to participate in the Originating Region Code Assignment Methodology (ORCAM) for the management of SSR codes.
- 1.1.4 All references to SSR Codes are confined to Mode 3/A.

2 DEFINITIONS AND ABBREVIATIONS

2.1 DEFINITIONS

Assigned Secondary Surveillance Radar code (ASSR)	The SSR code assigned by an ATS Unit (ATSU) to a departing aircraft or to an aircraft entering the airspace of the ATSU. <i>Note: In cases where the Previous Secondary Surveillance Radar code (PSSR) can be retained, PSSR and ASSR can be the same code</i>
(SSR) Code	The number assigned to a particular multiple pulse reply signal transmitted by a transponder in Mode A or Mode C.
Code allocation	The distribution of SSR Codes to a State, unit or service.
Code assignment	The distribution of SSR codes to aircraft.
Code block	A continuous series of four-digit codes from the same code series.
Code series	A group of 64 four-digit codes having the same first two digits.
Direction of flight	The direction shall be defined as a combination of one or more: a) exit points or receiving Areas of Responsibility (AOR); and b) destinations (defined by the first, the first two, the first three or all four letters of an ICAO location indicator).
Directional assignment	Assignment of an SSR code based on the direction of the flight.
Discrete code	A four-digit code with the last two digits not being “00”.
Domestic code	A code allocated to a specific AOR for use by designated ATC unit(s) within that AOR or, subject to certain conditions, across AOR boundaries.
Expectation window	A window of variable size around a 4D position, defined by flight plan information, at which a flight is expected to enter the AOR.
Four-digit code	An SSR identity code containing combinations of A, B, C and D pulses (any reply generated by a 4096-code transponder where the digits fall in the range 0-7).
Geographical correlation	Correlation of a flight with its flight plan using the geographical position of the flight by means of “Expectation Windows” in cases where the SSR code is already in use by one or more other flights within the same AOR.
Mode S Conspicuity Code	In order to maximise SSR code savings through Mode S Elementary Surveillance (ELS), all aircraft identified via the down linked Aircraft Identification (ACID) use the same SSR code, the Mode S Conspicuity Code A1000.
Octal block	A block of 8 four-digit codes from the Same Series and having the first three digits common. They may be identified by indicating their third digit when referring to the Code Series e.g. Codes 0010-0017 may be referred to as Codes 00(1).
Participating area (PA)	An area of specified dimensions comprising the areas of ATS unit responsibility of one or more States.
Previous Secondary Surveillance Radar code (PSSR)	The SSR code transmitted by an aircraft when entering the airspace of an ATSU or when being transferred by the transferring unit. <i>Note: In cases where the PSSR can be retained, PSSR and ASSR can be the same code.</i>

Simultaneous code use	Assignment of an SSR code, which is already in use within the same AOR, to an aircraft in accordance with procedures which ensure that the two aircraft will be exiting the AOR in opposite or nearly opposite directions.
Retention of an SSR code	Accepting an aircraft from the transferring unit without changing the SSR code. A code can be retained if no other aircraft within the AOR uses the same code and if the retention of the code is in accordance with the Code Allocation List (CAL).
Transit code	A code allocated to a State for a specified ACC for assignment to an aircraft engaged in transit flights within the originating PA or, subject to certain conditions, to specified locations in succeeding PAs.

2.2 ABBREVIATIONS

ABI	Advance Boundary Information
ACID	Aircraft Identification
ADEP	Aerodrome of Departure
ADES	Aerodrome of Destination
AOR	Area of Responsibility
ASSR	Assigned Secondary Surveillance Radar code
ATC	Air Traffic Control
ATS	Air Traffic Services
ATSU	Air Traffic Services Unit
CAL	Code Allocation List for the Middle East Region
CMP	Code Management Plan
COD	SSR Code Assignment Message
MIDANPIRG	Middle East Air Navigation Planning and Implementation Regional Group
ELS	Elementary Surveillance
FDPS	Flight Data Processing System
FIR	Flight Information Region
NM	Nautical Mile
ORCAM	Originating Region Code Assignment Method
PA	Participating Area
PSSR	Previous Secondary Surveillance Radar code
RDPS	Radar Data Processing System
SSR	Secondary Surveillance Radar
VSP	Variable System Parameter

3 INTRODUCTION

3.1 OBJECTIVES OF THE MIDDLE EAST SSR CODE MANAGEMENT PLAN

- 3.1.1 The Middle East SSR Code Management Plan (MID SSR CMP) has been established to provide States in the ICAO MID Region with means to coordinate the use of SSR codes based on the principles of the Originating Region Code Assignment Method (ORCAM), which provides for the most efficient and economical use of codes.
- 3.1.2 The MID SSR CMP will foster the implementation of ORCAM which will ultimately allow for an assigned discrete code which would, whenever possible, be retained throughout the flight.
- 3.1.3 For the development of automated SSR code assignment systems, reference should be made to Paragraph 6 below.
- 3.1.4 On the basis of the above, a detailed Code Allocation List (CAL) for the MID Region Participating Area (PA) and certain adjacent areas was developed. The CAL is maintained by the ICAO MID Regional Office as a Supplement to MID Doc 9708.
- 3.1.5 The agreed allocation of SSR codes to States and ATS units are documented in Part A of the CAL. The detailed listing of codes serving both transit and domestic purposes is shown in Part B of the CAL. The CAL is included in the MID eANP, Part IV.

3.2 GENERAL PRINCIPLES TO MEET THE OBJECTIVES

- 3.2.1 The detailed principles governing the use of SSR codes in the MID Region are based on the following general principles which are provided by or are complementary to the worldwide provisions detailed in *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), Chapter 8:
 - a) codes shall be allocated to States in accordance with regional air navigation agreements, taking into account overlapping radar coverage over adjacent airspace;
 - b) codes are allocated to Air Traffic Services Units (ATSU) on the basis of duly justified operational requirements; their number is primarily established by taking into account the number of aircraft to be handled simultaneously and the system capabilities;
 - c) the appropriate ATS authority shall establish a plan and procedures for the allocation of codes to ATSUs;
 - d) the plan and procedures for the allocation of codes to ATSUs shall be compatible with those practised in adjacent States;
 - e) codes shall be assigned to aircraft in accordance with the plan and procedures laid down by the appropriate ATS authority;
 - f) whenever there is a need for individual aircraft identification, each aircraft shall be assigned a discrete code which should, whenever possible, be retained throughout the flight;
 - g) the assignment of a code should preclude the use of this code for any other function within the area of coverage of the same SSR for a prescribed time period; and
 - h) to reduce pilot/controller workload and the need for communications, the number of code changes required shall be kept to the minimum.
- 3.2.2 SSR codes should be used for ATS purposes only.

- 3.2.3 Code allocations are expressed in terms of complete code series or specified parts thereof. In special cases, such requirements may even cover designated discrete codes.
- 3.2.4 Codes intended to be used for transit purposes are allocated to States for use by specified ATSUs within the MID PA. Where provided for in the *Middle East SSR Code Management Plan* and under clearly defined circumstances, such codes may also be designated for use across PA boundaries.
- 3.2.5 Codes intended to be used for domestic purposes are allocated to States for use by specified ATSUs requiring limited geographical protection for such codes. Where provided for in the MID SSR CMP and under clearly defined circumstances, such codes may also be designated for use across national boundaries.

3.3 MONITORING OF THE PLAN

- 3.3.1 Provisions regarding the progressive implementation and monitoring of the MID SSR CMP have been agreed by MIDANPIRG. In this connection, the management of the MID SSR CMP is exercised by the ICAO MID Regional Office. States expecting to introduce or change SSR facilities are requested to advise the ICAO MID Regional Office at least six months in advance, in order to provide sufficient time to carry out any necessary coordination.
- 3.3.2 To be effective, the MID SSR CMP must be kept up to date. While its contents will be reviewed regularly, it is the responsibility of all States to inform the ICAO MID Regional Office promptly of any variations proposed or considered necessary with respect to their code allocations, relevant to ATS infrastructure developments and/or the guidance material provided in the MID SSR CMP.
- 3.3.3 In order to serve their purposes it is imperative that the MID SSR CMP and the CAL are kept up to date. States are therefore required to inform the MID Office of ICAO promptly of any requests for changes, additions or deletions in regard to the use of specific codes, as follows:

ICAO MID Regional Office

Subject: SSR Code Management

E-mail:

icaomid@icao.int

Fax: +2 (02) 22674843

4 PERMANENT CODE DISTRIBUTION AND CATEGORIES

4.1 DISTRIBUTION OF CODES

- 4.1.1 Certain codes are reserved for special purposes on a worldwide scale or have been put in a common pool for use in the MID Region. The remaining code series for use in the ICAO MID Region are divided into two distinct types: transit codes and domestic codes. Both domestic and transit codes may be used as directionally assigned codes beyond their normal application under clearly defined and published circumstances, and appropriately coordinated through ORCAM.
- 4.1.2 The number of codes used for transit purposes has to take account of the extended geographical protection required, in order to reduce to a minimum the chances of confusion between the identities of two different aircraft assigned with the same discrete code. The MIDANPIRG has agreed that the retention time should normally be two hours.

4.1.3 The number of codes used for domestic purposes can be kept relatively small as they may be repeated within the same State or they can be used by other States provided a buffer is established. In some cases, by agreement, they can be used across national boundaries.

4.1.4 Furthermore, the allocation possibilities can be increased significantly by dividing specific code series into smaller contiguous codes. When this method is used for transit flights bilateral agreement may be required.

4.2 SPECIAL PURPOSE CODES

4.2.1 Specific codes in certain series are reserved for special purposes as follows:

Series 00	Code 0000 is available as a general purpose code for domestic use by any of the following States:

Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen.

Series 10	Code 1000 reserved for use as a conspicuity code for Mode S

Series 20	Code 2000 shall be used by flight crews in the absence of any Air Traffic Control (ATC) instructions or regional agreements unless the conditions for the use of codes: 7000, 7500, 7600 and 7700 apply.

Series 70	Code 7000 shall be used by flight crews not receiving ATS service in order to improve detection of suitably equipped aircraft in areas specified by States, unless otherwise instructed by ATS.

Series 75	Code 7500 is reserved for use in the event of unlawful interference.

Series 76	Code 7600 is reserved for use in the event of radio communications failure.

Series 77	Code 7700 is reserved for use in the event of emergencies and interception*. Code 7776 and Code 7777 are reserved for SSR ground transponder monitoring.

Codes 7601-7612	Are reserved for humanitarian flights.

Common SSR Code Pool	The following code blocks have been reserved for tactical allocation to States on a temporary basis to support large scale activities:

4.2.2 Discrete codes in the series 00 are allocated to States for use for domestic purposes. States in the MID Region are generally allocated two octal blocks of four-digit codes per State in such a manner that code duplication is avoided at FIR boundaries. The allocation of octal blocks is shown in the CAL.

**Note.— The word “interception” in this context does not include intercept and escort service provided, on request, to an aircraft in distress, in accordance with Volumes II and III of the International Aeronautical and Maritime Search and Rescue Manual (Doc 9731).*

4.3 TRANSIT CODES

4.3.1 Transit codes are allocated for assignment to transit flights. Aircraft will retain the assigned code within the geographical limits of the MID PA or, in the case of an agreement between States concerned, across the PA boundary.

4.3.2 The allocation of transit codes in the MID Region is based on one PA¹ which has been determined on the basis of the flow of air traffic in the region. It is shown on the Chart at **Appendix A** and includes the following States:

PA MID Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Sudan, Syria, United Arab Emirates and Yemen.

4.3.3 Transit codes shall be assigned in accordance with the following principles:

- a) when an aircraft enters the MID PA (either on departure or in flight), it will be assigned a discrete code by the first ATSU concerned at a Variable System Parameter (VSP) of not less than 30 minutes prior to activation of the flight entering the MID PA or when departing, upon ATC clearance delivery or at start up, whichever is later;
- b) each aircraft will keep the original code assigned on entering the MID PA for the entire flight within the PA. Appropriate code protection criteria have to be applied in order to avoid duplication by too early reassignment of the same code. Efforts should be made to reduce the “protection period” while retaining adequate protection. It has been agreed that the normal retention value shall be two hours; and
- c) a code change will be required at the time an aircraft crosses the MID PA boundary, unless special provision has been made for retention beyond the PA boundary.

4.3.4 In establishing the number and series of transit codes for both omni-directional and directional application, account is taken of the following factors:

- a) the air traffic flows and main sources of transit traffic in the MID Region and likely trends;
- b) the requirement for code series for a given ATC Unit. This requirement is derived from the total number of aircraft requiring assignment of a specific code during the busiest period of activity of that ATC Unit, taking into account a “protection period” after which any specific code assigned to an aircraft by an ATC Unit is normally available for reuse; and
- c) the assignment of a specific code to an aircraft is ideally made, as late as possible before take-off, normally on start up or upon ATC clearance delivery, whichever is later or, when an aircraft in flight is imminently due to come under control, normally a VSP value of not less than 30 minutes.

4.3.5 The distribution of the available code series for transit purposes is shown in the CAL.

4.3.6 Specific arrangements are required to ensure that no conflicting situations will arise in border areas.

4.4 DOMESTIC CODES

4.4.1 Domestic codes are allocated for use by aircraft remaining within the boundaries of the agreed Area Of Responsibility (AOR) (normally within one State) or, in the case of agreement between States concerned, across agreed AORs. Domestic codes can also be used for transit aircraft

¹ The actual number of PAs to be established will depend on the results of the Secretariat study.

entering the MID PA and landing at an aerodrome within the AOR of the ATSU that has assigned the SSR code. The relevant code series for domestic purposes are shown in the CAL.

- 4.4.2 Domestic codes should be used so that utmost economy in the number of codes required is achieved. Domestic codes used for terminal purposes or within specified portions of the airspace (sectors) or across national boundaries will be assured protection in these functions from other uses of the same code through suitable systematic or procedural methods.
- 4.4.3 More detailed information concerning the procedures to be used for SSR code assignment can be found in **Appendix B**.

5 ORCAM

5.1 OUTLINE OF ORCAM OBJECTIVES

- 5.1.1 The objectives of ORCAM are:
 - a) to ensure safety by uniqueness and continuity;
 - b) enhance safety;
 - c) reduce workload;
 - d) improve system capacity; and
 - e) increase efficiency.
- 5.1.2 Uniqueness and continuity criteria are intended to provide permanent perceptibility and identification of aircraft with a minimum of errors and interruptions.
- 5.1.3 *Uniqueness*. Depending on system functionality, only one aircraft should respond using a given code in any particular area and at any given time. This provides an unambiguous code/callsign correlation and consequently an easy identification of aircraft.
- 5.1.4 *Continuity*. A code assigned to an aircraft should, whenever possible, be retained throughout the flight. This secures permanent display of aircraft identification.
- 5.1.5 The uniqueness and continuity criteria of ORCAM enhance safety by limiting the likelihood of identification errors. They also assist traffic flows since radar identification and all aspects connected with transfers are facilitated. This results in a reduction of workload (radiotelephony, identification monitoring, etc.) and substantially improves the overall system capacity.
- 5.1.6 In some areas the number of flights could exceed the number of SSR codes available. Some rationalization according to the nature of the flight (short-, medium- or long-haul, domestic, international or transit) and of the capabilities of the system is necessary for the most intensive possible use of codes.
- 5.1.7 Permanent code assignments and allocations based on the aircraft callsign, control position or any other systematic distinguishing features cannot be accepted because of the wasteful effects on the efficiency in use of codes required.

6 ORCAM SYSTEM REQUIREMENTS

6.1 INTRODUCTION

- 6.1.1 Middle East States are relying on the extensive use of SSR in automated ATC ground systems to ensure uninterrupted aircraft identification and maintenance of radar/flight plan correlation.
- 6.1.2 They have recognized the common availability of specified capabilities in automated ATC ground systems as being essential for:
- a) participation of individual automated ATC units in a cooperative environment;
 - b) application of a common SSR Code assignment method in accordance with the ICAO principles;
 - c) efficient utilization of codes in automated ATC ground systems.
- 6.1.3 This “Statement of essential common capabilities for automated ATC ground systems in relation to the use of SSR” shown in paragraph 6.3 below, lists the capabilities concerned. It should be used by States as the basis to determine the minimum operational specifications for automated ground systems.

6.2 GENERAL SYSTEM CONSIDERATIONS

- 6.2.1 The application of automatic data processing in ATC ground systems allows for great freedom in the definition of system capabilities. This freedom should be exploited to:
- a) provide for all essential capabilities related to the use of SSR in the simplest manner having due regard to operational requirements; and
 - b) enable individual automated ATC ground systems to function as part of an inter-operable environment and to comply with agreed conventions facilitating such cooperation (e.g. principles and basic rules for code assignment, code assignment methods etc.).
- 6.2.2 Individual automated ATC ground systems should, as part of an inter-operable environment, be capable of making the maximum use of codes previously assigned by other units controlling the aircraft concerned; i.e. they should not introduce any code changes or if this is impossible in some circumstances, require only the minimum of changes.
- 6.2.3 Taking into account inter-operability of ATC ground systems within the MID Region with others outside that area and the range of codes which may be utilized under such arrangements, automated ATC ground systems should be capable of performing all system functions related to the use of SSR for any 4-digit identity code.
- 6.2.4 Automated ATC ground systems should be designed to allow the use of a minimum number of codes. The application of sophisticated code correlation methods may reduce the number of codes needed in comparison with those required when simpler methods are used.
- 6.2.5 The processing of SSR data in automated ATC ground systems should be aimed at reducing the need for controller intervention.
- 6.2.6 **Appendix C** and **Appendix D** provide greater detail regarding the implications for automation and the development of automated SSR code assignment systems respectively.

6.3 ESSENTIAL CAPABILITIES FOR AUTOMATED ATC GROUND SYSTEMS

6.3.1 It is essential that automated ATC ground systems be designed to have certain capabilities in common, based on the assumption that:

- a) the maximum use will be made of previously assigned codes;
- b) only where continuing use of previously assigned codes would give rise to ambiguity, new codes will be assigned in accordance with a suitable common SSR code assignment method;
- c) the prime use of codes will be to facilitate automatic identification, automatic tracking and automatic radar/flight plan data correlation; and
- d) the differentiation of aircraft essential for the execution of these functions can be achieved through the use of a single, adequately protected code per aircraft.

6.3.2 In detail, automated ATC ground systems should be capable of automatic:

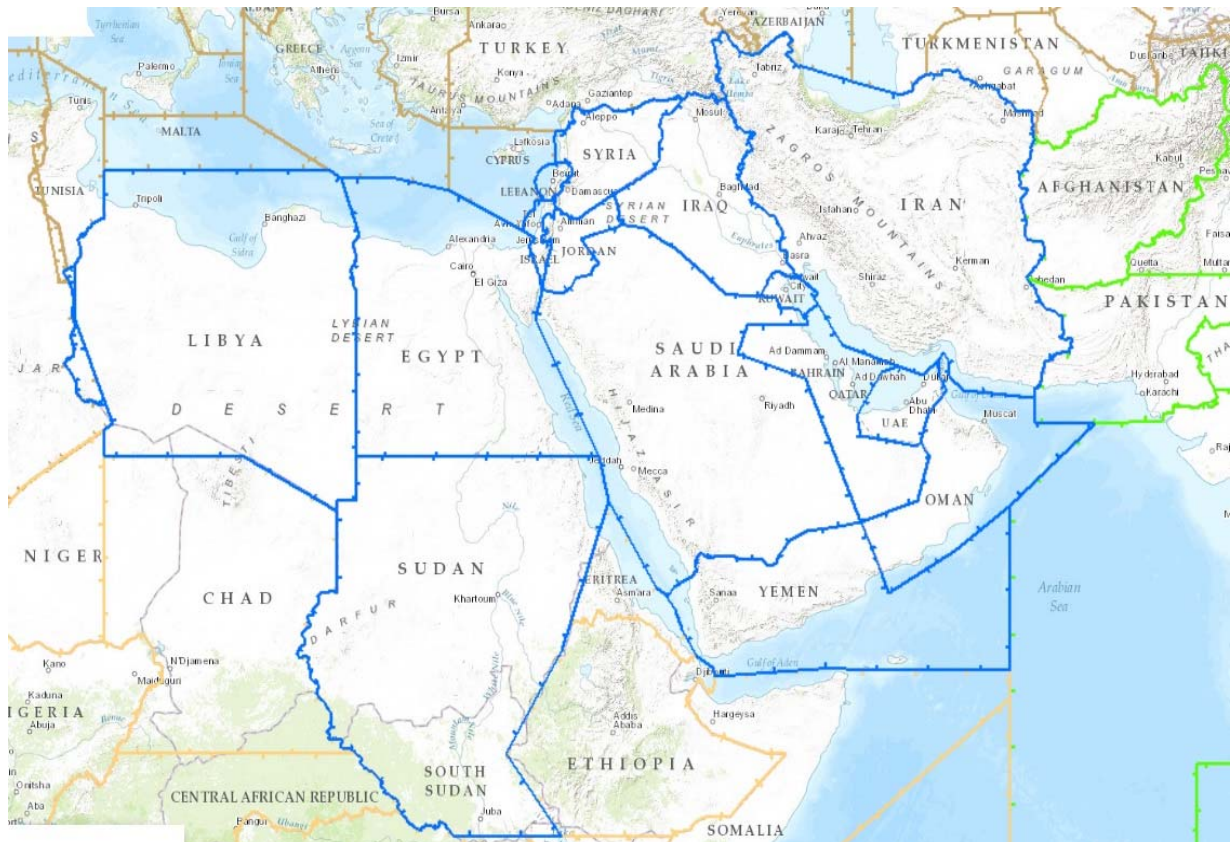
- a) **Exchange of codes:** in particular of timely transmission to adjacent centres concerned of information on the code previously assigned to flights to be transferred.
- b) **Assignment of codes:** in all instances where no previous code assignment has been made or where previous assignments are found to be unsuitable.
- c) **Processing of SSR code information, including:**
 - i) initiation of automatic tracking of SSR responses;
Note.— This does not exclude tracking on the basis of primary radar returns in areas where adequate primary coverage is available;
 - ii) determination for each code whether it meets the criteria to be established for unambiguous correlation;
 - iii) recognition of any code duplications affecting correlation;
 - iv) proposing action to controllers to resolve code duplications affecting correlation;
 - v) establishment of initial correlation between real-time radar information and current flight plan information on the basis of decoded SSR replies (including Mode C information). Correlation should be achieved sufficiently in advance of the time at which an aircraft enters the area of responsibility of a centre;
 - vi) maintenance of correlation between real-time radar information and current flight plan information on the basis of decoded SSR replies and/or coincidence of flight plan information (route, heading, altitude) or other distinguishing criteria and radar information;
 - vii) storage of code information until a VSP time at which its activation and protection is desired; and
 - viii) activation of stored information for correlation at a given VSP time and/or within a given airspace.

d) **Display of information including:**

- i) presentation in a suitable manner of decoded SSR replies and/or correlated flight plan information;
- ii) filtering of information to be displayed on the basis of SSR-derived data (Mode A/C); and
- iii) indication of code duplications.

e) **Special codes:** immediate recognition of special codes, as specified on a regional or world-wide basis, as well as maintenance of tracking and correlation of aircraft using these codes.

f) **Recovery from ground system degradation:** in cases of ground system degradation (excluding display component failure) to the extent that essential SSR-derived information is not displayed, automated ATC ground systems should be capable of restoring all essential information within the shortest possible time. Until full serviceability can be restored, the above aim may necessitate suppression of functions of secondary importance.

APPENDIX A - PARTICIPATING AREAS

SSR Code Allocation List

STATE FIR	Domestic Code	Domestic Code	Transit Code	Transit Code
Amman	0400 – 0477 1101 – 1177	2400 – 2477	0700 – 0777	
Baghdad	7400 – 7477	1300 – 1377	1001 – 1077	7200 – 7277
Bahrain	2100 – 2177 2700 – 2777	1200 – 1277	2200 – 2277 4400 – 4477	2600 – 2677 3200 – 3277
Beirut	2500 – 2577		4300 – 4377	
Cairo	0600 – 0677 2700 – 2777	2300 – 2377	1600 – 1677 7300 – 7377	3300 – 3377
Damascus	3000 – 3077		5700 – 5777	
Doha TMA	2300 – 2377			
Emirates	0400 – 0477 6000 – 6077	0600 – 0677 6100 – 6177	0500 – 0577 3400 – 3477	1700 – 1777 6200 – 6277
Jeddah	0100 – 0177 3500 – 3577 3000 – 3077	0200 – 0277 5000 – 5077 4100 – 4177	3100 – 3177 5200 – 5277	4500 – 4577 4200 – 4277
Khartoum	1200 – 1277 5200 – 5277	5300 – 5377	0100 – 0177	
Kuwait	0600 – 0677		1400 – 1477	
Muscat	6600 – 6677 4600 – 4677	6500 – 6577	4000 – 4077	4700 – 4777
Sana'a	3700 – 3777		7001 – 7077	
Tehran	1101 – 1177 1500 – 1577 5600 – 5677	4100 – 4177 6300 – 6377	3600 – 3677 5400 – 5477	5100 – 5177
Tripoli	1300 – 1377		4000 – 4077	

SSR Code Reserve list

Domestic	Transit
0001 – 0077	2001 – 2077
0300 – 0377	5300 – 5377
6700 – 6777	5500 – 5577
7100 – 7177	6400 – 6477
7501 – 7577	
7601 – 7612	
7613 – 7677	
7701 – 7777	

APPENDIX B - GENERAL PROCEDURES FOR SSR CODE ASSIGNMENT

B.1 Retention of previous code

- B.1.1 Every endeavour shall be made to retain the code already assigned to the aircraft. This assumes that the code is known at the time of coordination (either by voice coordination or by transmission of an Air Traffic Services (ATS) Interfacility Data Communications (AIDC) message, or an On- Line Data-Interchange (OLDI) or via the pilot) and input into the system if automated. If a code is not already being used by another aircraft flying in an unprotected area and if the code assigned to the aircraft is acceptable for the flight category², the code shall be retained.

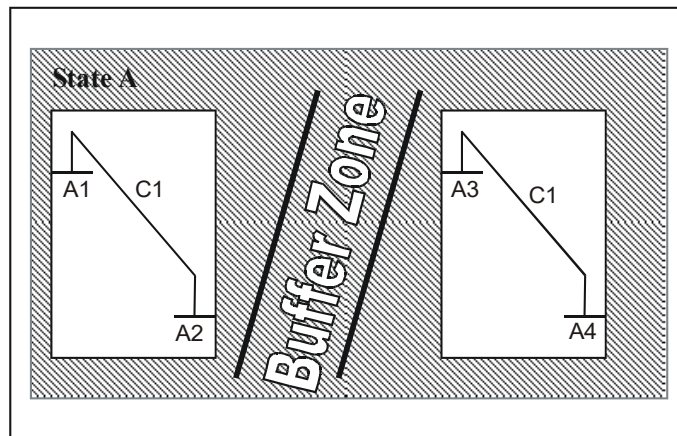
Note.— This should apply if the aircraft comes from an ATSU belonging to the same PA or a unit in another PA, but it may be retained in an area which has no conflicts with the other units in the area.

B.2 Code assignment or re-assignment

- B.2.1 The following rules will be applied to departing aircraft within the area of the control unit, or to aircraft whose previously assigned code failed to comply with the rules stated in B.1.1 above and consequently could not be retained:

- B.2.2 Where an aircraft remains inside a defined area of the AOR

Directional assignment of a domestic code - Code C1 can be assigned simultaneously to aircraft A1A2 and A3A4. C1 is protected for zone 1 and zone 2:

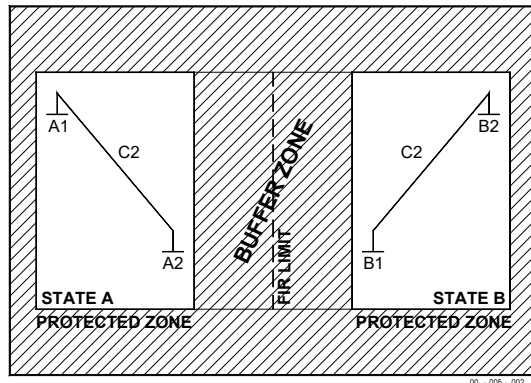


Note.— Domestic code allocation may be protected by buffer zones of at least 60 NM or separated by another unit. This rule is applicable within States, and also by arrangement between adjacent States. In order to make economic use of this type of allocation the same codes should preferably be disseminated (at most every 120 NM) in different small areas instead of having recourse to allocating codes belonging to an excessive number of different series.

² Flight category refers to transit, domestic or common pool codes.

B.2.3 Where an aircraft remains inside a State

Code C2 can be assigned simultaneously to aircraft A1A2 and B1B2 from different States A and B. C2 is protected for State A and State B:

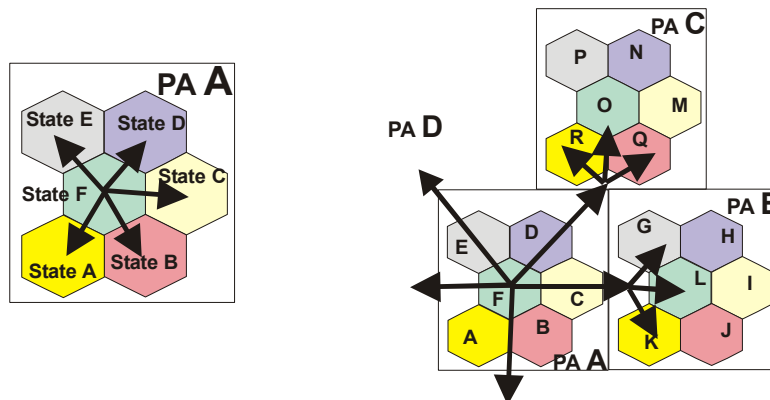


Note.— Domestic code allocation must be protected by buffer zones. Even more than in the case of B.2.2 above; consultation between adjacent States will be necessary to ensure such protection and rationalize excessive domestic code utilization as far as possible.

B.2.4 For an aircraft leaving a State

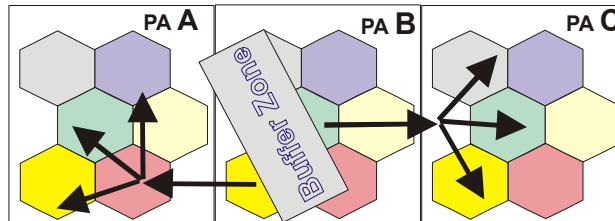
Transit codes are allocated by the Middle East SSR Code Management Plan to the various States for assignment to this flight category. Transit codes should be retained for the remainder of the flight in all States in the same PA and, if possible, other successive PAs, as agreed and reflected in Part B of the CAL. Transit codes received from a previous unit are maintained provided that they satisfy the assignment criteria.

B.2.4.1 *Omni-directional assignment of a transit code*



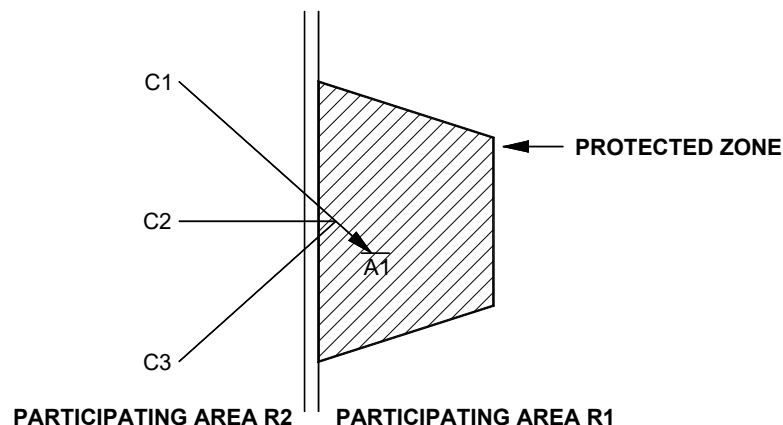
B.2.4.2 Directional assignment of a transit code

Allocated by the Middle East SSR Code Management Plan to the various States for assignment to aircraft under specific conditions: to specific destinations in the same PA or in different PAs; to specific directions of aircraft and/or via specific areas. Special attention shall be given in ensuring that when applying directional assignment of a transit code, no code conflict could occur.



B.2.4.3 Close to PA border, retention of transit codes of other PA

Codes C1, C2 and C3, which belong to R2 transit series are retained until landing at an airport A1 near the border between the two PAs, which is located in a protection area for the codes in question.



00 - 005 - 005 A

B.3 Code occupancy times

B.3.1 In order to ensure uniqueness of the code in the systems concerned by an aircraft, the ICAO MID Regional Office based its calculations on a “protection period” of approximately two hours, when establishing the number and series of transit codes (please see paragraph 4.3.4). At the same time, the protection period should be reduced when possible, while providing adequate protection (please see paragraph 4.3.3 b). Certain suggestions along these lines will be found below.

B.3.2 Point of time for code assignment to aircraft

In order to economize codes as much as possible, it is recommended that codes be assigned to flights which will be performed in the very near future (when ready for departure, or in flight, about to come under control).

Note.— The ideal moment is the flight activation point in the case of automated systems.

B.3.3 Assignment procedures

Codes are normally assigned according to the earliest time of release (a VSP). However, in units assigning codes manually such sophistication may be cumbersome. When sophisticated systems are not available, cyclical assignment of the codes released should be preferred instead of a systematic return to the beginning of the category.

B.3.4 Release of a code by an aircraft

When a system records an aircraft landing or passing a distant MID PA exit point, the code assigned to the aircraft may be regarded as released and be re-used. In the case of distant MID PA exit point, an additional VSP waiting time, normally thirty minutes, shall be added before re-use. In the event that a code has been assigned to flight that has been cancelled or which will not take place, the code assigned should be released for immediate re-use.

B.3.5 Saturation

When the traffic load is such that no code is available for a given flight category it may be necessary to assign codes in accordance with relaxed rules:

- a) reduced protection times –
(see B.3.4);
- b) using a different code category –
using an omni-directional assignment if no more codes for directional assignment

APPENDIX C - IMPLICATIONS FOR AUTOMATION

C.1 As stated in Appendix B, B.1.1, retention of the code assigned by the previous unit requires foreknowledge, implying capture of the data by the system in the event of automated assignment (direct capture by an AIDC or OLDI message, or indirect by manual input on coordination).

C.2 Assignment according to flight category implies that the system is capable of analysing the origin and destination of flights. If not, capture of units transferring and accepting, where applicable, may be used. For some cases one may need to process all four data items.

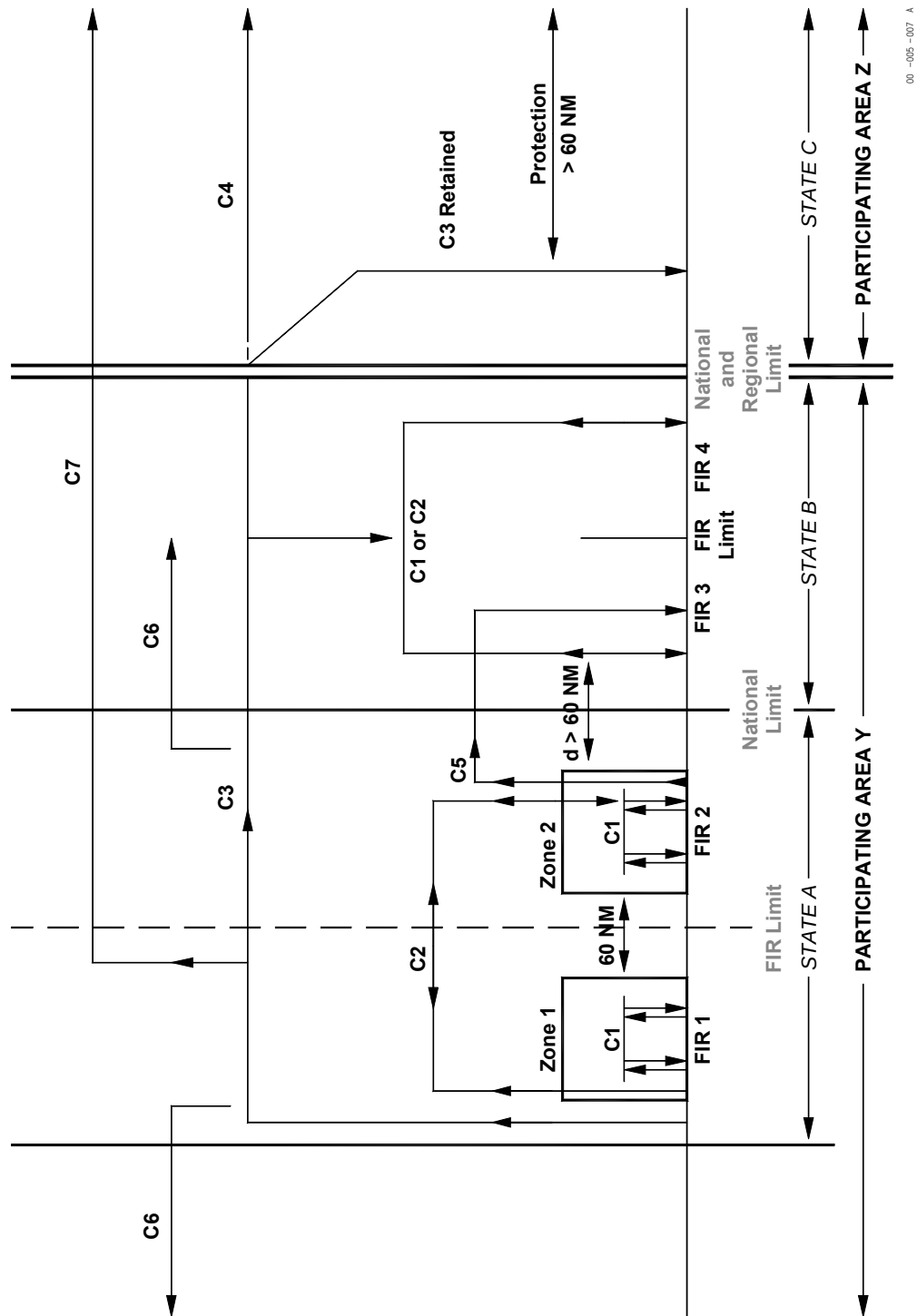
C.3 As in the case of any problem involving the “queuing management”, it is abundantly clear in the light of the previous remarks that the more centralized the allocation-assignment system, the more economical it will be. In other words, the less call there will be for allotment type solutions (provision of sub-banks to decentralized units), and the greater the use made of central assignment in accordance with overall criteria the more economical the system will be.

C.4 Likewise it has been seen that proper management of the assignment system presupposes knowledge of the actual traffic situation (entry into the system, route, exit from the system-landing etc.). Consequently, it is desirable that the assignment machinery should be linked with the real-time system.

C.5 A number of examples given in Appendix B show that despite the uniqueness by zone criterion, two codes may be found to be in use simultaneously in the same system (radar range is greater than the 60 NM buffer zone). Accordingly, the correlation systems should at least be capable of accommodating and unambiguously identifying two aircraft responding on the same code separated at the time of correlation by a designated geographical distance which will be a function of the automated system.

Note.—A geographical correlation filter should exist such that correlation will not be achieved if the calculated distance between the flight plan derived position based on estimate information and the SSR response corresponding to the SSR code in the flight plan is more than 30 NM.

C.6 Illustrative diagram for general code allocation and assignment



00 -005 -007 A

The following notes relate to the diagram:

Code C1: Domestic code for PA Y (Domestic in STATE A Domestic in STATE B)

These codes can be used inside zone 1, inside zone 2, inside other zones of STATE B, and even inside the whole territory of STATE B if a buffer zone of 60 NM or a FIR separates them.

These codes could be used in PA Z under the same condition of protection against the allocation in STATE B.

Code C2: Domestic code for PA Y (Domestic in STATE A and STATE B)

Condition: a 60 NM buffer zone should be provided between these two assignments.

Code C3: Transit code for PA Y (STATE A)

In general such a code should be assigned to any aircraft originated in STATE A and leaving its boundaries, for overflying STATE B or landing in B.

In general this code may be changed at the entry in PA Z, but it could be retained for an arrival at an aerodrome close to the border and having a protection area of at least 60 NM against any other use in PA Z.

If C3 is planned for transit use from PA Y to PA Z it could be retained inside the whole PA Z.

Code C4: Transit code for PA Z (STATE C)

Such a code will be assigned to any flight whose code cannot be retained and overflying STATE C for a further destination in PA Z.

Code C5: Directional transit code between STATE A FIR2 and STATE B FIR3

C5 should be simultaneously protected in the two FIRs though domestic for PA Y. Such an allocation has the advantage of avoiding assignment of a transit code for such short middle-range flights.

Code C6: Transit code for PA Y

The example given with C6 is a duplication where the directional assignment by STATE A gives a guarantee of no conflicts occurring with the following units.

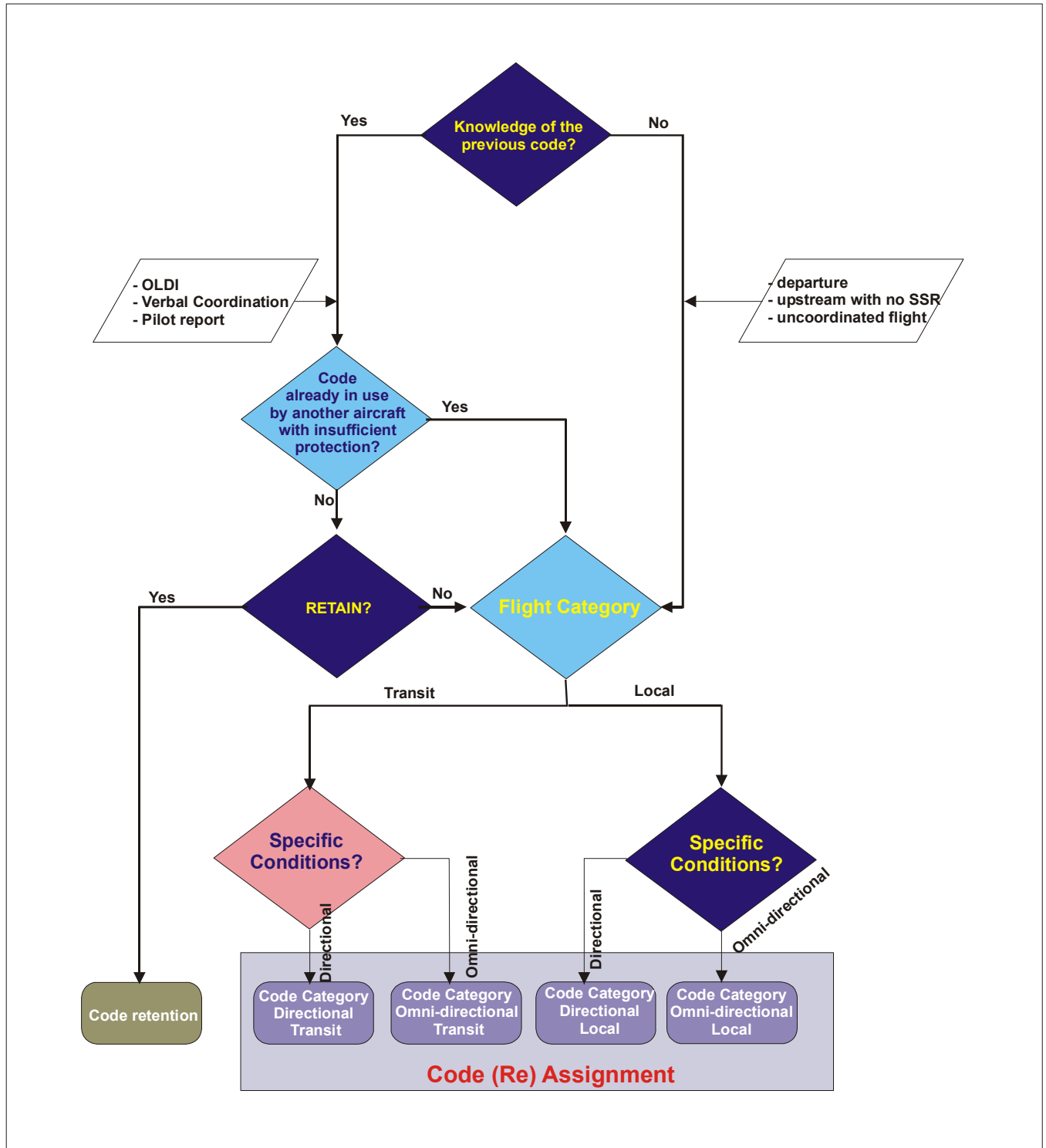
Code C7: Transit code for use for PA Y (STATE A) and PA Z

C7 which is at least transit in PA Y and having no domestic use in PA Z will be retained in the two areas.

Management of the code baskets for STATE A:

General:	Domestic basket				: C1, C2
	Transit basket				: C3, C6
Special:	Domestic State A	FIR 2	—	State B FIR 3	: C5
	Transit State A		—	PA Z	: C7
	Directional assignment	FIR 2	—	State B	
		FIR 1	—	Other State of PA Y	: C6

The following chart outlines the retention/assignment procedures described above:



APPENDIX D - DEVELOPMENT OF AUTOMATED SSR CODE ASSIGNMENT SYSTEMS

D.1 As computer capabilities could be a limiting factor in code assignment and thus reflect on the code allocation, the following principles for the development of automated SSR code assignment systems should be observed:

- a) automated systems shall be capable of using code blocks (part of a code series) without getting confused if, in a neighbouring system, other blocks of the same code series (with the same first and second digits) are used;
- b) automated equipment shall be capable of coping with a limited number of code conflicts rather than preventing code duplications by means of more complicated and less economical code allocation and assignment methods;

Note.— It is expected that this feature will become even more important as traffic increases.

- c) automated systems shall be capable of assigning codes with reference to the category of a flight, i.e. transit codes shall be assigned to an aircraft engaged in transit flights and domestic codes to an aircraft confined within the smaller area of use reserved for such codes;
- d) automated systems shall permit the addition of a sophisticated capability of assigning codes with reference to the routing or special code protection required for specific aircraft, especially when this will permit economies in the number of codes required;
- e) the code assignment logic of an automated system shall not impose any restriction on the free choice of any specific additional codes if this is required to satisfy new requirements;
- f) automated code assignment systems shall be designed to conform to international cooperative principles and essential capabilities described in this Document.

**TERMS OF REFERENCE (TOR) OF THE
MIDANPIRG AIR TRAFFIC FLOW MANAGEMENT TASK FORCE
(ATFM TF)**

I. TERMS OF REFERENCE

- 1.1 Perform a joint assessment and confirmation of the Pre-requisites for a regional ATFM. This shall include
- 1.2 Assessment of the performance objectives of the individual cooperating States and definition of common performance objectives for a regional ATFM service,
- 1.3 Perform a data collection and analysis to identify the hot-spot areas and critical times in a regional ATFM service area where demand consistently exceeds capacity. The reasons and contributing factors for unbalanced demand and capacity are to be identified.
- 1.4 Analysis of air traffic flows within the designated area of the regional ATFM service that is causing unbalanced demand and capacity. The analysis shall identify the traffic fractions that due to their uniformity are candidates for effective ATFM measures to increase the efficiency without violating the equity principle.
- 1.5
- 1.6 Develop an ATFM Concept of Operations and a Framework which addresses ATFM minimum requirements for the implementation of ATFM in the ICAO MID Region.
- 1.7 Agree on a mechanism to support the phased implementation of ATFM measures in the MID Region, when and where required.
- 1.8 Identify, research and recommend appropriate guidance regarding:
 - a) aerodromes and enroute capacities under the normal circumstances and adjustment factors affecting the capacity;
 - b) regular review for all aerodromes and ATC sectors where traffic demand is expected to reach capacity, or is resulting in traffic congestion;
 - c) mechanisms for ATFM data gathering, collation and sharing between States, Organizations and ICAO, which may include:
 - i. adjusted aerodromes and enroute capacity due to factors affecting capacity such as special use airspace status, runway closures and weather information;
 - ii. traffic demand information which may include flight schedules, flight plan data, repetitive flight plan data as well as associated surveillance updates of flight status; and
 - iii. ATFM Daily Plan.
 - d) compliance by airspace users with ATFM measures; and
 - e) any other guidance relevant to the Regional ATFM Framework.
- 1.9 Consider existing and planned ATFM initiative in the Region, and make specific recommendations to ensure their alignment.
- 1.10 Ensure inter-regional ATFM harmonization with adjacent ICAO Regions.
- 1.11 Recommend appropriate inputs to the ASBU Modules relevant to ATFM such as NOPS, A-CDM, etc.

1.12 Report to the ATM SG.

1.13 Review periodically its Terms of Reference and propose amendments as necessary.

1.14 Coordinate as deemed necessary with the Runway and Ground Safety Working Group (RGS WG) and the Meteorology Sub-Group (MET SG) the issues of mutual interest.

II. COMPOSITION

2.1 The Sub-Group is composed of MID ATFM focal points and experts from:

- a) MIDANPIRG Member States;
- b) India, FAA, AACO, ACAO, AEROTHAI, CANSO, EUROCONTROL, , IATA, and ICAO (Bangkok, Cairo, Paris Offices and HQ); and
- c) other representatives from provider States and Industry may be invited on ad hoc basis, as observers, when required.

2.2 The Task Force shall elect a Chairperson to act as the point of contact on behalf the Task Force.

2.3 The Task Force shall meet at least once a year and when deemed necessary.

2.4 ICAO MID Office will act as the Secretary of the ATFM Task Force meetings.

**TERMS OF REFERENCE (TOR) OF THE
MIDANPIRG WORLD CUP 2022 TASK FORCE
(W2022 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 an 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 such as the EXPO 2020 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 Coordination will be carried out among the Task Force members and with concerned State(s) through correspondence and teleconferences and, if required, face-to-face meetings with stakeholders on case-by-case basis.
- 4.4 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.
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INTERNATIONAL CIVIL AVIATION ORGANIZATION

**MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)**

**MID REGION
PERFORMANCE BASED NAVIGATION
IMPLEMENTATION PLAN**

EDITION DECEMBER, 2018

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 address 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 ground-based CNS infrastructure etc. Implementation targets for various categories of airspace for the short term (2013 – 2018) and for the medium term (2019 – 2025) have been projected in tabular forms to facilitate easy reference. For the long term (2026 and beyond) it has been envisaged that GNSS and its augmentation system would become the primary navigation infrastructure

This Document consolidates, updates and supersedes all previous MID Region PBN and GNSS Strategies/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.

Performance Based Navigation - Performance based navigation specifies RNAV and RNP system performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in an airspace.

Performance requirements - Performance requirements are defined in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept. Performance requirements are identified in navigation specifications which also identify which navigation sensors and equipment may be used to meet the performance requirement.

REFERENCE DOCUMENTS

The below ICAO Documents provide Guidance related to the PBN implementation:

- PANS-ATM (Doc 4444)
- PANS-Ops (Doc 8168)
- PBN Manual (Doc 9613)
- GNSS Manual (Doc 9849)
- RNP AR Procedure Design Manual (Doc 9905)
- CDO Manual (Doc 9931)
- Manual on Use of PBN in Airspace Design (Doc 9992)
- CCO Manual (Doc 9993)
- Procedure QA Manual (Doc 9906)
- PBN Ops Approval Manual (Doc 9997)

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ACRONYMS

The acronyms used in this document along with their expansions are given in the following List:

AACO	Arab Air Carrier Association
ABAS	Aircraft-Based Augmentation System
ACAC	Arab Civil Aviation Commission
AIS	Aeronautical Information System
APAC	Asia and Pacific Regions
APCH	Approach
APV	Approach Procedures with Vertical Guidance
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
IATA	International Air Transport Association
IFALPA	International Federation of Air Line Pilots' Associations
IFATCA	International Federation of Air Traffic Controllers' Associations
IFF	Identification Friend or Foe
INS	Inertial Navigation System
IRU	Inertial Reference Unit
MEL	Minimum equipment list
MID eANP	MID Region Air Navigation Plan
MIDANPIRG	Middle East Air Navigation Planning and Implementation Regional Group
MIDRMA	Middle East Regional Monitoring Agency
MLAT	Multilateration
PANS	Procedures for Air Navigation Services
PBN	Performance Based Navigation
PIRG	Planning and Implementation Regional Group
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	World Geodetic System

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

- a) *Access and Equity*: Increased aerodrome accessibility.
- b) *Capacity*: In contrast with ILS, the GNSS based approaches do not require the definition and management of sensitive and critical areas resulting in potentially increased runway capacity.
- c) *Efficiency*: Cost savings related to the benefits of lower approach minima: fewer diversions, overflights, cancellations and delays. Cost savings related to higher airport capacity in certain circumstances (e.g. closely spaced parallels) by taking advantage of the flexibility to offset approaches and define displaced thresholds.
- d) *Environment*: Environmental benefits through reduced fuel burn.
- e) *Safety*: Stabilized approach paths.
- f) *Cost Benefit Analysis*: Aircraft operators and air navigation service providers (ANSPs) can quantify the benefits of lower minima by using historical aerodrome weather observations and modeling airport accessibility with existing and new minima. Each aircraft operator can then assess benefits against the cost of any required avionics upgrade. Until there are GBAS (CAT II/III) Standards, GLS cannot be considered as a candidate to globally replace ILS. The GLS business case needs to consider the cost of retaining ILS or MLS to allow continued operations during an interference event

3. GOALS AND OBJECTIVES OF PBN IMPLEMENTATION

- 3.1. The MID Region PBN Implementation Plan 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, organizations, and airspace users.
- 3.2. Furthermore, the Plan will provide a high-level strategy for the evolution of the navigation applications to be implemented in the MID Region in the short term (2013-2018), medium term (2019-2025).
- 3.3. 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 plan 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 specification and granting PBN operational approvals should be in compliance with ICAO provisions;
 - b) States conduct pre- and post-implementation safety assessments 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) Users/operational requirements should be taken into consideration while planning for PBN implementation;
 - e) States should provide the ICAO MID Regional Office with their updated PBN implementation Plan on annual basis (before December);
 - f) 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.
- 5.2. Continuous Climb and Descent Operations (CCO and CDO) would enhance efficiency, flight predictability, while reducing fuel burn, emissions and controller-pilot communications, thereby enhancing safety.

En-route

5.3. Considering the traffic characteristic and CNS/ATM capability of the Region, the en-route operations can be classified as oceanic, remote continental, 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 will be applied by the States and international organizations themselves, as coordinated at regional level to ensure harmonization.

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.

Terminal

5.5. 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.

5.6. 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.

Approach

5.7. 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.

5.8. MID States are encouraged to include implementation of CCO and CDO, where appropriate, as part of their PBN implementation plans, in compliance with the provisions of ICAO Documents 9931 and 9993, and in accordance with the MID Region Air Navigation Strategy.

5.9. 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.

CHAPTER 2

CNS INFRASTRUCTURE

1. NAVIGATION INFRASTRUCTURE

Global Navigation Satellite System (GNSS)

1.1. Global Navigation Satellite System (GNSS) is a satellite-based navigation system utilizing satellite signals, such as Global Positioning System (GPS), and GLONASS for providing accurate and reliable position, navigation, and time services to airspace users. In 1996, the International Civil Aviation Organization (ICAO) endorsed the development and use of GNSS as a primary source of future navigation for civil aviation. ICAO noted the increased flight safety, route flexibility and operational efficiencies that could be realized from the move to space-based navigation.

1.2. GNSS supports both RNAV and RNP operations. Through the use of appropriate GNSS augmentations. GNSS navigation provides sufficient accuracy, integrity, availability and continuity to support en-route, terminal area, and approach operations. Approval of RNP operations with appropriate certified avionics provides on-board performance monitoring and alerting capability enhancing the integrity of aircraft navigation.

1.3. GNSS augmentations include Aircraft-Based Augmentation System (ABAS), Satellite-Based Augmentation System (SBAS) and Ground-Based Augmentation System (GBAS). More information about GNSS can be found in the Guidance on GNSS Implementation in the MID Region (MID DOC XXX).

2. OTHER NAVIGATION INFRASTRUCTURE SUPPORTING PBN

2.1. Other navigation infrastructure that supports PBN applications includes INS, VOR/DME, DME/DME, and DME/DME/IRU. These navigation infrastructures may satisfy the requirements of RNAV navigation specifications, but not those of RNP.

2.2. INS may be used to support PBN en-route operations with RNAV 10 and RNAV 5 navigation specifications.

2.3. VOR/DME may be used to support PBN en-route operations based on RNAV 5 navigation specification.

2.4. DME/DME and DME/DME/IRU may support PBN en-route and terminal area operations based on RNAV 5, and RNAV 1 navigation specifications. Validation of DME/DME coverage area and appropriate DME/DME geometry should be conducted to identify possible DME/DME gaps, including identification of critical DMEs, and to ensure proper DME/DME service coverage.

Note.- The conventional Navaid infrastructure should be maintained to support non-equipped aircraft during a transition period.

3. SURVEILLANCE INFRASTRUCTURE

3.1. 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

4. COMMUNICATION INFRASTRUCTURE

4.1. 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.

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. Table 3-1 shows the navigation specifications published in PBN Manual (Doc 9613), Volume II. It demonstrates, for example, that navigation specifications extend over various phases of flight. It also contains the Nav aids/Sensor associated with each PBN specification.

1.5. 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
- Time of Arrival Control (TOAC).

Table 3-1. Application of navigation specification by flight phase

Navigation Specification	FLIGHT PHASE								NAVAIDS/SENSORS				
	En-route oceanic/ remote	En-route continental	Arrival	Approach				DEP					
				Initial	Intermediate	Final	Missed ¹						
RNAV 10	10	N/A		N/A				N/A	One or combination of GNSS, INS				
RNAV 5 ²	N/A	5	5					One or combination of GNSS, VOR/DME, DME/DME, INS, IRS					
RNAV 2		2	2					2	One or combination of GNSS, DME/DME, DME/DME/IRU				
RNAV 1		1	1					1					
RNP 4	4	N/A		N/A				N/A	GNSS				
RNP 2	2	2	N/A					N/A					
RNP 1 ³	N/A		1	1	1	N/A	1	1					
Advanced RNP (A-RNP) ⁴	2	2 or 1	1	1	1	0.3	1	1					
RNP APCH ⁶	N/A			1	1	0.3 ⁷	1	N/A					
RNP AR APCH				1-0.1	1-0.1	0.3-0.1	1-0.1						
RNP 0.3 ⁸	N/A		0.3	0.3	0.3	0.3	0.3						

1. Only applies once 50 m (40 m, Cat H) obstacle clearance has been achieved after the start of climb.
2. RNAV 5 is an en-route navigation specification which may be used for the initial part of a STAR outside 30 NM and above MSA.
3. The RNP 1 specification is limited to use on STARs, SIDs, the initial and intermediate segments of IAPs and the missed approach after the initial climb phase. Beyond 30 NM from the ARP, the accuracy value for alerting becomes 2 NM.
4. A-RNP also permits a range of scalable RNP lateral navigation accuracies
5. PBN manual contains two sections related to the RNP APCH specification: Section A is enabled by GNSS and Baro-VNAV, Section B is enabled by SBAS.
6. RNP 0.3 is applicable to RNP APCH Section A. Different angular performance requirements are applicable to RNP APCH Section B only.
7. The RNP 0.3 specification is primarily intended for helicopter operations.

2. IMPLEMENTATION PHASES:

En-route

Short Term:

2.1. The current application of RNAV 10 will continue for Oceanic and Remote continental routes.

2.2. For Continental RNAV 5 specifications should be completed by December 2017. Before the PBN concept, the MID Region adopted the Regional implementation of RNP 5. Further to application of the PBN concept, RNP 5 routes have been changed into RNAV 5 routes. 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:

2.3. RNP 4 and/or RNP 2 routes would be considered for implementation for the en-route oceanic/remote operations.

2.4. RNP 2 or RNAV 1 would be considered for implementation for en-route continental/local domestic operations.

Long Term

A-RNP would be considered for implementation beyond 2026 as a regional requirement based on the PBN SG and ATM SG decisions.

Terminal

Short Term:

2.5. In a non-surveillance environment and/or in an environment without adequate ground navigation infrastructure, the SID/STAR application of RNP 1 is expected in selected TMAs with exclusive application of GNSS.

2.6. CCO and CDO 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.

Medium Term:

2.7. RNAV 1, A-RNP 1 will be implemented in all TMAs, the end of this term.

Approach

Short Term:

2.8. Implementation of PBN approaches with vertical guidance (LNAV/VNAV minima) for runway ends at the international aerodromes listed in the MID ANP, including LNAV only minima.

2.9. The application of RNP AR APCH procedures would be limited to selected airports, where obvious operational benefits can be obtained due to the existence of significant obstacles.

Medium Term:

2.10. The extended application of RNP AR APCH should continue for airports where there are operational benefits.

2.11. To progress further with the universal implementation of PBN approaches. GLS procedures should be implemented for the defined runway ends to enhance the reliability and predictability of approaches to runways increasing safety, accessibility, and efficiency.

2.12. 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 2020		Medium term 2021-2025	
	Navigation Specification Preferred	Targets	Navigation Specification Acceptable	Targets
En-route – Oceanic	RNAV 10 RNP 4*	100 % by 2016 50% by 2020	RNP 4*	100% by 2025
En-route - Remote continental	RNAV 5	100% by 2016	RNP 4*	50% by 2023 100% by 2025
En-route – Continental	RNAV 5 RNAV 1	100 % by 2017 W/A ¹		
En-route - Local / Domestic	RNAV 5 RNAV 1	100 % by 2017 W/A		
TMA – Arrival	RNAV 1 (surveillance environment) or RNP 1 (non- surveillance environment)	50% by December 2016 100% by 2020		
TMA – Departure	RNAV 1 (surveillance environment) or RNP 1 (non- surveillance environment)	50% by 2016 100% by 2020		
Approach	LNAV: for all RWY Ends at International Aerodromes LNAV/VNAV: for all RWY Ends at International Aerodromes	80 % by 2014. 100% by 2020 70% by 2016 100% by 2020	GLS (GBAS) For the defined RWY Ends Based on operational needs and CBA	TBD
CCO and CDO	W/A	50% by 2020	W/A	100 % by 2025

- W/A: where applicable/defined Airspace, in accordance with State PBN implementation Plans, the MID Region Air Navigation Strategy and the MID ANP.
- * would be considered for implementation at the identified Airspace/TMAs
- When no month is specified (e.g. by 2017) means by the end of the year (December 2017).

Long Term (2026 and Beyond)

2.13. In this phase, GNSS augmentation is expected to be a primary navigation infrastructure for PBN implementation. States should work co-operatively on a multinational basis to implement GNSS in order to facilitate seamless and inter-operable systems and undertake coordinated Research and Development (R&D) programs on GNSS implementation and operation.

2.14. Moreover, during this phase, States are encouraged to consider segregating traffic according to navigation capability and granting preferred routes to aircraft with better navigation performance.

2.15. The required PBN navigation specifications and their associated targets to be implemented for the Long term will be defined in due course.

CHAPTER 4

SAFETY ASSESSMENT AND MONITORING

1. NEED FOR SAFETY ASSESSMENT

1.1. 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 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

2.1. 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.

2.2. 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

1.2. 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.

1.3. 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

1.4. 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.

1.5. The operator must have a configuration list detailing the pertinent hardware and software components and equipment used for the PBN operation.

1.6. 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.

1.7. 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.)

1.8. 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.

1.9. 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

1.10. 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

1.11. The SOP must be adequately documented in the OM and checklists

Flight crew and dispatch training

1.12. 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

1.13. 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

4.2. 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.

4.3. 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

4.4. 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

4.5. 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

4.6. 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

4.7. 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

4.8. 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. States should promote the implementation and operational approval of Advanced RNP (A-RNP) navigation specifications, which serves all the flight phases as follows:

- En-Route Oceanic, Remote: RNP 2;
- En-Route Continental: RNP 2 or RNP 1;
- Arrival and Departures: RNP 1;
- Initial, intermediate and missed approach phases: RNP 1; and
- Final Approach Phase: RNP 0.3.

5.5. 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

PBN CHARTING

1. INTRODUCTION

6.1 Charting of PBN Instrument Approach Procedures in the MID Region should follow the criteria included in Annex 4 and the PANS OPS (DOC 8168).

2. TRANSITION PLAN FOR RNAV TO RNP INSTRUMENT APPROACH CHART DEPICTION

6.2 For a harmonized implementation of the Amendment 6 to the PANS OPS related to RNAV to RNP Approach Chart Depiction, the following transition plan should apply in the MID Region:

- MID States, that have not yet done so, should implement RNAV to RNP Chart naming convention for their current PBN Approach Procedures published in their AIPs, starting from 29 March 2019 up to 8 September 2022.
- New PBN Approach Procedures, planned to be published before 29 March 2019, should be published using the new naming convention, if practicable.
- If a PBN Approach Procedure published in the National AIP is amended and re-published before 29 March 2019 (for any reason), the new naming convention should be used, if practicable.

6.3 States are required to provide the ICAO MID Office with their action plan for the implementation of RNAV to RNP Chart naming convention, and keep the MID Office apprised of the status of implementation.



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авиации

منظمة الطيران
المدنى الدولى

国际民用
航空组织

File Ref: AN 6/33 – 18/144

9 May 2018

Subject: ICAO MID Region Flight Procedure Programme Draft Project Document

Action required: Reply not later than 10 June 2018

Sir,

I have the honor to refer to the outcome of the Fourth Meeting of the Directors General of Civil Aviation-Middle East Region (DGCA-MID/4), Muscat, Oman, from 17 to 19 October 2017 and the Kick-off meeting of the MID Region Flight Procedures Programme (MID FPP), Cairo, Egypt, 22 – 24 January 2018.

The MID FPP objective is to assist States to develop sustainable capability in the Instrument Flight Procedure (IFP) design, PBN Airspace Design and PBN OPS Approval, including regulatory oversight, so as to meet their obligations related to instrument flight procedure and the regional requirements (MID Region Air Navigation Strategy, MID Region PBN Implementation Plan and the Doha Declaration on Aviation Safety and Air Navigation in the MID Region) related to PBN implementation. In this respect, the MID FPP would support States to overcome the challenges identified as the main impediments faced by States in meeting the agreed global and regional PBN Performance Targets.

As a follow-up to the DGCA-MID/2 meeting (Jeddah, Saudi Arabia, 20 - 22 May 2013) Conclusion 2/5, the ICAO MID Office exerted all efforts for the establishment of the MID FPP. Several meetings/workshops addressing the subject were convened with the support of ICAO HQ, African and Asia Pacific Flight Procedure Programmes and other stakeholders. I would like to recall that the Global Ministerial Aviation Summit (Riyadh, Saudi Arabia, 29-31 August 2016) endorsed the MID FPP as the regional air navigation project with the highest priority.

States willing to join the MID FPP are required to sign a Project Document with ICAO, which defines the institutional framework of the MID FPP, organizational structure, scope, operating concept, host/location, expected outcomes and objectives, first year work plan, Job Descriptions, budget, etc.

The attached Draft MID FPP Project Document was consolidated by ICAO based on the outcome of the MID FPP Kick-off Meeting (Cairo, Egypt, 22-24 January 2018).

../.

The MID FPP will be established as an ICAO technical cooperation project and its office will be hosted by Lebanon in Beirut, based on the results of the selection process of the host State, which was communicated to your Administration through my Letter Ref.: AN 6/33 – 16/176 dated 30 June 2016.

In order for the ICAO Technical Cooperation Bureau (TCB) to initiate the recruitment of the Manager of the Programme at least five (5) States should sign the Project Document and an amount of **USD 300,000** should be available in the bank account of the Programme. Accordingly, States have been strongly encouraged to make advance payments, which would be deducted later from their annual financial contributions based on the agreed funding mechanism. It is to be highlighted that ICAO is exploring all resource mobilization opportunities from donors to expedite the establishment/start of operation of the MID FPP.

Currently, Saudi Arabia and UAE gratefully offered to provide **USD 50,000** each to support the establishment of the MID FPP.

I would like to highlight that the funding mechanism of the MID FPP including the annual amount that should be paid by each Active State will be agreed upon by the MID FPP Steering Committee, which should meet tentatively during the last quarter of 2018 (after the signature of the Project Document by at least five States).

I would be grateful, if you could review the attached Draft MID FPP Project Document and provide the ICAO MID Office with your comments/inputs, if any, preferably not later than **10 June 2018**, in order to consolidate the final version of the Document to be signed by the ICAO Secretary General and then sent to States for signature.

I would also appreciate if you could confirm, by **10 June 2018**, your willingness to join the MID FPP as Active State or User State, indicating the amount of the advanced financial contribution or the in-kind contribution your Administration will provide to the MID FPP.

Mr. Elie El Khoury, Regional Officer, Air Traffic Management and Search and Rescue (RO/ATM/SAR) (ekhoury@icao.int), the MID FPP focal point, could be contacted if additional information/clarification is needed.

Accept, Sir, the assurances of my highest consideration.



for/ Mohamed Khalifa Rahma
Middle East Regional Director

Attachments

INTERNATIONAL CIVIL AVIATION ORGANIZATION



**MID REGION FLIGHT PROCEDURE PROGRAMME
(MID FPP)**

Prepared by the

International Civil Aviation Organization (ICAO)

for the

**Directorate General of Civil Aviation (DGCA) of Lebanon
and the**

Civil Aviation Administrations of other Participating States

March 2018

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INTERNATIONAL CIVIL AVIATION ORGANIZATION PROJECT DOCUMENT

Project Title: MID Region Flight Procedure Programme (MID FPP)
Project Number: RAB/18801
Duration: 3 years:
Project Cost: US\$
Participating State: [State]
Sector and Subsector: Air Navigation/Air Traffic Management (ATM)/PANS-OPS
Governments Executing Agency: Civil Aviation Authorities of the MID States
Executing Agency: International Civil Aviation Organization (ICAO)
Location : Beirut, Lebanon
Estimated Starting Date: 01 January 2019

- ☐ **Active State:** A MID Participating State that commits to funding the Programme by means of an annual financial contribution in line with an approved budget
- ☐ **User State:** A MID Participating State that is not an Active State, but one that intends to use the MID FPP services

Brief Description: The Programme objective is to assist States to develop sustainable capability in the instrument flight procedure (IFP) design, PBN airspace design and PBN OPS approval, including regulatory oversight, so as to meet their commitments under Assembly Resolutions A37-11 for Performance Based Navigation (PBN) implementation and the regional requirements, and comply with ICAO provisions related to flight procedure design and PBN.

Signed by	Signature	Name	Title	Date
State				
ICAO				

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1. BACKGROUND

1.1 ICAO developed harmonized navigation specifications for all existing area navigation applications, and published these navigation specifications in the Performance Based Navigation (PBN) Manual (Doc. 9613).

1.2 The 37th session of the ICAO Assembly in 2010 in its Resolution A37-11 reaffirmed the global commitment for PBN implementation and called upon the States to complete a PBN implementation plan as a matter of urgency and ICAO to develop a coordinated action plan to assist States in the implementation of PBN and to ensure development and/or maintenance of globally harmonized SARPs, Procedures for Air Navigation Services (PANS) and guidance material including a global harmonized safety assessment methodology to keep pace with operational demands.

1.3 In 2009, ICAO published the Quality Assurance Manual for Flight Procedure Design (Doc. 9906). This document addresses two levels of processes. A high-level process, called the Instrument Flight Procedure (IFP) process, covers all elements from initiation to publication of the procedure and the relevant maintenance, safety, validation and flight inspection activities. The process does not end with publication. Feedback from users must be considered in the improvement process. A second specific process, for the design of the IFP — the Flight Procedure Design (FPD) process — is part of the IFP process.

1.4 The MID Air Navigation Strategy (ICAO MID Doc 002), endorsed by MIDANPIRG, includes the Aviation System Block Upgrades (ASBU) B0-APTA, B0-CCO and B0-CDO Modules, which are considered as priority 1 for implementation in the MID Region. In this respect, the MID FPP would support its Participating States with the implementation of the mentioned Modules.

1.5 The Directors General of Civil Aviation-Middle East (DGCA-MID) Region through the Doha, Declaration, April 2015, agreed to take necessary measures to implement PBN approach procedures with vertical guidance, for all runways ends at international aerodromes, either as the primary approach or as a back-up for the precision approaches by 2017

1.6 The DGCA-MID/2 (Jeddah, Saudi Arabia, 20 - 22 May 2013) recognized the need for cooperation and exchange of experience between MID States in the field of procedure design (PANS-OPS). The meeting through DGCA-MID Conclusion 2/5 agreed that a study related to the establishment of FPP be carried out within the framework of the PBN/GNSS TF taking into consideration similar programs in other ICAO Regions.

1.7 The MIDANPIRG/15 meeting (Bahrain, 8-11 June 2016) emphasized that the establishment of the MID Flight Procedure Programme (MID FPP) would foster the PBN implementation in the Region. The meeting noted that the MID FPP was endorsed as one of the MID Region ATM Enhancement Programme (MAEP) projects.

1.8 The MIDANPIRG/15 meeting noted with appreciation that ICAO is ready to provide necessary support for the establishment of the MID FPP and to share the experience gained from the ASIA-Pacific and AFI FPPs' establishment. Accordingly, the meeting agreed, through Conclusion 15/13, that a Workshop on the establishment of the MID FPP to be held in Cairo, Egypt, 18-19 October 2015, back-to-back with the Second meeting of the MAEP Steering Committee (MAEP SC/2) (20-22 October 2015). The main objective of the Workshop was to develop a framework for establishing an FPP for the MID Region along with the proposed organizational structure, governance procedures, scope of activities and services, work plan and deliverables, resources and financial structure to be presented in a Project Document.

1.9 The MID FPP Workshop developed the draft MID FPP Project Document, which was further reviewed by the PBN SG/2 meeting (Sharm El Sheikh, Egypt, 22-25 February 2016) and circulated to States for their comments and inputs on 16 March 2016.

1.10 The MAEP Board/2 meeting (Cairo, Egypt, 11-13 April 2016) noted that, as a follow-up action to the MAEP SC/2 Draft Conclusion 2/2, the ICAO MID Regional Office circulated a Questionnaire to seek

States' willingness to join the MID FPP and/or provide in-kind contributions, get their views regarding the hosting, identify the States' needs and determine the flight procedures design and PBN capabilities in the MID Region. The meeting reviewed the survey results as presented to the PBN SG/2 meeting and noted with appreciation that the majority of States are supporting the establishment of the MID FPP.

1.11 The MAEP Board/2 meeting received with appreciation three (3) offers for hosting the MID FPP from Egypt, Lebanon and Sudan. The meeting agreed that the evaluation process of the offers should be based on clear criteria and procedure of evaluation.

1.12 The Evaluation Committee met on 26 June 2016 and selected Lebanon as the hosting State for the MID FPP based on the agreed criteria. The selection result was communicated to States through State Letter Ref. AN 6/33 – 16/176 dated 30 June 2016.

1.13 The Global Ministerial Aviation (GMA) Summit (Riyadh, Saudi Arabia, 29-31 August 2016) supported the MID FPP and agreed to the following Recommendation:

MID FPP Recommendation

- a. States are encouraged to sign the MID FPP Project Document
- b. States and Stakeholders are encouraged to support:
 - i. the establishment of MID FPP through the provision of cash and/or in-kind contributions; and
 - ii. the MID FPP activities through the assignment of experts to be part of the MID FPP pool of resources

1.14 The DGCA-MID/4 meeting (Muscat, Oman, 17-19 October 2017) emphasized that the establishment of the MID FPP would enhance the States' capabilities related to PANS-OPS and eventually foster PBN implementation in the Region. The DGCA-MID/4 meeting agreed to the following Conclusion:

DGCA-MID/4 CONCLUSION 4/3 – MID FLIGHT PROCEDURE PROGRAMME

That:

- a) States are urged to sign the MID FPP Project Document with ICAO TCB;
- b) till the recruitment of a MID FPP Manager/Coordinator, the ICAO MID Office provide full support to run the Programme, in close coordination with the Host State;
- c) a Kickoff meeting of the MID FPP be held in January 2018; and
- d) States and Stakeholders are urged to participate in the Kickoff meeting of the MID FPP

2. INSTITUTIONAL FRAMEWORK

2.1. **Participating States:** The Programme will be executed on the basis of the Project Document signed by the Host (*Lebanon*) and ICAO and to which any State wishing to participate may sign on. Upon signature onto the Project Document, such State becomes a Participating State. Participating States are grouped in two categories:

- **Active States:** All Participating States that commit to funding the Programme by means of an annual financial contribution in line with an approved budget become an Active State. The Host State (*Lebanon*) is considered an Active State, based on the in-kind contribution provided to the Programme.
- **User States:** MID States that are not Active States but intend to use the MID FPP services are User States.

2.2. **Donors:** States, organizations and entities that support the MID FPP by financial and/or in-kind contribution (experts, equipment, services, etc.). A specific agreement with the Donor might be required.

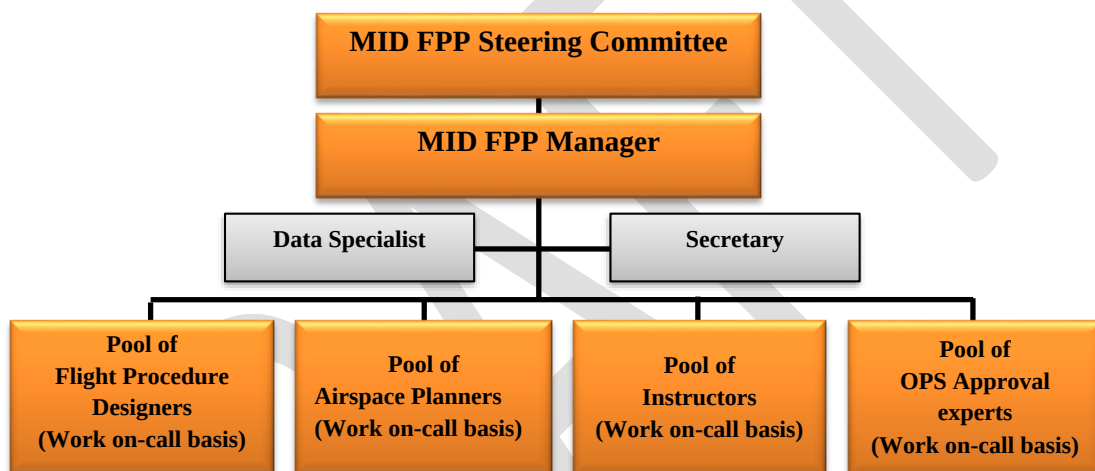
2.3. **Observer States:** States that are not Participating States or Donors and are interested in the Programme.

2.4. The Host State's in-kind contribution related to the hosting of the MID FPP should be taken into account by the MID FPP SC for offsetting its annual financial contribution to the Programme. Contributions in kind from other Participating States may also be taken into account for offsetting their annual financial contribution to the Programme.

Host Administration

2.5. During Phase I of the Programme, *Lebanon* is the Host Administration. The MID FPP will be located at the Lebanese Safety Training Centre, Hariri International Airport, Beirut, Lebanon.

MID FPP Organizational Structure



2.6. The Programme will be governed by the MID FPP Steering Committee (MID FPP SC), in accordance with its Terms of Reference at **Appendix A**.

2.7. The MID FPP Manager should present to the ICAO Regional Director, Middle East Office, on a quarterly basis, progress reports related to the Programme developments, recommending necessary measures to improve the effectiveness and efficiency of the Programme. The MID FPP Manager should present progress reports on an annual basis to the MID FPP Steering Committee, including recommendations to improve the performance and efficiency of the Programme.

2.8. The MID FPP Manager will be responsible for the local coordination and the management of the Programme, for maintaining liaison with States and stakeholders as well as ensuring full coordination and cooperation between the MID FPP assigned experts and CAA counterparts. The FPP Manager will also be responsible for the submission of periodic progress reports and for the preparation of the draft Terminal Report prior to the termination of his/her assignment.

Roles and Responsibilities

2.9. In the context of the MID FPP, the roles and responsibilities of the MID FPP Steering Committee, as outlined in **Appendix A**, should include but not be limited to the following:

- review the Programme performance;
- review and approval of the:
 - strategic objectives of the MID FPP;

- annual Work Plan of the MID FPP;
- annual Budget;
- annual financial contribution of the Active States. Contributions in-kind from Participating States may also be taken into account for offsetting their annual financial contribution to the Programme;
- fee schedule for services and trainings in compliance with ICAO existing Policy; and
- MID FPP Project Document as deemed necessary.

2.10. The role of the ICAO MID Regional Office is as follows:

- support the MID FPP Manager who is responsible for the execution of the work plan approved by the MID FPP Steering Committee;
- collaborate with the MID FPP Manager to develop the work plan;
- ensure that the MID FPP work plan is in line with the MID Region priorities and would support States in meeting the regional targets related mainly to PBN implementation;
- monitor PBN implementation and capacity building progress; and
- communicate to the MID FPP the States' needs.

2.11. The role of Technical Cooperation Bureau (TCB) is as follows:

- Assign a Focal Point for the MID FPP;
- Recruit and deploy the MID FPP Manager;
- procure services and goods in accordance with ICAO's Procurement Code, Financial Regulations and Rules, and applicable process and procedures; and
- provide administrative and financial support to the MID FPP.

2.12. The role of Air Navigation Bureau (ANB) at ICAO Headquarters is as follows:

- review the MID FPP Technical work programme/plan to ensure that it is consistent with the ANB PBN regular programme;
- provide the technical/operational input/advice; and
- facilitate the global coordination amongst the FPPs (African, APAC and MID), specifically on educative tools/presentations etc. as necessary.

2.13. The role of the MID FPP Manager includes but is not limited to the following:

- act as the Secretary of the MID FPP Steering Committee;
- develop the Work Plan in collaboration with the MID Regional Office;
- work under the supervision of the ICAO MID Regional Director;
- report to the MID Office technical and operational matters;
- provide progress reports on the Programme to the relevant MIDANPIRG subsidiary bodies; and
- represent the MID FPP in relevant events that would support the achievements of the MID FPP objectives.

3. CHALLENGES AND OPERATING CONCEPT

Challenges

3.1. Instrument flight procedures developed to take advantage of the benefits of PBN are reliant on the data in a database on the aircraft. For this reason, quality assurance in the flight procedure design process, while always important, takes on added importance for PBN-based procedures. A great safety concern in this respect is that many States lack the expertise to establish a sustainable internal procedure design capability, meeting the requirements of PANS-OPS and their responsibility under Annex 15 for the quality of their aeronautical information and data, including instrument flight procedures.

3.2. Following are some of the main procedure design-related challenges and problems faced by States:

- a) Insufficient number of procedure designers;
- b) Insufficient procedure design work in some States to attain or maintain proficiency;
- c) Lack of airspace and procedure design training: initial, On-the-Job Training (OJT), and/or recurrent;
- d) Lack of knowledge to integrate procedure design efficiently into airspace design;
- e) Lack of depth in procedure design organization to perform quality assurance (QA);
- f) Insufficient expertise in procedure design organization to provide adequate QA of procedures;
- g) Lack of procedure design and obstacle data storage automation in the States;
- h) Lack of operational approval expertise to obtain proper operational approval and to oversee operators for PBN operations;
- i) Lack of regulatory expertise to oversee the process leading to procedure publication; and
- j) Lack of service provision for Air Traffic Control/ Air Traffic Management (ATC/ATM) training for PBN implementation.

Operating Concept

3.3. The MID FPP would serve as a means to assist Participating States to address the issues listed in para 3.2. The MID FPP will foster the implementation of instrument flight procedures, developed with the appropriate quality systems, especially focusing on PBN in Terminal Area and vertically guided instrument approach procedures by:

- a) assisting States with sufficient number of procedures to establish a sustainable internal procedure design capability capable of meeting the requirements of PANS-OPS and their responsibility for the quality of their procedures;
- b) providing the appropriate level of technical expertise necessary to enable States that do not have the volume of procedures necessary to sustain an internal procedure design capability; and
- c) providing a vehicle to improve quality in the States' procedure design process through access to procedure design automation solutions and associated data storage; and assisting States with airspace design and operational approval functions.

3.4. At Participating States' request the MID FPP would:

- a) assist State's procedure and airspace designers in developing their Instrument Flight Procedures (IFP) with priority for PBN procedures;
- b) assist State with the development of a Quality Assurance (QA) system for IFP, including flight procedure regulatory approval;

- c) provide refresher, recurrent and PBN initial training courses and OJT to procedure designers, remotely, on-site or at the MID FPP location;
- d) provide training course and OJT on QA for IFP including flight procedure regulatory approval;
- e) provide training course and OJT on operators' approval for PBN operations;
- f) assist State in PBN Plan implementation through operational assessment, business case, and activity planning for PBN Implementation;
- g) assist States in the design of IAPs, SIDs, STARs, Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO);
- h) assist State in developing PBN-related regulations;
- i) develop procedures implementation for States that have no or little procedure design capability;
- j) assist State with data origination and validation;
- k) assist State with ground and flight validation;
- l) assist State in operators' approval for PBN operations;
- m) provide training courses for air traffic controllers about PBN flight procedures operations;
- n) provide State with any other associated assistance, as required;
- o) provide training courses for newly recruited flight procedures designers in accordance with ICAO Doc 9906;
- p) assist States with the estimation of environmental benefit accrued from the implementation of instrument flight procedures/PBN procedures; and
- q) assist States with PBN airspace design.

Note: in order to assist the Participating States in expediting the implementation, both training and services may be extended to air navigation service providers of the Participating States in accordance with applicable ICAO policies.

3.5. As part of the services provided in 3.4 above, the Programme would:

- a) provide States access to procedure design software applications at the MID FPP location; and
- b) provide States access to available databases for training purposes.

3.6. The services listed in 3.4 will be provided free of charge to the Active States. The provision of additional services by MID FPP including the design of new instrument flight procedures, may be against a fee determined based on a cost formula agreed upon by the MID FPP SC.

3.7. User States will be charged for the services provided by the MID FPP in accordance with applicable ICAO policies and as agreed by the MID FPP SC.

3.8. Other States may benefit from the services provided by the MID FPP against fees in accordance with applicable ICAO policies and as agreed by the MID FPP SC.

3.9. For on-site missions/training courses, the travel and accommodation expenses and the daily subsistence allowance for the MID FPP personnel, ICAO Team and course' instructors should be covered by the beneficiary State in accordance with applicable ICAO policies.

4. RELEVANT DOCUMENTS

- a) Global Air Navigation Plan (GANP) (Doc 9750)
- b) Procedures for Air Navigation Services – Aircraft Operations (Doc 8168)
- c) Performance Based Navigation Manual (Doc 9613)
- d) World Geodetic System Manual (Doc 9674)
- e) Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information (Doc 9881)
- f) Required Navigation Performance – Authorization Required Procedure Design Manual (Doc 9905)
- g) Quality Assurance Manual for Flight Procedure Design (Doc 9906)
- h) Continuous Descent Operations Manual (Doc 9931)
- i) Manual on Use of PBN in Airspace Design (Doc 9992)
- j) Continuous Climb Operations Manual (Doc 9993)
- k) PBN Operational Approval Manual (Doc 9997)
- l) PANS-ATM (Doc 4444)
- m) ICAO Annexes 4, 6, 10, 11, 14 and 15
- n) ICAO Assembly Resolutions A37-11
- o) Manual of All-Weather Operations (Doc 9365)
- p) Aeronautical Charting Manual (Doc 8697)

5. PROGRAMME IMPLEMENTATION STRATEGY

5.1 In order to support the goals of the Assembly Resolution A37-11, GANP and the MID regional requirements, Phase I of the Programme will commence on **1 January 2019** and is expected to last at least until **31 December 2021**.

5.2 The following resources are planned to achieve the Programme objectives for Phase I:

- a) The MID FPP is hosted by Lebanon in Beirut. The inputs to be provided by Lebanon are specified in **Appendix B1**; and the MID FPP office minimum requirements are at **Appendix B2**;
- b) The ICAO MID Office will support setting up the office and building the pool of experts for the MID FPP during the first year and may organize some activities as appropriate funded through the Programme budget;
- c) The MID FPP Manager is appointed by ICAO for a period of one-year renewable. The Job descriptions of the MID FPP Manager are presented in **Appendix C1**;
- d) Experts in PANS-OPS, Airspace Planning, OPS Approval, and Instructors, as well as data specialist may be nominated by States, Organizations, and Industry to create a pool of experts who will support the provisions of the MID FPP services. Their Job descriptions are presented in **Appendices C2, C3, C4 and C5**, respectively. Candidates nominated by Participating States and Donors shall meet the job description requirements. The Regional Director of the MID Office and the Chief of the Programmes Coordination and Implementation Section at ICAO Headquarters in coordination with the MID FPP Manager will evaluate the nominated experts. The appointment of the

experts shall be carried out in accordance with the ICAO Policies on Secondment, Consultancy, ICAO Programme for Aviation Volunteers (IPAV), Internship, etc.

5.3 The MID FPP will build its capacity to provide assistance, training, quality assurance, procedure and airspace design, and operational approval to the Participating States. Other specific fields may be identified during implementation. Additional staff may be needed, as deemed necessary, to meet the demand.

5.4 The draft work plan for the first year to be agreed upon by the MID FPP SC is presented at **Appendix D**.

5.5 Implementation strategy detailed in 5.1 through 5.4 herein may be revised by a decision of the MID FPP SC and ICAO.

6. STRATEGIC OBJECTIVES OF THE PROGRAMME

6.1. The strategic objectives of the MID FPP are detailed in **Table 1**.

Note: "T0" in the table refers to the start of operation date of the Programme:

Category		Objective		Target	Remarks
1	Building MID FPP human resources (pool of experts)	a	Assignment of expert by States and stakeholders (PANS-OPS, OPS approval, Airspace Planners, Instructors) to support the MID FPP activities	T0 + 3 Months	
		b	Ensuring competency of the MID FPP experts through training courses and workshops	T0 + 12 Months	
2	Regulatory oversight framework	a	Develop PANS-OPS Regulation for 80% of Active Participating States	T0 + 15 Months	
		b	Assist States as appropriate in meeting the requirements of the USOAP CMA related to PANS-OPS. 100% of Active Participating States receiving USOAP CMA activity to score above 70% EI in PANS-OPS field	T0 + 24 Months	
3	Meeting the targets set out in the MID Region Air Navigation Strategy related to PBN	a	Develop/update PBN National Implementation Plans for 100% of Active Participating States	T0 + 12 Months	
		b	Implementation of PBN flight procedures at 80% runway ends at international aerodromes of Active Participating States	T0 + 24 Months	
		c	Implementation of PBN SIDs and STARs at 70% international aerodromes of Active Participating States, with due regard to incorporate CCO and CDO	T0 + 24 Months	

4	Training Programmes	a	100% of Participating States develop Training Programme for PANS OPS inspectorate	T0 + 18 Months	
		b	100% of Participating States develop Training Programme for PANS OPS technical experts (service provider)	T0 + 18 Months	
		c	Qualify at least one OPS Approval expert for each Active participating State	T0 + 24 Months	

Table. 1

6.2. A review by the MID FPP Steering Committee should be conducted at least one (1) year prior to the end of Phase I to determine whether the Programme should be continued into the next Phase, and if so, the strategic direction that the Programme should take.

7. MID FPP FIRST YEAR OUTPUTS AND ACTIVITIES

7.1 The following outputs and activities, related mainly to the setup of the MID FPP capabilities, are targeted for the first year of the Programme.

Objective 1: Convene the First MID FPP Steering Committee meeting

Outputs	Activities
<u>Output 1.1:</u> Convene the kickoff meeting of MID FPP from 22 to 24 January 2018 to officially launch the Programme	<u>Activity 1.1.1:</u> The ICAO MID Regional Office to issue the invitation for the meeting by 20 November 2017 to the 15 MID States and stakeholders.
<u>Output 1.2:</u> Convene the First MID FPP Steering Committee meeting in in second half of 2018	<u>Activity 1.2.1:</u> The ICAO MID Regional Office to issue the invitation for the first MID FPP SC/1 meeting at least 2 months in advance. <u>Activity 1.2.2:</u> The MID FPP SC/1 meeting to agree on the MID FPP work plan for the first year and the funding mechanism.

Objective 2: Establish capability for PBN Workshop Implementation Plan, using external expertise, if required.

Outputs	Activities
<u>Output 2.1:</u> Establish workshop programme for PBN Implementation Plan	<u>Activity 2.1.1</u> Define external expertise origin and source of funding <u>Activity 2.1.2</u> Determine contents and schedule for the workshop

Objective 3: Establish capability for operational approval of air operators by Civil Aviation Authorities (CAA) course, using external expertise if required.

Outputs	Activities
<u>Output 3.1:</u> Establish workshop programme for operational approval of air operators by CAA	<u>Activity 3.1.1:</u> Define external expertise origin and source of funding <u>Activity 3.1.2:</u> Determine contents and schedule for the course

Objective 4: Establish capability for airspace design course, using external expertise if required.

Outputs	Activities
<u>Output 4.1:</u> Establish workshop	<u>Activity 4.1.1:</u> Define external expertise origin and source of funding

programme for Airspace Design Course	<u>Activity 4.1.2</u> : Determine contents and schedule for the course

Objective 5: Establish operating capability of the MID FPP in the areas of procedure design including initial PANS-OPS, PBN and OJT (On-The-Job) training capability.

Outputs	Activities
<u>Output 5.1</u> : Establish automation system for the input, storage and output of aeronautical data required for the instrument flight procedure process, based on global standards that will interface with flight procedure design automation tools and avionics database packing tools	<u>Activity 5.1.1</u> : Install automated software and middleware supporting on the software on technical computers of the internal network
<u>Output 5.2</u> : Establish initial procedure design and OJT (On-The-Job) training capabilities.	<u>Activity 5.2.1</u> : Train procedure designers as instructors. <u>Activity 5.2.2</u> : Determine contents for procedure design training sessions and OJT sessions

Objective 6: Establish Flight Procedure validation process and regulatory approval process support capability.

Outputs	Activities
<u>Output 6.1</u> : Establishment of Flight Procedure validation process support capability	<u>Activity 6.1.1</u> : Identify a list and pricing or through in-kind contribution of Flight procedure validation suppliers to cover MID Region to establish initial Flight procedure validation capability, <u>Activity 6.1.2</u> : Train MID FPP staff in Flight Procedure design ground validation process. <u>Activity 6.1.3</u> : Establish a support framework to assist States in validating flight procedures.
<u>Output 6.2</u> : Establishment of Flight Procedure regulatory approval process support capability	<u>Activity 6.2.1</u> : Train MID FPP staff in Flight Procedure regulatory validation process based on Doc 9906 (Quality Assurance Manual), examples from competent States (at least three) and consultation with ICAO <u>Activity 6.2.2</u> : Continue updating the training as new ICAO documentation becomes available. <u>Activity 6.2.3</u> : Establish a support framework to assist States in approving flight procedures

Objective 7: Execute -2019 MID FPP annual work plan, as at **Appendix D**.

Outputs	Activities
<u>Output 7.1</u> : Successful execution of MID FPP 2019 annual work plan	<u>Activity 7.1.1</u> : Provide to Member States the schedule list of training and support activities. <u>Activity 7.1.2</u> : Provide trainings and support activities according to annual work plan. <u>Activity 7.1.3</u> : initiate procedure design projects for the top priority runway ends identified in consultation with the airspace users.

Objective 8: Attain the full capability for MID FPP for Phase I.

Outputs	Activities
<u>Output 8.1:</u> Establish a pool of specialists in PANS-OPS, OPS Approval and Flight procedures Instructors who will mainly work remotely with the MID FPP Manager (on-call basis).	<u>Activity 8.1.1:</u> Establish selection process and identify a pool of suitable candidates, preferably through approaching MID States, Organizations, Airlines, and Donors, according to the job descriptions at Appendices C2-C5 . <u>Activity 8.1.2:</u> select the required pool of resources for the execution of the MID FPP work plan.

Objective 9: Obtain approved work plan, budget and agreement on annual States contribution for the second year of operation

Outputs	Activities
<u>Output 9.1:</u> Obtain approved work plan, budget and agreement on States contribution for the second year.	<u>Activity 9.1.1:</u> provide progress report on the implementation of - 2019 work plan to PBN SG and/or MIDANPIRG meetings <u>Activity 9.1.2:</u> Prepare and propose work plan, budget and annual States contribution level for the second year.

8. INPUTS

8.1. The minimum requirements for the hosting of the MID FPP are specified in **Appendix B2**.

8.2. By 1 January 2019, Lebanon as the Host Administration will provide the facilities and services as outlined in **Appendix B1** (Lebanese offer to host the MID FPP) based on the minimum hosting requirements at **Appendix B2**.

8.3. The host State will facilitate the issuances of visas, accreditations or residence permits for the ICAO experts and recognized dependents ensuring the expeditious relocation of them at the duty station and for the whole duration of their ICAO contracts and subsequent renewals.

Active States

8.4. Active States will provide the following:

- a) annual financial contributions covering the cost of the Programme, as indicated in the annual budget of the Programme; and
- b) participation in the MID FPP SC meetings as Member States with the right to vote.

Participating States

- a) Participating States might provide in-kind contribution to support the MID FPP such as:
 - Computer and Information Technology equipment.
 - Procedure design and charting equipment and software.
 - Suitably equipped classroom(s) for MID FPP training courses held in their States.
- b) support the MID FPP by nominating Procedure Designers, Instructors, Airspace Planners, OPS Approval experts, etc. to support the MID FPP with the implementation of its work plan;
- c) authorize and release to the MID FPP of aeronautical data from third parties, including AIP and electronic terrain and obstacle data, as well as appropriate topographic mapping

data and charts pertaining to their State for the purposes of the Programme, in particular for the design of instrument flight procedures and for quality assurance assistance;

- d) bear the expenses of duty travel (Air Tickets, Transportation, Accommodation and Daily Subsistence Allowances, in accordance to ICAO policies and practices) of MID FPP and ICAO staff as required supporting the MID FPP activities in their States.
- e) release of the assigned experts from their daily duties in order to support the MID FPP activities using their facilities (software, etc.), as required; and
- f) complete all remaining necessary steps to publish instrument flight procedures developed wholly or partly within the MID FPP framework in their State Aeronautical Information Publication.

ICAO (funded by the FPP Programme)

8.5. ICAO will provide the following:

- a) full support from the ICAO MID Office to run the Programme, in close coordination with the Host State, until such a time when the recruitment of a MID FPP Manager is completed;
- b) International Personnel (Programme Manager) for the MID FPP for 3 years;
- c) mission travel of ICAO personnel for monitoring purposes;
- d) administrative and other services for the handling of the Programme;
- e) financial account management and budgetary control of the Programme;
- f) technical support to the Programme experts in the performance of their duties including monitoring missions; and
- g) procurement through TCB: turn-key services for the procurement of goods and services as requested by the MID FPP SC; provided the requisite funds are made available and the project budget is revised, as appropriate. The procurement of equipment or services will be carried out in accordance with ICAO's Procurement Code, Financial Regulations and Rules, and applicable process and procedures.

9. RISKS, MITIGATION MEASURES AND PREREQUISITES

Risks and Risk Levels

9.1. The following are the main identified risks with their associated level:

Risks	Risk Level
a) Delay in the recruitment of MID FPP Manager	High
b) Delays in transfer of funds to ICAO	High
c) Delays in sourcing OPS Approval Instructor	High
d) Delays in nominating of experts from participating States and Organizations	Medium to High
e) Delays in identification of suitably qualified candidates for positions	Medium to High
f) Delays in sourcing of implementation workshop facilitator	Low
g) Delays in MID FPP expert training as Procedure Design Instructor	Low

Risk Mitigation Measures

9.2. It may be considered that low level in risk is acceptable and does not need any mitigation measure.

9.3. Considering the high and medium to high level for delays in:

- a) Delay in transferring fund to MID FPP account: follow-up by ICAO with the concerned States and Donors would mitigate the risk to an acceptable low level;
- b) Delay in the recruitment of the MID FPP Manager: the MID Office, based on the Steering Committee approval, could set up the Programme in coordination with the host State, establish the pool of expertise, and initiate the implementation of some activity from the first year's work plan, until the recruitment of the Manager. This action could mitigate the risk to an acceptable low level;
- c) Designation and release of experts by States: the MID FPP work plan could be difficult to implement. The MID FPP activity supposed to be provided by the missing expert would be replaced by another activity with capacity to provide. This action could mitigate the risk to an acceptable low level; and
- d) Identification of suitably qualified candidates: MID FPP Manager will support States with the identification of candidates. This mitigation could reduce risk to medium level. The MID FPP activity supposed to be provided by the missing nominated expert would be replaced by another activity that MID FPP is in capacity to provide. This action could mitigate the risk to an acceptable low level.

Pre-requisites

9.4. The Project Document should be signed by the host State and a minimum of four (4) Active States before the start of the Programme to ensure funding for the Annual Budget and to permit the MID FPP to perform its activities effectively and efficiently.

9.5. The establishment of the pool of resources and the readiness of the premises.

10. PROGRAMME WORK PLAN

10.1 The work plan for the first year is provided at **Appendix D**.

11. PROGRAMME BUDGET

11.1 MID FPP budget is composed of resources and expenses.

Resources are composed of:

- Annual contribution paid by the Active States;
- Cash contribution provided by Donors; and
- Fees paid by States in relation to services provided by MID FPP as outlined in Section 3.

Expenses mainly relate to:

- Manager Salary and allowances;
- Allowances paid to MID FPP experts;
- Workshops and courses organization, consultant expertise costs,
- Travel Missions Expenses (travel, transportation and DSA),
- Office costs, and
- Administrative Overhead.

11.2 The activities/events should normally be convened at the MID FPP premises. If a State/Organization offers to host an activity, it shall coordinate with the MID FPP Manager as early as possible, but in any case at least six (06) months in advance and, shall be responsible for providing a venue, services and all costs of travel, accommodation and daily subsistence allowance for MID FPP experts, ICAO personnel, Instructors and Experts performing the activity.

11.3 The Programme budget corresponding to Phase I is provided at **Appendix E**.

12. LEGAL FRAMEWORK

12.1 The funds and activities under this Agreement shall be administered according to applicable ICAO regulations, rules, directives, procedures and practices.

12.2 The obligations assumed by the parties under this Agreement shall continue to exist after termination of this Agreement to the extent necessary to permit the orderly finalization of activities, the withdrawal of personnel, the distribution of funds and assets, the liquidation of accounts existing between the parties, and the settlement of contractual obligations. Additional funds, if necessary, to cover the above-mentioned expenditures shall be provided by the Participating States.

12.3 All cash receipts to, and payments made by, ICAO under this Agreement shall be recorded in a separate account, opened, inter alia, in order to place on record the receipt and administration of payments. All payments made to ICAO shall be made in U.S. dollars and deposited in ICAO's bank account as follows:

Pay to://CC000305101
Royal Bank of Canada
Ste. Catherine and Stanley Branch
1140 Ste. Catherine Street West
Montreal, Quebec
Canada H3B 1H7
For credit to: 05101 404 6 892
Project: RAB/18/801
ICAO Account
Swift code: ROYCCAT2

12.4 ICAO shall not be obliged to begin or continue the provision of the Services until the payments of this Agreement have been received and ICAO shall not be obliged to pay or commit any sums exceeding the funds deposited in the aforementioned account.

12.5 ICAO shall furnish the Participating States with unaudited financial statements concerning the Services covered in this Agreement, showing the status of the funds in U.S. dollars as at the end of March, June, September and December. After ICAO has concluded the provision of the Services, it shall submit a final financial statement. In the event that the Participating State(s) requests that a special audit/evaluation of its account or project under this Agreement be performed by the Internal or External Auditor of ICAO, the Participating State(s) shall bear the cost of such audit.

12.6 If due to unforeseen circumstances the funds received under this Agreement should prove insufficient to cover the total cost of provision of the Services and Administrative Charges, ICAO shall inform the Participating States to that effect and additional funds, if required, shall be made available to ICAO before the continuation of the project

12.7 Any dispute, controversy or claim arising out of or relating to this Agreement, or the breach, termination or invalidity thereof, shall be settled, in the first instance, by direct negotiations between the parties. If unsuccessful, such dispute, controversy or claim shall be settled by arbitration in accordance with the United Nations Commission on International Trade Law (UNCITRAL) Arbitration Rules, as in force at the time of arbitration. The place of arbitration shall be Montreal, Province of Quebec, Canada, conducted in the English language. Arbitration shall be conducted by one arbitrator. The arbitral award shall contain a statement of reasons on which it is based and shall be accepted by the Parties as the final adjudication of the dispute.

12.8 Nothing in or relating to this Agreement shall be deemed a waiver, express or implied, of any immunity from suit or legal process or any privilege, exemption or other immunity enjoyed or which may be

enjoyed by ICAO, its officers, staff, assets and funds either pursuant to the Convention on the Privileges and Immunities of the Specialized Agencies, 1947 or other applicable conventions, agreements, laws or decrees

12.9 The Participating States shall indemnify, hold harmless and, in consultation with ICAO, defend ICAO, including its personnel from any and all actions, claims or other demands arising out of any act performed by ICAO on behalf of the Participating States pursuant to this Agreement.

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MID FPP STEERING COMMITTEE (MID FPP SC)

TERMS OF REFERENCE

A) Purpose of the MID FPP SC:

The MID FPP Steering Committee shall meet at least once a year at a venue and time agreed upon by the SC Members.

In order to meet its Terms of Reference, the MID FPP SC shall:

1. elect a Chairperson for a cycle of three years unless re-elected;
2. review regional objectives, plans and users' requirements;
3. monitor and evaluate the Programme activities since the previous meeting;
4. formulate policies and assign priorities for the activities of the MID FPP taking into account the requirements of this Institutional Framework, the provisions of the MID FPP Project document and the availability of funds;
5. review and approve the annual work plan and budget of the MID FPP; taking into account the Host State's and Participating States' in kind-contributions for offsetting their annual financial contribution to the Programme.
6. review plans submitted by the MID FPP Manager;
7. ensure that the business plans are in line with the MID Air Navigation Strategy;
8. oversee the activities of the MID FPP in line with the plans and approved budgets;
9. monitor the financial performance at project level in line with the approved budget;
10. monitor and follow-up the implementation of the MIDANPIRG Conclusions and Decisions related to the MID FPP;
11. follow up with the implementation of the agreed projects and provide regular progress report to the relevant MIDANPIRG subsidiary bodies;
12. coordinate technical issues with the appropriate MIDANPIRG subsidiary bodies; and
13. review and update its terms of reference as deemed necessary.

B) Composition:

The MID FPP SC is composed of:

- a) MID FPP Active States: Directors General of Civil Aviation of the MID FPP Active States, or their designated representatives;
- b) ICAO: Regional Director, Middle East Office, Director, Technical Cooperation Bureau (TCB), and Chief of Programmes Coordination and Implementation Section (ANB/PCI) or their representatives; and
- c) MID FPP Manager, who will act also as the Secretary of the Steering Committee meetings.

The following may participate in the Steering Committee meetings as observers:

- a) MID FPP Users States: Directors General of Civil Aviation of the MID FPP Member States, or their designated representatives;
- b) Donor States, agencies, organizations and industry having made a financial or in-kind contribution (recognized as "Partners" in the implementation of the Programme);
- c) Representatives from observers States, agencies, organizations and industry with an interest in

aviation safety or air navigation issues in the MID Region; and

d) Representatives from the following Partners:

AACO, ACAC, ACI, AIRBUS, BOEING, CANSO, EUROCONTROL/SESAR JU, IATA, IFALPA IFAIMA, and IFATCA.

Other representatives from States and industry may be invited on ad-hoc basis, as required.

Note 1: *The composition of the MID FPP SC may be updated over time to include only States and/or Partners that could participate actively and contribute to the work of the SC.*

DRAFT

Appendix B1

MID FPP LEBANON HOSTING OFFER

State Name:	Lebanese General Directorate of Civil aviation	date: 18 JUNE 2016
Filled by:	Kamal Nassereddine/chief of air navigation Department	email: atm@beirutairport.gov.lb

Please complete and send in a closed envelope by courier (DHL, ARAMEX, etc.) to the ICAO Middle East Office, Cairo International Airport, Ministry of Civil Aviation Complex, P.O.Box 85, Postal Code 11776, Cairo, Egypt

During evaluation grades will be set out of 10 marks and then multiplied by the relevant factors.

Item	Requirements	Multiply Factor	Details	Your Offer/Answers
General Living conditions				
1	City Accessibility	2	Indicate which of the MID States have NO direct flight to your State	All states have more than one daily direct flights to Beirut airport Except for Sudan, Libya, and Yemen.
2	Visas	2	Indicate which of the MID States require entry visa to your State	(Egypt , Libya, Sudan, Yemen)
3			Will your Administration facilitate the visa process for the participants?	these states need some documents to get the visas at Beirut airport like hotel reservation , 2way flight tickets, 2000 USD cache, a security check might also be required for some participants, even though the DGCA will provide appropriate support to facilitate visa issuance for them.
4	United Nations privileges	2	Is the necessary procedures in place that facilitate the issuances of visas, accreditations or residence permits for the MID FPP Manager and his family members (UN-ICAO expert) ensuring the expeditious relocation of them at the duty station and for the whole duration of their ICAO contracts and subsequent renewals.	yes Lebanon will facilitate the issuances of their visas also The Programme Coordinator will benefit from the same privileges provided to the United Nations Staff working in Lebanon (residency, Immunities, etc.) in accordance with the Lebanese law and policies.
5	Transportation	1	What are you offering for the MID FPP Manager for his daily transportation?	upon request DGCA can provide the transportation with driver to/from within Beirut city Zone for the FPP coordinator and for purposes of official movements between programme office and supporting facilities as needed or requested.
Premises				
6	Building	2	Building Type (Villa, Apartment, Centre, etc.)	the premises will be in the safety training center located within Beirut Rafic Hariri International Airport-Beirut Area and just away 9 km from Beirut city center.
7	Offices	3	Number of Offices for the Manager and experts.	2 -3 OFFICES as requested by ICAO letters :AN 6/33-16/023, and Letter Ref: AN 6/33-16/149 dated 2 June 2016.
8	Facilities	1	List the facilities that will be provided within the premises such as: parking, garden, kitchen, cafeteria, playground, coffee machines, etc.	the center include: large parking for more than 50 cars, backyard garden, kitchen, small self service cafeteria , play ground , coffee machines and Beverages machines, library with study room . (please see the pictures No 1 & 2)
9	Furniture	1	What furniture will be provided?	all requested by ICAO letter: AN 6/33-16/023 AN 6/33-16/023, and Letter Ref: AN 6/33-16/149 dated 2 June 2016 for fully new furnished offices
10	Labs	3	Number of laboratory to be used by procedure designers	Two laboratories are available upon request with pre-reservation : 1- Computer LAB contains 20 workstations. (see the pictures No 3) 2- Another available large ROOM (20 persons) can be used as LAB
11	Meeting Rooms	3	Number and capacity of meeting rooms	3 meeting rooms are available upon request with pre-reservation with the center coordinator and CERSA (security training academy) : 1- examination hall can contain 80 persons. (see the pictures No 4) 2- Amphitheatre capacity 64 people . (see the pictures No 5). 3- one meeting room for 18 persons equipped with smart projector (see the pictures No 6).
12	Classrooms	3	Number and capacity of classrooms	the center has 7 classrooms (Capacity between 10 and 25 trainees) (see the pictures No 7).
13	Air conditioning	2	Indicate if the premises is or will be air-conditioned through the hosting offer	the center is already air-conditioned 24/24hours through the Lebanese DGCA offer.

Running cost of the premises				
14	Security of the premises	1	Are you willing to provide security services?	yes Centre is provided with private parking ,fence and the police is guarding the center 24/24 hours since in the same location there is the CERSA Aviation Security Training Academy and police office (see the pictures No 8).
15	Electricity	1	Is electricity fees covered by your offer?	yes for 24/24hours through the lebanese DGCA offer.
16	Internet	1	Is internet fees covered by your offer?	yes 4 MB HDSL will be provided through the lebanese DGCA offer.
17	Telephone	1	Is telephone bills covered by your offer (specify if local and/or international calls)?	the local telephone bills will be only covered by lebanon DGCA offer, for the international calls the center is equipped by a pay-phone machine.
18	Cleaning services	1	Are you willing to provide cleaning services of the premises?	yes / a daily cleaning services are already provided through DGCA to all training center premises including MFPP offices.
19	Maintenance	1	Are you willing to cover the maintenance expenses related to the premises?	yes maintenance are already covered through DGCA to all training center premises .
Man power support				
20	PANS-OPS experts	2	Indicate the number of experts that will support the MID FPP and in which area (PANS-OPS, Airspace Planners, OPS-Approval, Instructors)	LEBANON Doesn't have procedures designer experts (we have one person didn't complete all the required courses and without OJT) and we are willing to train 3-4 persons in the mentioned area through the MFPP project training courses.
21	data analyst	1	Are you willing to support the MID FPP with a Data Analyst?	NO
22	secretary	1	Are you willing to support the MID FPP with a Secretary?	NO
Equipment and software				
23	PCs	3	Indicate number of PCs that will be provide (Workstations and Server)	1 server + 4 workstations (PC)
24	Monitors	3	Number of 19 inch monitors for the above PCs	5 Monitors
25	Maps Storage cabinet	1	Cabinet for MAPs and documentation storage	yes (and we will provide more than one cabinet if needed)
26	A0 Printer or Plotter	1	Type of the A0 printer	HP DESIGN-JET
27	Maps A3 printer	1	Type of the A3 printer	HP
28	A0 scanner	1	Type of the A0 scanner	HP DESIGN-JET
29	Computer Data Projector	2	Projector (type and numbers)	ALL classrooms and meeting rooms in the center are equipped with projectors and there is one meeting room is equipped with smart projector and we can provide one extra projector (sony or epson) if needed or requested by MFPP manager.
30	Supplies for training sessions**	1	Are willing to provide supplies for training sessions such as: set squares, protractors, compasses, rulers and nocket calculators?	yes (but we need a list of the items needed+ numbers and types)
31	2 Procedure Design Software Licenses	3	Are willing to provide the procedure design software? Indicate type and how many licenses?	the MFPP STAFF will have access (if requested or needed) to use the lebanese flight procedure design software and tools(GeoTITan) which we are going to upgarde to the new version during 2016/17 and we are planning to get 2 licenses and we will then dedicate one of them to the MFPP project.
32	2 GOOGLE EARTH licenses	1	Are willing to provide 2 GOOGLE EARTH licenses?	yes
33	2 ACROBAT READER licenses	1	Are willing to provide2 ACROBAT READER licenses?	yes
34	2 COREL DRAW licenses	1	Are willing to provide 2 COREL DRAW licenses?	yes
35	Simulator	2	Are you willing to provide or make available the use of a Fast Time Simulator.	A project for a new ATC Simulator (Tower - Approach - Area), including a FTS has been already initiated with ICAO TCB and could be used by the MID FPP .
36	2 virtual machines (such as VMWARE) licenses	1	Are willing to provide 2 virtual machines (such as VMWARE) licenses for the remotely use of the MID FPP software?	YES
Readiness to sign the Agreement				
37	Premises	2	How much time is needed for the readiness of the premises?	the premises is already exist and the training center is opened and operated many years ago.
38	Agreement	3	how much time is needed for the signature of the Hosting Agreement with ICAO Technical Cooperation Bureau (TCB)?	after the signature of the hosting agreement with ICAO (TCB) we need 6 months for purchasing the furniture , tools , and the softwares offered by the Lebanese DGCA.

END

MID FPP MINIMUM OFFICE REQUIREMENTS

MID FPP staff	
	• Programme Manager (1) Full Time Recruited by ICAO TCB • 5 to 10 Procedure Designers and Airspace Planners, 2- to 4 OPS Approval experts and 2 to 4 PD Instructors assigned by States and Donors, who will work on-call-basis. • PANS-OPS Specialist, Data Specialist (1), Administrative Assistant (1) and/or IT Specialist (1) should be seconded when needed in compliance with the ICAO policy on secondment.
Office space	
1 office	• Programme Manager
1 office	• PANS-OPS Expert
1 room	• Lab for procedure design
1 room	• Classroom/ Meeting room
Furniture equipment	
Manager	• Desk and chair • Storage/File cabinet • Book case • Conference table (6 persons) and chairs • Monitor/Webcam for conferences
Offices	• Standard furniture for all offices • Desk, chair, storage/file cabinet, book case – per person
Classroom OJT room	• Adequate space for 20 students • 4 drawing tables • White boards • Student tables • Projector
Meeting room	• Adequate equipment for 20 persons
IT equipment	
	• Secure Wi-Fi Internet connection • Desk-top Phone with international services • 1 Mobile phone (Manager) – Laptop computer with docking station – monitor 19" • Data Specialist when seconded – Office computer equipment (monitor 19") • External storage disks • 1 desktop multi-functional color copier/scanner/printer
Procedure Design equipment	
Offices	• Maps Storage cabinet • Maps A3 printer • A0 scanner • A0 printer Semi-professional • GPS • 1 server and 2 workstations (PCs)
Classroom	• Computer Data Projector • Supplies for training sessions : set squares, protractors, compasses, rulers and pocket calculators
software	• 2 Procedure Design Software Licenses • 2 GOOGLE EARTH licenses • 2 ACROBAT READER licenses • 2 COREL DRAW licenses • 2 virtual machines (such as VMWARE) licenses for the remotely use of the Procedure Design Software

APPENDIX C - JOB DESCRIPTION



International Civil Aviation Organization Technical Cooperation Bureau – Job Description

POSITION INFORMATION

Generic Title:	Programme Manager	Position Number (ID):	
Specific Title:	MID FPP Manager	Job Card:	
Project Number:		Post Number/Job Code:	
Duty Station:	TBD	CCOG code:	
Duration:	1 year	Starting Date:	1 January 2019

ORGANISATIONAL SETTING

Under the direction of the Director/Technical Cooperation Bureau, the Field Operations Section is responsible for the strategic planning, development, execution and evaluation of Projects in TCB. The Section assists with the identification of priority development requirements across civil aviation and with technical cooperation to recipient States. It carries out resource mobilization with multilateral and bilateral development partners and industry and develops regional and country specific technical cooperation programmes and projects. The Section executes these programmes and projects in accordance with the policies and contractual modalities of TCB.

MAJOR DUTIES AND RESPONSIBILITIES

Under the direction of the ICAO Middle East Regional Director and in cooperation with the national counterparts and other MID FPP Programme personnel:

- work with ICAO and the participating States on the establishment of the MID FPP Office and commencement of operations, including establishment of office capability and processes;
- be responsible for all aspects of the operation and management of the Flight Procedure Programme to include Programme coordination functions, personnel resourcing and training, office software and automation implementation, work plans, travel, and budget;
- implement of the work plan agreed upon by the MID FPP Steering Committee;
- perform frequent coordination with ICAO MID Regional Office, other FPP offices, sub-regional groups, international and regional Organizations and States on issues related to FPP operations;
- foster positive relationships and cooperation among assigned staff, international experts, nominated experts, seconded officers and CAA counterparts;
- identify, and develop Programme resources;
- report on a quarterly basis to the MID FPP Steering Committee and the ICAO Middle East Regional Director, on the progress of the FPP to include:
 - a. Programme Status (Interim or Full Operational Capability, status of resources, budget, etc.);
 - b. Accomplishments (since last report);
 - c. Objectives for the next reporting period; and
 - d. Other (new requirements, concerns, issues, etc.)
- develop and amend business plans (deliverables, timeline, budget and concerned entities) for MID FPP and recommends them to the Steering Committee;
- develop Key Performance Indicators (KPIs) to monitor the implementation, assess and measure the effectiveness of the Programme;
- identify and report Programme risk to the MID FPP SC and maintain a risk database;
- assign projects to the MID FPP personnel;
- supervise/monitor the performance of the MID FPP Specialists; and
- perform other related duties as required.

QUALIFICATIONS AND EXPERIENCE

Educational background

A first level university degree in aeronautics, ATM, or in a related field, is required. A technical qualification in aviation such as an Airline Transport Pilot License (ATPL) and Air Traffic Control (ATC) License may be accepted in lieu of a university degree.

Professional experience and knowledge

- At least 10 years' operational experience as PANS-OPS Specialist, Airspace Planner, pilot or Air Traffic Controller, with a good understanding of instrument flight procedure design process. A working knowledge of the Ops Approval and Airspace Design processes is highly desirable.
- Knowledge in aeronautical data quality and trajectories' publication.
- At least 5 years' aviation management experience.
- Knowledge of the ICAO GANP as well as the Performance Based Navigation (PBN) concept, objectives and supporting ICAO provisions and guidance.
- Ability to work and coordinate with civil aviation officials at all levels, as well as industry, regional and sub-regional groups, to accomplish the goals of the Programme.
- Ability to successfully lead major projects under a team structure; Experience in team management with the ability to foster and maintain harmonious, positive working relationships in a multi-national environment.
- Satisfactory completion of PANS-OPS, Airspace planning or PBN course(s).
- Satisfactory completion of the ICAO online course related to PBN.
- Knowledge of the process related to the development of IFPs for conventional and PBN procedures.
- Completion of SMS or Quality assurance course(s) with knowledge about the implementation of Flight Procedure Design Quality Assurance (Doc 9906) requirements.
- Experience using Flight Procedure Design automation systems for flight procedure design is preferable.
- Experience as an Instrument Flight Procedure Design Instructor for ICAO PANS-OPS (Doc 8168) courses is preferable.

Language Skills

Essential

- Fluent reading, writing and speaking abilities in English is essential.

Desirable

- A working knowledge of Arabic is an asset

Competencies

- **Judgment/Decision-Making:** Demonstrated ability to take ownership of all responsibilities and commitments, to exercise a mature opinion, to recognize key issues and analyse relevant information, to formulate viable recommendations and make decisions.
- **Vision:** Identifies strategic issues, opportunities and risks.
- **Leadership:** Drives for change and improvement, does not accept the status quo, establishes and maintains relationships with a broad range of people to understand needs and gain support.
- **Managing Performance:** Monitor progress against milestones and deadlines.
- **Building Trust:** Operates with transparency, treats sensitive or confidential information appropriately.
- **Teamwork:** Ability to work with colleagues to achieve the project objectives and maintain harmonious working relations in a multinational environment.
- **Client Orientation:** Ability to establish and maintain partnerships with outside partners, to work and argue effectively in a system based on consensus and to successfully manage and resolve conflicts.
- **Communication:** Ability to write clearly and concisely and present oral reports.

REMUNERATION

APPENDIX B - JOB DESCRIPTION



International Civil Aviation Organization

Technical Cooperation Bureau – Job Description

POSITION INFORMATION

Generic Title:	Procedure Designer	Position Number (ID):	
Specific Title:	Procedure Designer	Job Card:	
Project Number:		Post Number/Job Code:	
Duty Station:	Remotely	CCOG code:	
Duration:	1 year	Starting Date:	

ORGANISATIONAL SETTING

Under the direction of the Director/Technical Cooperation Bureau, the Field Operations Section is responsible for the strategic planning, development, execution and evaluation of Projects in TCB. The Section assists with the identification of priority development requirements across civil aviation and with technical cooperation to recipient States. It carries out resource mobilization with multilateral and bilateral development partners and industry and develops regional and country specific technical cooperation programmes and projects. The Section executes these programmes and projects in accordance with the policies and contractual modalities of TCB.

MAJOR DUTIES AND RESPONSIBILITIES

Under the direction of the ICAO Middle East Regional and with the supervision of the MID FPP Manager:

- design instrument flight procedures;
- review, verify, maintain and make sure that the flight procedure is ready for the final approval;
- guarantee a quality assurance in the flight procedure design;
- provide OJT training to new procedure designers;
- maintain a well-structured database for obstacles assessment; and
- perform other related duties as assigned.

QUALIFICATIONS AND EXPERIENCE

Educational background

University degree or equivalent qualifications and experience in the air navigation.

Professional experience and knowledge

- Minimum five (5) years' experience at increasing levels of responsibility in flight procedure design
- Experience in aviation operations as a pilot, navigator or air traffic controller is desirable.
- Satisfactory completion of an approved PANS OPS flight procedures design courses and advanced courses on PANS OPS flight procedures design (PBN, RNAV, GBAS, etc.) at a specialized recognized institution.
- Knowledge in the aeronautical information conceptual and exchange model (AIXM), automation, digital terrain model (DTM), geographic information systems and cartography.
- Experience in the use of flight procedure design software.
- Knowledge in participating in the work of International Organization for Standardization (ISO) and quality assurance.
- Thorough knowledge of ICAO Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS).
- Ability to write clearly and concisely detailed technical and specialized reports and to make verbal presentations.
- Ability to develop clear goals that are consistent with agreed strategies.

Language Skills

Essential

- Good command of oral and written English is essential.

Desirable

- A working knowledge of Arabic is an asset.

Competencies

- **Judgment/Decision-Making:** Demonstrated ability to take ownership of all responsibilities and commitments, to exercise a mature opinion, to recognize key issues and analyse relevant information, to formulate viable recommendations and make decisions.
- **Vision:** Identifies strategic issues, opportunities and risks.
- **Leadership:** Drives for change and improvement, does not accept the status quo, establishes and maintains relationships with a broad range of people to understand needs and gain support.
- **Managing Performance:** Monitor progress against milestones and deadlines.
- **Building Trust:** Operates with transparency, treats sensitive or confidential information appropriately.
- **Teamwork:** Ability to work with colleagues to achieve the project objectives and maintain harmonious working relations in a multinational environment.
- **Client Orientation:** Ability to establish and maintain partnerships with outside partners, to work and argue effectively in a system based on consensus and to successfully manage and resolve conflicts.
- **Communication:** Ability to write clearly and concisely and present oral reports.

REMUNERATION

APPENDIX B - JOB DESCRIPTION



International Civil Aviation Organization Technical Cooperation Bureau – Job Description

POSITION INFORMATION

Generic Title:	Instructor	Position Number (ID):	
Specific Title:	Instructor	Job Card:	
Project Number:		Post Number/Job Code:	
Duty Station:	Remotely	CCOG code:	
Duration:	1 year	Starting Date:	

ORGANISATIONAL SETTING

Under the direction of the Director/Technical Cooperation Bureau, the Field Operations Section is responsible for the strategic planning, development, execution and evaluation of Projects in TCB. The Section assists with the identification of priority development requirements across civil aviation and with technical cooperation to recipient States. It carries out resource mobilization with multilateral and bilateral development partners and industry and develops regional and country specific technical cooperation programmes and projects. The Section executes these programmes and projects in accordance with the policies and contractual modalities of TCB.

MAJOR DUTIES AND RESPONSIBILITIES

Under the direction of the ICAO Middle East Regional and with the supervision of the MID FPP Manager:

- conduct airspace planning, procedure design and OPS Approval courses as tasked by the MID FPP Manager; and
- perform other related duties as assigned by the MID FPP Manager.

QUALIFICATIONS AND EXPERIENCE

Educational background

University degree or equivalent qualifications and experience in the air navigation.

Professional experience and knowledge

- Significant aviation experience as air traffic controller or a pilot or demonstrated equivalencies.
- Significant experience as Instrument Flight Procedure Design specialist with extensive knowledge of ICAO PANS-OPS (Doc 8168) and ICAO PBN (Doc 9613) requirements.
- Significant experience as an Airspace Design specialist with knowledge of ICAO use of PBN in Airspace Design (ICAO Doc 9992).
- Training and Experience as an Instrument Flight Procedure Design Instructor for ICAO PANS-OPS (Doc 8168) courses with thorough understanding of teaching techniques and assessment methods is desirable.
- Thorough understanding of Flight Procedure Design Quality Assurance (Doc 9906) requirements and its implementation.

Language Skills

Essential

- Good command of oral and written English is essential.

Desirable

- A working knowledge of Arabic is an asset.

Competencies

- **Judgment/Decision-Making:** Demonstrated ability to take ownership of all responsibilities and commitments, to exercise a mature opinion, to recognize key issues and analyse relevant information, to formulate viable recommendations and make decisions.
- **Vision:** Identifies strategic issues, opportunities and risks.
- **Leadership:** Drives for change and improvement, does not accept the status quo, establishes and maintains relationships with a broad range of people to understand needs and gain support.
- **Managing Performance:** Monitor progress against milestones and deadlines.
- **Building Trust:** Operates with transparency, treats sensitive or confidential information appropriately.
- **Teamwork:** Ability to work with colleagues to achieve the project objectives and maintain harmonious working relations in a multinational environment.
- **Client Orientation:** Ability to establish and maintain partnerships with outside partners, to work and argue effectively in a system based on consensus and to successfully manage and resolve conflicts.
- **Communication:** Ability to write clearly and concisely and present oral reports.

REMUNERATION

APPENDIX B - JOB DESCRIPTIONS



International Civil Aviation Organization Technical Cooperation Bureau – Job Description

POSITION INFORMATION

Generic Title:	OPS approval Expert	Position Number (ID):	
Specific Title:	OPS approval Expert	Job Card:	
Project Number:		Post Number/Job Code:	
Duty Station:	Remotely	CCOG code:	
Duration:	1 year	Starting Date:	

ORGANISATIONAL SETTING

Under the direction of the Director/Technical Cooperation Bureau, the Field Operations Section is responsible for the strategic planning, development, execution and evaluation of Projects in TCB. The Section assists with the identification of priority development requirements across civil aviation and with technical cooperation to recipient States. It carries out resource mobilization with multilateral and bilateral development partners and industry and develops regional and country specific technical cooperation programmes and projects. The Section executes these programmes and projects in accordance with the policies and contractual modalities of TCB.

MAJOR DUTIES AND RESPONSIBILITIES

Under the direction of the ICAO Middle East Regional and with the supervision of the MID FPP Manager:

- assist States with the developments/implementation of flight procedure regulatory approval as tasked by the MID FPP Manager;
- review, verify, maintain and make sure that the flight procedure is ready for the final approval;
- provide on-the-job training to OPS Approval experts; and
- perform other related duties as assigned

QUALIFICATIONS AND EXPERIENCE

Educational background

University degree or equivalent qualifications and experience in the air navigation.

Professional experience and knowledge

- Satisfactory completion of formal PANS-OPS course(s) to cover the conventional and PBN procedure design criteria.
- Experience in the development of IFPs for conventional and PBN procedures.
- Understanding of Flight Procedure Design Quality Assurance (Doc 9906) requirements and its implementation.
- Experience using Flight Procedure Design automation systems for flight procedure design is preferable.
- Experience as an Instrument Flight Procedure Design Instructor for ICAO PANS-OPS (Doc 8168) courses is preferable.
- Experience of working with CAAs (Regulatory authorities).

Language Skills

Essential

- Good command of oral and written English is essential.

Desirable

- A working knowledge of Arabic is an asset.

Competencies

- **Judgment/Decision-Making:** Demonstrated ability to take ownership of all responsibilities and commitments, to exercise a mature opinion, to recognize key issues and analyse relevant information, to formulate viable recommendations and make decisions.
- **Vision:** Identifies strategic issues, opportunities and risks.
- **Leadership:** Drives for change and improvement, does not accept the status quo, establishes and maintains relationships with a broad range of people to understand needs and gain support.
- **Managing Performance:** Monitor progress against milestones and deadlines.
- **Building Trust:** Operates with transparency, treats sensitive or confidential information appropriately.
- **Teamwork:** Ability to work with colleagues to achieve the project objectives and maintain harmonious working relations in a multinational environment.
- **Client Orientation:** Ability to establish and maintain partnerships with outside partners, to work and argue effectively in a system based on consensus and to successfully manage and resolve conflicts.
- **Communication:** Ability to write clearly and concisely and present oral reports.

REMUNERATION

APPENDIX B - JOB DESCRIPTIONS



International Civil Aviation Organization Technical Cooperation Bureau – Job Description

POSITION INFORMATION

Generic Title:	Data Specialist	Position Number (ID):	
Specific Title:	Data Specialist	Job Card:	
Project Number:		Post Number/Job Code:	
Duty Station:	TBD	CCOG code:	
Duration:	1 year	Starting Date:	

ORGANISATIONAL SETTING

Under the direction of the Director/Technical Cooperation Bureau, the Field Operations Section is responsible for the strategic planning, development, execution and evaluation of Projects in TCB. The Section assists with the identification of priority development requirements across civil aviation and with technical cooperation to recipient States. It carries out resource mobilization with multilateral and bilateral development partners and industry and develops regional and country specific technical cooperation programmes and projects. The Section executes these programmes and projects in accordance with the policies and contractual modalities of TCB.

MAJOR DUTIES AND RESPONSIBILITIES

Under the direction of the ICAO Middle East Regional and with the supervision of the MID FPP Manager:

- establish and update MID FPP data base of aeronautical data to support procedure design;
- acquire and store obstacle data to support procedure design; and
- perform other related duties as assigned

QUALIFICATIONS AND EXPERIENCE

Educational background

University degree or equivalent qualifications and experience in the air navigation.

Professional experience and knowledge

- Significant experience in aeronautical data management.
- Knowledge of ICAO PANS-OPS (Doc 8168) and ICAO PBN (Doc 9613) data requirements.
- Thorough understanding of Flight Procedure Design Quality Assurance (Doc 9906) requirements and its implementation.
- Training and experience using Flight Procedure Design automation systems for flight procedure design.
- Experience of working with CAAs, preferably in the MID Region.

Language Skills

Essential

- Good command of oral and written English is essential.

Desirable

- A working knowledge of Arabic is an asset.

Competencies

- **Judgment/Decision-Making:** Demonstrated ability to take ownership of all responsibilities and commitments, to

exercise a mature opinion, to recognize key issues and analyse relevant information, to formulate viable recommendations and make decisions.

- **Vision:** Identifies strategic issues, opportunities and risks.
- **Leadership:** Drives for change and improvement, does not accept the status quo, establishes and maintains relationships with a broad range of people to understand needs and gain support.
- **Managing Performance:** Monitor progress against milestones and deadlines.
- **Building Trust:** Operates with transparency, treats sensitive or confidential information appropriately.
- **Teamwork:** Ability to work with colleagues to achieve the project objectives and maintain harmonious working relations in a multinational environment.
- **Client Orientation:** Ability to establish and maintain partnerships with outside partners, to work and argue effectively in a system based on consensus and to successfully manage and resolve conflicts.
- **Communication:** Ability to write clearly and concisely and present oral reports.

REMUNERATION

WORK PLAN 2019

MID FPP Objectives for Year 1 (2019)

The first year will be an important year for the MID Flight Procedures Programme (MID FPP). The purpose of the Programme is to provide opportunity to use the training activities and services proposed by the Programme for Participating States.

In order to propose a variety of training activities and services addressing the needs of Participating States while complying with the ICAO Resolution A37-11, ASBU B0-APTA and the Global and regional requirements, the MID FPP training programme is composed of workshops, training courses and support activities. The training activities centered on PBN Implementation Plan, regulatory approval procedures and PBN OPS Approval for operators have to be considered as essential to improve or start PBN implementation in States.

On the other hand, specific projects and implementation support activities will assist Participating States to consolidate or implement the flight procedures through ground validation and approval process. These activities will allow the Participating States to expedite or to make the first steps for implementing PBN flight procedures in the Region.

The MID FPP Objectives for 2019 are as follows;

- Commence Phase 1 MID FPP operations on **01 January 2019**;
- Conduct 4 Training activities; and
- Conduct 2 Project-orientated implementation support activities

MID FPP Training Activities for-2019

1) PBN Implementation Workshop--5 days – [date]

Description: This PBN Implementation Workshop is intended to assist States/Administrations in enhancing their PBN Implementation Plans and move forward with actual PBN implementations. The Workshop will also provide updated information regarding global PBN activities and how PBN can be an enabler for enhancing ATM operations. During the workshops, the participants with assistance from MID FPP facilitators will develop a list of short-term action items aiming to enhance their existing PBN Implementation Plans and advance their on-going PBN implementations and deployments. The list of action items along with relevant recommendations will then be submitted to appropriate CAAs for their actions.

Participants to these workshops should be representatives from all aviation stakeholders with an interest in PBN implementation.

- Facilitator – TBD
- Coordination/Sponsorship –TBD
- Material – ANB, APAC FPP, AFI FPP, MID FPP
- Facility – TBD
- Funding – TBD

2) PBN Ops Approval Course - 1 week - [date]

Description: The course is based on ICAO Doc 9997 and conducts to support States in developing their operational approval capability for approving PBN operations and air operators in obtaining PBN OPS approvals. The purpose of the course is to provide experienced flight inspectors, flight operations regulators and air operators' personnel with a comprehensive understanding of the requirements for PBN operational approval.

At the end of the course, each participant will be individually assessed and the outcome of the assessment will be reported to each participant and his/her agency. The course is open to qualified and experienced flight inspectors, regulators and air operator personnel involved in PBN flight operations.

- Instructor – TBD
- Coordination/Sponsorship – TBD
- Material – ANB, TBD
- Facility – TBD
- Funding - TBD

3) PANS-OPS Initial Procedure Design Course– 4 Weeks – [dates]

Description: The course is based on ICAO PANS-OPS and aims to support States in developing their conventional flight procedures and basic procedure design capability by providing fundamental knowledge regarding procedure design. The instruction consists of lecturing, exercises, progress tests and examinations. At the end of the course, each participant will be individually assessed and the outcome of the assessment will then be reported to each participant and his/her agency.

- Instructor – TBD
- Material – TBD
- Facility – TBD
- Funding – TBD

4) PBN Procedure Design – 4 Weeks – [dates]

Description: The course aimed to support States/Administrations in developing their PBN procedure design capacity. The course is a follow-up to the ICAO PANS-OPS Initial Procedure Design Course. At the end of the course, each student will be individually assessed and the outcome of the assessment will then be reported to each student and his/her agency. The course is open to qualified procedure designers who have successfully completed PANS-OPS Initial Course either at the MID FPP or other institutions.

- Instructor – TBD
- Material – TBD
- Facility – TBD
- Funding - TBD

MID FPP Project-oriented Implementation Support for 2019

1) OJT on ground validation and approval procedures with specific projects, [States, dates]

Description: The OJT sessions are targeted to assist regulators in validating and approving specific PBN procedures. The purpose of the session is to provide hands-on assistance for regulators in reviewing specific procedure design and validation packages which have been submitted prior to actual approvals and publications into the State AIPs. It is expected that once the validation and approval process is completed, the said procedures will be promptly published and implemented.

- Instructor - Qualified procedure designer from MID FPP
- Funding by States participating on the OJTs or Donors if available
- Facility - TBD
- Conditions – This OJT session is available for
 - Active States with annual contributions to the MID FPP; or
 - States that request this support under a service fee

2) Provision of assistance for the development of IFPs including Quality Assurance. [States, dates]

Description: The MID FPP would assist States for the development of instrument flight procedures with a focus on quality assurance, including the conduct of training courses or workshops for the personnel involved in the development process.

Appendix E

**INTERNATIONAL CIVIL AVIATION ORGANIZATION
TECHNICAL CO-OPERATION PROGRAMME**

PROJECT BUDGET COVERING MSA CONTRIBUTION
(IN UNITED STATES DOLLARS)

COUNTRY:		REGIONAL PROJECT								
PROJECT NO:		RAB18801								
PROJECT TITLE:		FLIGHT PROCEDURES PROGRAMME - MID								
WORK ORDER:		RAB18801-01								
VERSION:		3								
			TOTAL	2019	2020	2021				
			w/m	\$	w/m	\$	w/m	\$	w/m	\$
PROJECT PERSONNEL										
INTERNATIONAL PROFESSIONAL POSTS										
B500A	900186 / PROGRAMME MANAGER		36.0	809 200	12.0	286 400	12.0	226 200	12.0	296 600
B554A	CONSULTANTS			85 000		25 000		30 000		30 000
SUB-TOTAL (INTERNATIONAL PROFESSIONAL POSTS)			36.0	894 200	12.0	311 400	12.0	256 200	12.0	326 600
B814A	INTERNATIONAL TRAVEL			45 000		15 000		15 000		15 000
TOTAL (PROJECT PERSONNEL)				939 200		326 400		271 200		341 600
SUB-CONTRACTS										
B803A	SUB-CONTRACT - LOCAL			45 000		15 000		15 000		15 000
TOTAL (SUB-CONTRACTS)				45 000		15 000		15 000		15 000
EQUIPMENT										
B751D	EXPENDABLE EQUIPMENT - LOCAL			15 000		5 000		5 000		5 000
TOTAL (EQUIPMENT)				15 000		5 000		5 000		5 000
MISCELLANEOUS										
B807M	MISCELLANEOUS EXPENSES			25 000		8 700		7 300		9 000
B754A	OVERHEAD CHARGES			102 500		35 500		29 900		37 100
TOTAL (MISCELLANEOUS)				127 500		44 200		37 200		46 100
PROJECT TOTAL				1 126 700		390 600		328 400		407 700

-END-

MID REGION SAR AGREEMENT STATUS BETWEEN ANSPS/ACCS**November 2018**

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 ☐ TURKMANISTAN	☒ AZERBAIJAN ☒ IRAQ ☐ PAKISTAN ☒ UAE	☐ AFGHANISTAN ☒ KUWAIT ☐ TURKEY	7/11
IRAQ	☒ IRAN ☒ JORDAN	☐ KUWAIT ☐ SAUDI ARABIA	☐ SYRIA ☐ TURKEY	2/6
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	2/6
QATAR	☐ BAHRAIN	☐ SAUDI ARABIA	☐ UAE	0/3
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	2/5
YEMEN	☐ DJIBOUTI ☐ ERITREA ☐ ETHIOPIA	☐ INDIA ☐ OMAN ☐ SAUDI ARABIA	☐ SOMALIA	0/7

☒ Agreement Signed ☐ Agreement NOT Signed Signed Agreements / Total No. of required Agreements

MID Doc 010



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)**

MID REGION

SEARCH AND RESCUE (SAR) IMPLEMENTATION PLAN

EDITION DECEMBER, 2018

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.

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ABBREVIATIONS AND ACRONYMS

ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
ANRF	Air Navigation Reporting Form
ANSP	Air Navigation Service Provider
ARCC	Aeronautical Rescue Coordination Centre
ARSC	Aeronautical Rescue Sub-Centre
A/SMC	Assistant SMC
ASPOCS	Administrative Single Point of Contact for SAR
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
CONOPS	Concept of Operations
COSPAS-SARSAT	Cosmicheskaya Sistema Poiska Avariynyh Sudov-Search and Rescue Satellite-Aided Tracking
EI	Effective Implementation
ELT	Emergency Locator Transmitters
GADSS	Global Aeronautical Distress and Safety System
GANP	Global Air Navigation Plan
GASP	Global Aviation Safety Plan
GLONASS	GLObal NAVigation Satellite System
GPS	Global Positioning System
IAMSAR	International Aeronautical and Maritime SAR (Manual)
IMO	International Maritime Organization
iSTARS	Integrated Safety Trend Analysis and Reporting System
JRCC	Joint (aeronautical and maritime) Rescue Coordination Centre
JRSC	Joint Rescue Sub-Centre
JWG	ICAO/IMO Joint Working Group on the Harmonisation of Aeronautical and Maritime Search and Rescue
LoA	Letter of Agreement
MCC	Mission Control Centres
MEOSAR	Medium-altitude Earth Orbit Search and Rescue
MRCC	Maritime Rescue Coordination Centre
MRO	Mass Rescue Operations
MRSC	Maritime Rescue Sub-Centre
OJT	On-the-Job Training
PQs	Protocol Questions
PSCS	Preferred SAR Capability Specifications
RANP	Regional Air Navigation Plan
RCC	Rescue Coordination Centre
RPK	Revenue Passenger Kilometres
RPAS	Remotely Piloted Aircraft Systems
SAR	Search and Rescue
SARPs	Standards and Recommended Practices
SAREX	SAR Exercises
SC	Search and Rescue Coordinator

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SCC	Search and Rescue Coordinating Committee
SMC	Search and Rescue Mission Coordinator
SMS	Safety Management System
SOLAS	International Convention for the Safety of Life at Sea
SPOC	SAR Point of Contact
SRR	Search and Rescue Region
SRU	Search and Rescue Unit
SWIM	System Wide Information Management
UNCLOS	United Nations Convention on the Law of the Sea
USOAP-CMA	Universal Safety Oversight Audit Programme – Continuous Monitoring Approach
VSP	Variable Set Parameter

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SCOPE OF THE PLAN

Plan Structure

1.1 The MID Search and Rescue (SAR) Implementation Plan (hereinafter referred to as the 'Plan') references different levels. At the higher level are global requirements established by the ICAO Annex 12 to the ICAO Convention on International Civil Aviation (ICAO Doc 7300). Global guidance material is provided by the International Maritime Organization (IMO) and ICAO's joint publication, the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual. Beneath this is regional planning guidance primarily provided by this Plan and other regional guidance material, in order to enable States to define the goals and means of meeting objectives for State planning towards improving State SAR System capability, such as Regional Air Navigation Plan (MID ANP, ICAO Doc 9708) objectives.

1.2 The global air navigation perspective is guided mainly by the *Global Air Navigation Plan* (GANP, Doc 9750), the *Global ATM Operational Concept* (Doc 9854) and the *Global Aviation Safety Plan* (GASP).

1.3 The scope of the Plan is to:

- determine the current status of SAR in MID Region States; and
- identify recommendations for SAR planning and preparedness enhancements, in terms of compliance with Annex 12 of the ICAO Convention, IAMSAR Manual guidance, and accepted best international practice.

Plan Review

1.4 As an iterative process, the Plan requires regular updating to keep current with changes in ICAO Annexes and guidance material, the IAMSAR manual, regional aviation activity, developments in the Air Traffic Management (ATM) system, new technology, political considerations, human performance and lessons learned from actual SAR responses. Plan updates should also focus on the SAR system being an important component of an integrated regional and global air navigation system. It is intended that MIDANPIRG and its contributory bodies conduct a complete review every three years of the Plan to align with the review cycle of the GANP and the IAMSAR Manual. The review should be guided by a consultative process involving States and relevant International Organizations such as the IMO and other technical bodies.

OBJECTIVES

Introduction

2.1 MID States who are signatories to the Chicago Convention accept the responsibility for the provision of SAR services per the requirements of its Annex 12 - Search and Rescue. Increases in both aviation and maritime traffic throughout the MID Region places additional importance on the ability for States to be adequately prepared for potentially increased demand for aeronautical and maritime SAR services.

2.2 States need to be adequately prepared for the provision of efficient and effective SAR services. To assist in achieving this, it is essential for States to cooperate, collaborate and in some cases assist with resources to neighboring and sub-regional RCCs.

2.3 ICAO Regional Office maintains a record of the status of State's SAR compliance against Annex 12 requirements. There are significant variations in the level of State SAR capability across the Region with significant gaps requiring urgent action. A number of States have not reported their status at all to ICAO. The ICAO Universal Safety Oversight Audit Programme – Continuous Monitoring Approach (USOAP-CMA) also provides a useful tool to States to self-assess their individual SAR system status.

2.4 There is a high risk of negative consequences to a State that does not provide an adequate SAR response to an aircraft or vessel in distress. The primary concern is the higher probability for loss of lives that may have been saved. The ability for news to spread rapidly in today's technologically connected world also provides the opportunity for a poor or ineffective SAR response to quickly reach a global audience resulting in damage to that State's reputation internationally and potential economic loss to sensitive State industries such as tourism and transport. However, the benefits of an effective and reliable SAR service to States offers many advantages. Besides reduction of loss of life and human suffering, other advantages include the following aspects:

- a) Safer and more secure environment for aviation and maritime related industries, commerce, recreation and travel. Increased safety may promote use and enjoyment of aviation and maritime environments, tourism and economic development. This is especially true when the SAR system is associated with programmes aimed at preventing or reducing the effects of mishaps, sometimes referred to as "Preventative SAR."
- b) Availability of SAR resources often provides the initial response and relief capabilities critical to saving lives in the early stages of natural and man-made disasters. SAR services offer an integral part of local, national and regional emergency management systems.
- c) Well performed SAR operations can provide positive publicity about situations, which may otherwise be viewed negatively. This can lead to improved public confidence in that State's reputation and commitment to providing a safe environment, leading to increased confidence to conduct activities beneficial to that State's economy.
- d) As SAR is a relatively non-controversial and humanitarian mission, it provides an excellent opportunity to enhance cooperation and communication in general between States and organizations, not only for SAR. It can also foster better working relationships between States and organizations at the local, national and international levels, including civil/military cooperation.

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2.5 In 2014 Malaysia Airlines flight MH370, a Boeing 777 with 239 persons on board, disappeared when flying from Kuala Lumpur, Malaysia to Beijing, China, and Air Asia QZ8501 was lost on a flight from Surabaya to Singapore. The MH370 event resulted in probably the largest and most expensive search response for a missing aircraft in human history. Together with Air France flight AF447, which crashed into the Atlantic Ocean in 2009, these tragedies have highlighted vulnerabilities in the current air navigation system, including the SAR system, which have hampered timely identification and localization of aircraft in distress, hindering effective response efforts. ICAO is taking measures to assist with addressing these vulnerabilities through the Global Aeronautical Distress and Safety System (GADSS) concept; however, this also requires improvements in global SAR capability.

2.6 The Plan is designed to address both civil and military SAR authorities and has been developed in consultation with MID States, SAR administrations and relevant International Organizations. States should consult with stakeholders nationally, regionally and internationally as appropriate and determine actions in order to commit to achieving the objectives of this Plan in order to meet the minimum SAR service requirements in accordance with ICAO Annex 12. It is noted that where a State is unable to meet minimum SAR Standards and Recommended Practices (SARPs) of ICAO Annex 12, Article 38 to the ICAO Convention requires notification to ICAO of the differences between its own practice and that established by the international standards.

2.7 States should aim to meet their obligations progressively in a strategically structured and planned manner with improvement goals set for short term, medium term and long term implementation. It may be more productive to make gains in small steps commencing with measures that are more easily achievable in the short term and have a minimal cost, progressing to measures, which will take longer to implement over the medium to long term. Short term measures that may be implemented relatively easily include the establishment of a national SAR Committee and ensuring SAR Agreements are in place with neighboring States allowing for seamless cross-border transit of search assets engaged in SAR activity.

2.8 All States are encouraged to use the guidance provided within this Plan as a way forward, thus ensuring a timely, well-coordinated response to any SAR incident within their area of responsibility, or during cooperative responses involving more than one Search and Rescue Region (SRR).

Plan Objective

2.9 The objective of this SAR Plan is to provide a framework to assist MID States to meet their SAR needs and obligations accepted under the Convention on International Civil Aviation and for the harmonized and interoperable delivery of both aeronautical and maritime SAR services within the Region, and across other ICAO Regional boundaries, where practicable.

2.10 The Plan is to be consistent with the SARPs of ICAO Annex 12 - Search and Rescue, and aligned where appropriate with the SAR technical and operational standards and guidance of the IMO.

2.11 The Plan recognizes that ICAO serves as the forum for the implementation of practical and achievable measures to improve SAR services for international civil aviation. The Plan also recognizes that the IMO provides a similar forum for SAR services to maritime shipping.

2.12 Both ICAO and IMO share the same goal of ensuring that SAR services are available globally wherever people sail or fly. The SAR services that ICAO and IMO promote are complementary and offer tangible opportunities to derive mutually beneficial efficiencies for both the aviation and maritime transportation SAR systems globally, regionally and nationally. The objective of this Plan includes encouraging States to take advantage of such efficiencies. States should, where practicable, align their SAR systems with the guidance provided by the IAMSAR Manual, which also

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provides the benefit for standardized SAR coordination between RCCs and across SRR lines of delineation.

2.13 State SAR plans describe how SAR services will be provided, organized and supported in order for States to meet their obligations under the relevant Conventions. Search and Rescue Coordinators (SC) and SAR managers oversee and implement these plans. National SAR plans should be signed by all Government agencies, which can provide or support SAR services. These agencies should all be represented on the State's Search and Rescue Coordinating Committee (SCC), which oversees these plans.

Note: The SC should not be confused with the operational nature of the SAR Mission Coordinator (SMC). The primary purpose of the national SC is to enable a whole-of-government approach to make efficient and effective use of a State's capabilities for SAR.

SAR System Funding

2.14 The level of funding provided for effective SAR systems is a matter of concern for all senior decision-makers. The resources should be sufficient to develop and/or maintain the required SAR service per their obligations as signatories to the relevant aeronautical and maritime SAR conventions. This may require the development of business cases to governments outlining where additional funding is required.

2.15 Business cases should include consideration of amendments to existing State SAR arrangements which may provide more efficient delivery of the SAR service by better utilization of existing resources (for example by establishing Joint RCCs (JRCCs), or additional funding sources where required (for example charging a levy to aircraft operators for providing the SAR service or seeking company sponsorship for SRUs).

Joint Rescue Coordination Centres (JRCCs)

2.16 Where practicable, States are encouraged to examine the potential benefits that may be derived by the establishment of JRCCs to incorporate the aeronautical and maritime SAR activities and/or facilities of ARCCs/ARSCs and MRCC/MRSCs. JRCCs have the potential to not only provide a more effective SAR service to both the aeronautical and maritime industries, but also offer potential financial efficiencies by releasing funds for improvements in other SAR areas.

Note: Where JRCCs are not practicable, development of facilities and procedures which provide and/or enhance effective SAR coordination and collaboration between the ARCCs and MRCCs in support of each other, to provide an efficient and integrated State SAR system for both aeronautical and maritime SAR incident response.

2.17 Where practicable, the JRCC evaluation may consider consolidation of two or more different State RCCs into single sub-regional JRCCs.-

Note: a single sub-regional JRCC may be established in partnership with a group of States and serve as a 24 hour nodal JRCC supported by Joint Rescue Sub-Centres (JRSCs) of the other partner States which may not necessarily need to be manned 24 hours but could be activated when required

Plan Development

2.18 The Plan is expected to provide guidelines and recommendations for MID States to consider for the enhancement and improvement of national, sub-regional and regional SAR capability including:

- a) compliance with Annex 12 SARPs;
- b) identification and addressing of deficiencies in SAR capability;

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- c) continuous and coherent development of SAR capability;
- d) harmonization of aeronautical and maritime SAR services;
- e) civil/military cooperation and coordination (including SAR response, information sharing and use of airspace);
- f) remote SAR response capability, including provision for Mass Rescue Operations (MRO);
- g) establishment and review of arrangements between neighboring States to expeditiously facilitate SAR coordination, operations and cooperation across regional boundaries including contingency procedures;
- h) facilitation of the implementation of SAR systems and services including the establishment of JRCCs where suitable and practicable;
- i) supporting the sharing of SAR information, data and expertise;
- j) integration with ATM systems and future ATS developments, where appropriate;
- k) monitoring of outcomes from MIDANPIRG Sub-Groups, other ICAO Region SAR groups, ICAO/IMO Joint Working Group on Harmonization of Aeronautical and Maritime SAR (JWG) and related forums for issues that may affect the Plan;
- l) facilitation of a continuous reporting mechanism of State SAR capability, Annex 12 compliance and SAR performance data to the MID Regional Office through the MIDANPIRG Air Traffic Management Sub-Group (ATM SG);
- m) implementation of a SAR System Improvement and Assessment measures, including Safety Management System, Quality Assurance programme and risk assessment;
- n) coordinating the introduction of new technology affecting the regional SAR system;
- o) sharing future research and development concepts;
- p) seeking efficiencies, through the coordination and facilitation of concurrent regional SAR meetings, seminars, workshops and exercises, including joint ICAO and IMO, and sub-regional forums where practicable; and
- q) conducting efficient SAR Exercises (SAREXs) that identify improvements and latent problems.

BACKGROUND INFORMATION

Improvement Drivers

5.1 The ICAO USOAP-CMA focuses on a State's capability in providing safety oversight by assessing whether the State has effectively and consistently implemented the critical elements of a safety oversight system and determining the State's level of implementation of ICAO's safety –related SARPs, including Annex 12 Search and Rescue, and associated procedures and guidance material.

5.2 ICAO MID Regional Office maintains MIDANPIRG Air Navigation Deficiencies Database (MANDDD). The MANDDD is based on the uniform methodology for identification, assessment and reporting of such deficiencies. By identifying and addressing specific deficiencies, MIDANPIRG and its Sub-groups facilitate the development and implementation of corrective action plans by States to resolve identified deficiencies, where necessary.

Recent ICAO SAR Initiatives

5.3 The tragedies of Malaysia Airlines flight MH370 in 2014 and Air France flight AF447 in 2009 had highlighted vulnerabilities in the current air navigation system, which had hampered timely identification and location of aircraft in distress, particularly remote oceanic areas. This had significantly hindered effective SAR efforts and recovery operations.

5.4 As part of the response to the Conclusions and Recommendations from the ICAO Multi-disciplinary Meeting on Global Tracking, ICAO developed a Concept of Operations (CONOPS) for a GADSS. The implementation of this target concept will have implications for the provision of services such as air traffic control, SAR and accident investigation. It contained a large number of measures targeting improvements in SAR system response integrated within the wider ATM and aircraft/airline operations systems.

5.5 The CONOPS noted that the effectiveness of the current alerting and SAR services should be increased by addressing a number of key improvement areas. The ICAO GADSS CONOPS also included aspects that potentially involve use of different distress systems, including for example 406 MHz Emergency Locator Transmitters (ELTs) and the COSPAS-SARSAT system as part of the proposed GADSS solution.

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COSPAS-SARSAT System

5.6 COSPAS-SARSAT had been developing two major enhancements to its distress-alerting System of value to all System users, including the aviation industry. One is the introduction over the period of approximately 2016 to 2018, and beyond, of a new space-segment architecture based primarily on Medium-altitude Earth Orbit Search and Rescue (MEOSAR) payloads aboard the European Commission's Galileo system, the Russian Federation's GLObal Navigation Satellite System (GLONASS) and the United States' Global Positioning System (GPS) satellites.

5.7 This architecture would permit determination of a distress incident location (independent of any location data transmitted in the beacon message) beginning with the first burst from the distress beacon. This could mean near real-time and very frequent delivery of distress alerts.

5.8 The SAR/Galileo space segment would also provide a Return Link Service (RLS) that, among other possible future uses, would provide an acknowledgment back to the beacon to confirm when the distress message has been received.

5.9 The other major development was the completion in the next couple of years of specifications for the next generation of 406 MHz distress beacons, including ELTs. This new generation of beacons should further improve speed and accuracy in locating an activated distress beacon. The period from beacon activation to first transmission was expected to be reduced from 50 seconds to three seconds. The specification would consider in-flight activation of ELTs when certain flight parameters were exceeded. The RLS was also being considered as part of the GADSS Concept, being a means of remotely activating an ELT in the case of an unresponsive or uncooperative cockpit.

5.10 States should ensure that aviators were aware that 121.5 MHz beacons cannot be detected by the global COSPAS-SARSAT System and were only intended as a final homing signal for 406 MHz beacons.

5.11 States also need to ensure the critical requirement to provide for a suitable, clear and simple means for aircraft owners to register and keep updated their 406 MHz distress beacon details.

Note: information on beacon registration is at: <http://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals>).

5.12 Entries in the beacon register should be available to both aeronautical and maritime RCCs on a 24-hour basis (Annex 12 – *Search and Rescue* refers, although Annex 10 establishes the registration requirement). States should note that Annex 12 should be read in conjunction with elements of the following ICAO Annexes:

Annex 6 – *Operation of Aircraft*;

Annex 10 – *Aeronautical Telecommunications*;

Annex 11 – *Air Traffic Services*; and

Annex 14 – *Aerodromes*.

CURRENT SITUATION

Global Situation

6.1 The Report on ICAO USOAP CMA Results (2013-2015) indicated that, at the global level, about 70% of the States have not established and implemented an effective system to conduct surveillance of their Rescue Coordination Centres (RCCs) and Rescue Sub-Centres (RSCs), if any. In many States, SAR services are provided by military authorities, and thus coordination between these military authorities and the State's CAA is essential. In practice the coordination (e.g. on the basis of a Memorandum of Understanding) is often limited to the operational aspect of SAR and does not clearly address the conduct of surveillance activities. Common factors preventing the effective surveillance of the RCCs are the lack of sufficiently qualified inspectorate staff and the absence of a formal surveillance programme. The global Effective Implementation (EI) of SAR is 61%

MID SAR Analysis

6.2 Based on the USOAP CMA results analysis, it appeared that the major areas of weakness is in coordination with adjacent States, effective SAR oversight, and training of SAR staff that provide the SAR services. Therefore, a focus on the minimization of barriers associated with the efficient cross-border coordination of SRU (such as pre-arranged approval) and other coordination mechanisms, including updates of SAR agreements (whatever their form) was vital. Finally, there was a need for improved systemic approaches to training for both SAR inspectors and personnel responsible for the provision of SAR services, including the regular organization of effective SAR exercises that test systems and personnel. It should be noted that the training of SAR inspectors did not require SAR-specific technical training, but was more focused on effective audit and inspection techniques, etc.

Challenges

6.3 The following potential challenges should be considered to ensure they do not become barriers to the achievement of the expected SAR capability:

- a) absence of established appropriate legal framework designating, recognizing, supporting and giving authority to national SAR authorities, RCCs and SMCs;
- b) lack of legislation ensuring effective oversight by the CAAs over the SAR service providers;
- c) low number of qualified SAR regulators/inspectors in the MID Region;
- d) inadequate funding and equipping of SAR authorities and in particular, resourcing of RCCs;
- e) absence of an appropriate SAR organizational framework;
- f) absence of a national SAR committee;
- g) lack of clarity of responsibilities for each component of the SAR system;
- h) absence of bilateral/multi-lateral/international SAR Agreements;
- i) inadequate civil/military cooperation; and
- j) complacency about, or lack of recognition of, the importance or priority given to SAR.

6.4 The provision of sufficient resources was critical in a number of areas, including:

- a) Financial-
 - funding for 24 hour RCC facility and staff;

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- funding for use/hire of search and rescue units; and
 - Provision of a suitable administrative process enabling financial support including the ability for SAR authorities to quickly authorise payments required for emergency response aircraft, vessels and supporting logistics such as fuel.
- b) RCC personnel: suitable number of trained and skilled staff, supplemented by a pool of trained RCC support staff where appropriate;
- c) RCC facilities-
- appropriate RCC facility space;
 - minimum RCC tools (such as current charts, plotting equipment, documentation, etc.);
 - identify and task available SRUs;
 - Aircraft and vessel tracking information including ADS-B, Automatic Identification System, etc.;
 - reliable and rapid H24 communications, and a suitable means to-
 - o receive and communicate distress alerts
 - o communicate with ATS units, other RCCs/RSCs, Coast Radio Stations, COSPAS-SARSAT Mission Control Centres (MCCs), military units, medical services, meteorological offices, etc.;
 - information technology-
 - o RCC workstation computers;
 - o Software including basic databases, drift modelling, incident management, etc.;
- d) Contingency: back-up RCC facility, or arrangement with another RCC as a contingency against inability to operate from the primary RCC due to the need to evacuate or loss of systems, etc.;
- e) Search and Rescue Units (SRUs):
- available and suitable SAR aircraft and crews;
 - funding arrangements/agreements for hiring/payment/sharing of SRUs to permit rapid deployment; and
 - Available and suitable SAR survival equipment for delivery by aircraft to survivors and to assist SAR coordination efforts (e.g.: SAR Datum Buoys, droppable life rafts and survival supplies, etc.);
- f) Training support:
- RCC staff – basic and ongoing;
 - SRU crews – pilots, air crew and air observers; and
 - RCC support staff – basic and refresher.

PERFORMANCE IMPROVEMENT PLAN

Preferred SAR Capability Specifications (PSCS)

Note: PSCS are the non-mandatory expectations on all MID States to enhance SAR systems in order to meet a minimum level of SAR capability, with a high degree of interoperability and harmonization, and interoperability with other ATM components such as Air Navigation Service Providers (ANSPs) and aerodrome operators. PSCS were not expected to contravene existing Annex 12 standards.

PSCS (expected implementation by 07 November 2020)

Note: Guidance Material for the implementation and monitoring of PSCS is expected to be developed by MIDANPIRG.

7.1 Legal Framework and Structure Planning: All States should develop statutes and related provisions that establish or enhance the legal foundation for a State SAR organization and its framework, resources, policies and procedures to, where appropriate to:

- a) ensure that it is party to, and/or aligned with the following Conventions, as applicable –
 - i. Convention on International Civil Aviation 1944;
 - ii. International Convention on Maritime Search and Rescue, 1979;
 - iii. International Convention for the Safety of Life at Sea (SOLAS), 1974;
 - iv. Convention on the High Seas, 1958; and
 - v. United Nations Convention on the Law of the Sea (UNCLOS), 1982;
- b) establish a SAR inspectorate within the CAA to regulate SAR and carry effective oversight activities over the SAR service providers;
- c) unless delegated by written agreement, establish an entity that provides, on a 24-hour basis, SAR services within its territories and designated area of responsibility/SRR;
- d) establish a national SAR committee consisting of civil and where appropriate, military members to enable a whole-of-government approach;
- e) empower SAR Mission Coordinators with the authority to adequately carry out their responsibilities;
- f) establish an Administrative Single Point of Contact for SAR (ASPOCS) for non-urgent, administrative matters, such details to be submitted to the ICAO Regional Office;
- g) conduct studies to check the feasibility for, and develop an implementation plan if practicable, the integration of aviation and maritime SAR activities, and as far as practicable, civil and military activities, including joint training and familiarization of staff and review of documentation to ensure harmonization of procedures, and joint exercises;
- h) conduct studies to align, as far as practicable, aeronautical and maritime Search and Rescue Regions (SRRs); and SRRs and Flight Information Regions (FIRs); and
- i) establish a single State SAR Plan that:
 - i. designates the responsible RCC(s), RSC(s) and 24-hour SPOC/ASPOC;
 - ii. describes the relevant SRRs, including the coordinates and geographical chart depiction of the SRR and neighboring SRRs;

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- iii. details the National SAR Committee;
- iv. details the governmental and non-governmental agencies with authority and responsibility for SAR coordination within its territories and designated area of responsibility;
- v. details required and available SAR facilities, personnel, and equipment;
- vi. details the SAR manuals, plans and procedures for national and regional cooperative SAR response arrangements;
- vii. details the SAR personnel training and competency programme, qualification standards, SAR certification if applicable and SAR cooperation training;
- viii. details the SAR agreements required;
- ix. is electronic and accessible on the Internet, such details to be submitted to the ICAO MID Regional Office; and
- x. is monitored by quality assurance processes.

7.2

SAR Standards and Procedures: All States should:

- i) establish aerodrome emergency plans that provide for co-operation and co-ordination with RCCs;
- j) establish SAR agreements with States having adjoining SRRS or FIRs, including trans-regional neighbors (the agreements should include clear responsibilities for overlapping or non-adjointing aeronautical and maritime SRRs);
- k) provide up to date cross-border information on SAR capability (this should be included in bilateral SAR agreements);
- l) pre-arrange procedures for cross-border SAR responses (this should be included in bilateral SAR agreements);
- m) establish contingency procedures for delegation of SAR responsibility where such service is not able to be provided, or in contingency (temporary) circumstances;
- n) establish a program for regular SAREX, which may be a desktop communications exercise, with each alternate SAREX being a full exercise (this expectation may be fulfilled by participating in a sub-regional SAREX that tests the State's SAR system; and
- o) establish RCC plans for response to Mass Rescue Operations (MROs) integrated with national disaster plans;
- p) establish SAR Operations Plans to include:
 - i. procedures for cooperation and deployment of foreign SRUs;
 - ii. provision for translators/liaison Officers/Embassy Officers for the daily tasking of the SRUs at the RCC;
 - iii. provision of information for logistic and administrative support (hotels, fuel, security passes, food, medicine, etc.);
 - iv. instructions on communication (ops normal reports, sightings, etc.) for search planning, command and control to foreign SRUs;
 - v. daily end of day report by SRUs to the RCC (via mobile, email, fax, etc.); and
- q) establish SAR Alerting procedures which:
 - i. are tested and fully integrated with RCC procedures so that RCCs are rapidly notified of any SAR event 24 hours a day;

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- ii. include procedures for joint aeronautical and maritime distress alert notification, including reliable delivery and acknowledgement of COSPAS-SARSAT distress alerts, support and response to both aviation and maritime SAR incidents; and
- iii. where applicable, include protocols for civil and military support and sharing of information.

SAR Facilities and Resources

7.3 RCC Facility: All States should ensure that RCCs are of sufficient size with adequate provision for operational positions designed in accordance with human factors principles (such as human machine interface) for a major search involving civil and military assets where applicable, and facilities such as:

- a) Workstations, telephones (with international access), plotting tables, wall notice/status boards, computer, and communications equipment and systems, briefing/debriefing areas room for storage including incident records and recorders, RCC staff break and rest facilities;
- b) computer resources which may provide support to RCCs with incident management, plotting, search planning, mapping, contact databases, web-based information, etc.;
- c) charts, electronic or paper, which:
 - i. apply to SAR (aeronautical, nautical, topographic and hydrographic);
 - ii. depict SRR, neighboring SRRs, FIR(s), SAR resources and made available for all relevant aeronautical and maritime RCCs, ATS units, aircraft operators; and
 - iii. provide a means of plotting;
- d) ability to reliably receive and acknowledge distress alerts 24 hours a day;
- e) maritime broadcast facilities;
- f) a means of recording, playback and archiving of communications;
- g) shipping/vessel communications and maritime broadcast facilities such as Coast Radio Stations, RCC radio and satellite communications, marine radio networks;
- h) aircraft communications via ATS units, aircraft operators, satellite communications or direct between RCC and aircraft;
- i) access to aircraft and ship tracking data, e.g. ADS-B, Automatic Identification System and Long Range Identification and Tracking of Ships (LRIT) allowing rapid identification of potential aircraft and vessels that may divert to assist;
- j) a means of obtaining meteorological information – forecast, present and historical data;
- k) if applicable drift modelling software;
- l) if applicable, ocean data including sea temperature, currents, winds, tides, etc.;
- m) if applicable, SAR Datum Buoys, preferably with satellite tracking capability; and
- n) RCC documentation and reference material such as plans of operation, procedures manuals, guidance material, ICAO and IMO references, SAR agreements; and
- o) COSPAS-SARSAT equipment and reference material.

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7.4

Personnel and Training.

- a) All States shall Staff the SAR inspectorate the sufficient number of qualified SAR inspectors and provide them with adequate trainings necessary to perform their duties;
All State should maintain a 24 hour service:
- b) provide adequate ATC resources (either an ATS supervisor or other staff) that can provide relief within Area Control Centres (ACCs) to allow timely SAR alerts and information to RCCs;
- c) provide sufficient RCC staffing;
- d) provide a sufficient number of trained specialist RCC officers including SMCs and Assistant SMCs (A/SMCs);
- e) provide availability of a pool of RCC support staff who are familiar with RCC operations, but not trained as coordinators, that can assist with the functioning of the RCC during SAR incident response;
- f) develop SAR personnel position descriptions that detail responsibilities and eligibility criteria for recruitment of operational staff;
- g) develop a comprehensive training programme that includes SAR training for:
 - i. RCC SAR Coordinators (SCs) based on a competency-based assessment approach to ensure technical and English language proficiency, cyclical (periodic) instruction that provides continuous training to ensure competency is maintained, and a system for maintaining training records; and
 - ii. SRU staff, including military personnel.
- h) facilitate RCC staff to be proficient in the English language; and
- i) facilitate a programme of regular liaison visits between relevant RCCs, ATC units and airline operating Centres in order to understand those organizations, facilities and capabilities (reference Annex 12, paragraph 3.1.9).

7.5

Search and Rescue Units: All States should establish capabilities enabling:

- a) availability and deployment of suitably crewed, trained and equipped SRUs (including a pool of air search observers trained in visual search techniques), public and/or private, civil and military, for rapid SAR response;
- b) availability and deployment of SRU craft that may be in use for another primary purpose but made available to RCCs for SAR purposes on an as needed emergency basis (vessels, aircraft and land units);
- c) protocols for civil SAR authorities to request the assistance of military assets, and similarly military SAR authorities to request civil assets;
- d) a communication means and information protocols between the State's Aeronautical and Maritime SAR Authorities;
- e) cooperative use and/or sharing of SAR assets with protocols incorporated within National SAR Plans and bilateral SAR Agreements;
- f) pre-arranged government authority for funding of costs associated with hiring of SRUs, and payment for critical supporting logistics such as fuel, to avoid any delays in response availability;
- g) aircraft with the ability and regulatory approval to safely conduct SAR missions.

Note: guidance material on SAR aircraft capability is found in the IAMSAR.

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7.6 Distress Beacons: All States should :

- a) where separate ARCCs and MRCCs exist with responsibility for coincident aviation and maritime SRRs, coordinate distress beacon alert procedures to ensure both RCCs are aware of any distress beacon activations within their areas to avoid duplication of response. For example, MRCCs should ensure their procedures alert ARCCs and ATS units to any EPIRB activations;
- b) have a reliable distress beacon registration system that:
 - i) provides a readily-accessible mechanism (preferably one that is available by Internet as well as other conventional means) to enable distress beacon owners to fulfil their obligation to register ELTs, EPIRBs and PLBs, and update the registration data as information changes (e.g., change in ownership);
 - ii) is available to RCCs 24 hours a day and includes up-to-date registration details for all national civil and military ELTs, EPIRBs and PLBs;
- c) take steps (including education) required to prepare for, and to implement changes related to, the introduction of next generation beacons (e.g.: update beacon registration systems to be compatible with new beacon hexadecimal identifications) and the transition to the MEOSAR satellite architecture (e.g.: update local user terminals and mission control centres to properly receive and manage MEOSAR data), in accordance with COSPAS-SARSAT specification documents (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>); and
- d) establish an appropriate nationwide means of disposal for old distress beacons.

Note 1: Information on beacon registration is at:

<http://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals>.)

Note 2: Incorrect disposal of distress beacons often causes the deployment of scarce and often expensive SAR resources only to have the beacon located as a non-distress event in a rubbish dump or similar location. This also creates the risk of SAR resources being diverted away from a real emergency should it arise at the time. Beacon batteries are hazardous items, which should be disposed of in an environmentally friendly manner.

7.7 Contingency Facilities: All States should ensure there are established contingency facilities, or when a SAR service is not able to be provided, procedures in place for the temporary delegation of the SAR responsibility to another appropriate national body or State. All States should test their contingency arrangements periodically, but not less than once every six months.

SAR Information

7.8 Provision of Information: All States should ensure the:

- a) establishment of a centralized information source publishing all MID State Aeronautical Information Publication (AIP) information as required by ICAO Annex 15 Appendix 1, page APP 1-8 including:
 - i. The agency responsible for providing SAR services;
 - ii. The area of SAR responsibility where SAR services are provided;
 - iii. The type of SAR services and facilities provided including indications where SAR aerial coverage is dependent upon significant deployment of aircraft;
 - iv. SAR agreements;
 - v. The conditions of SAR facility and service availability; and

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- vi. SAR procedures and signals used;
- b) establishment of an Internet-based SAR information sharing system (with security protocols as required and in accordance with the emerging System Wide Information Management – SWIM concept as applicable) to share SAR activity with States and key stakeholders participating in a SAR activity (the information sharing system should include a means of handling media and next of kin enquiries, and recognize the need to avoid premature media statements); and
- c) maximum practicable cooperation between State entities in the provision of accurate and timely information when required, including from military sources except where national security could be adversely affected.

7.9 SAR Facilities and Equipment Lists: All States should develop and maintain a current, comprehensive electronic list of State SAR Facilities, SAR Equipment, and SAR Units (SRUs), including joint or shared facilities and equipment, and provide the Internet link to that list to the ICAO Asia/Pacific Regional Office.

7.10 SAR Library: All States should:

- a) establish a web-based SAR Library, or cooperate by contributing to an Internet-based MID resource (such as <http://www.uscg.mil/hq/cg5/cg534/NSARC.asp>); and
- b) ensure that each RCC and SAR Authority has ready access to a current copy (either electronic or hard copy) of the following reference documents at a minimum:
 - i. ICAO Annex 12;
 - ii. IAMSAR Manual Volumes I, II and III;
 - iii. International Convention on Maritime SAR (SAR Convention);
 - iv. MID SAR Plan
 - v. MID Air Navigation Plan; and
 - vi. relevant regional, national and agency SAR documents.

Note: The US Coast Guard contains a list of documents that may be held by RCCs and JRCCs as appropriate. In addition, a list of documents would be available on the IMO website at:

(<http://www.imo.org/en/OurWork/Safety/RadioCommunicationsAndSearchAndRescue/SearchAndRescue/Pages/Default.aspx>).

SAR Improvement

7.11 Search and Rescue Exercises (SAREX): All States should conduct regular SAREX (at least once every two years) to test and evaluate existing coordination procedures, data and information sharing and SAR response arrangements involving:

- a) both aeronautical and maritime SAR authorities including both civil and military agencies as applicable, and related bodies such as Air Navigation Service Providers (ANSPs) and Airline Operations Centres (AOCs);
- b) where appropriate, cross-aeronautical SRR coordination (SAREX should routinely involve SAR authorities of adjacent SRRs, especially if the SAREX area concerned is within 50NM of the adjoining SRR); and
- c) SAREX effectiveness through a post-SAREX review and written report, completed to ensure that deficient areas or latent problems are identified and remedied.

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*Note 1: a SAREX template is provided at **Appendix 1**.*

Note 2: SAREX should test the SAR system, including unannounced alerts that allow an actual search (whether it is a desktop or a physical operation), to be conducted which will indicate weaknesses in the system. SAREX should not be confused with, or take the form of, simulated crash fire exercises such as for Aerodrome Emergency Procedures that do not have a search component.

Note 3: Real SAR incident responses which include an adequate post-response review and evaluation with lessons learned may replace the need for a SAREX.

7.12 SAR Quality Assurance: All States should implement SAR System Improvement and Assessment measures, including Safety Management and Quality Assurance systems, that:

- a) provide performance and safety indicators, including post-incident/accident lessons learned and management reviews (RCC and SAR System Continuous Improvement process), and feedback from RCC staff, SAR system users or SAR stakeholders;
- b) identifies risk and corrective and preventive actions that prevent or minimize risk and the possibility of substandard SAR performance;
- c) establishes an internal quality assurance programme, which includes regular internal audits of the RCC, SAR operations, SAR facilities and procedures that are conducted by trained auditors;
- d) ensures the person responsible for internal quality assurance within the entity responsible for SAR services has direct access to report to the Head of the entity responsible for SAR services on matters of quality assurance; and
- e) where appropriate, provides submissions to the JWG to share lessons learned and experiences with other global States for the continuous improvement of the worldwide SAR system.

Note 1: Resourcing of SAR system audit arrangements could be mitigated by States entering cooperative arrangements, including sub-regional regulation, between States for auditing of each other's SAR systems to share expertise and costs.

Note 2: Provisions of Annex 19 for a Safety Management System (SMS) may apply where a SAR service is provided under the authority of an ATS provider (Annex 19, Chapter 3, 3.1.3 e refers).

Note 3: Peer review, either external or internal, may provide a useful internal quality assurance tool.

7.13 SAR Management Review: All States should conduct an annual or more frequent analysis of their current State SAR system to identify specific gaps in capability against the minimum requirements of Annex 12 and the guidelines of the IAMSAR Manual to:

- a) enable the ICAO MID SAR data to be updated to accurately reflect the State's capability;
- b) be informed regarding the availability and capability of SAR services in neighboring States;
- c) identify SAR research and development programmes, especially those which could be conducted if possible in cooperation with other States;
- d) establish a common set of basic SAR system statistics, which include-
 - i. number of SAR incidents per year;

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- ii. number of lives at risk versus number of lives saved;
 - iii. time from first alert to tasking the SRU;
 - iv. time from first alert to arrival on scene of first SRU; and
 - v. time from first alert to rescue.
- e) plan for any necessary improvements to gradually build and improve capability over time, which would be detailed in the State SAR Plan; and
- f) regularly review and update SAR agreements as appropriate.

Note 1: The National Self-Assessment found in IAMSAR Manual Vol I Appendix H and the ICAO USOAP-CMA Protocol Questions for SAR may assist States with their reviews.

Note 2: The number of incidents should identify the type (e.g. COSPAS-SARSAT alert, ATS alerts, etc.) and outcome of SAR incidents.

7.14 **SAR Promotion:** All States should conduct SAR promotional programs (e.g. Seminars, Workshops and public safety campaigns) to:

- a) encourage higher SAR preparedness by persons that may require SAR services through public safety campaigns aimed at preventing persons getting into distress situations (i.e.: 'preventative SAR');
- b) ensure the support of government decision-makers for SAR facilities and improvements, in particular adequate funding availability;
- c) assist media to understand SAR operations in order to minimize the need for explanations during SAR responses;
- d) recognize improvement in State SAR systems;
- e) enhance cooperation between SAR services and –
 - i. civil, military and police agencies;
 - ii. ANSPs;
 - iii. aerodrome and port operators;
 - iv. aircraft and shipping operators;
 - v. meteorological agencies;
 - vi. accident investigation agencies;
 - vii. government and non-government agencies affected by SAR operations, in particular large scale national and international responses involving whole of government agencies and
 - viii. other States.

Note: social media may be an effective means of SAR promotion that reduces the workload of SAR staff during major SAR responses.

RESEARCH AND FUTURE DEVELOPMENT

Research and Development

8.1 To develop the tools and systems required to meet foreseeable long-term requirements, there is a need for States to undertake planning and co-operation on SAR matters. This includes major efforts to define concepts, to extend knowledge and invent new solutions to future SAR challenges so these new concepts are selected and applied in an appropriate timely manner. Such efforts could be forged through collaborative partnerships between, States, ANSPs, International Organizations, institutes of higher learning and specialized technical agencies. This concept may manifest itself in joint projects such as:

- ICAO and/or IMO regional SAR training opportunities where provided to assist States that are unable to provide their own SAR training;
- Bilateral or Joint Sub-regional cooperation that brings together civil and military SAR experts and provides a single SAR facility that is cost-effective and has a level of resources and facilities that would be difficult for all States to maintain by themselves; and
- Regional online eLearning packages.

Note: Appendix 3 provides a summary of benefits to the SAR System of States assisting other States.

8.2 With the end goal of a globally interoperable SAR system in mind, the region will have to consider planning for a long term supporting concept and infrastructure. The following are possible areas that should be considered for future SAR research and development, in order to promote the maximum possible harmonization and interoperability of SAR systems:

- a) data sharing such as aircraft and ship tracking information;
- b) automated data link communication to RCCs when an aircraft or ship exceeds a Variable Set Parameter (VSP) in terms of its operating envelope, or activation of an emergency status (could be displayed as a symbol, and the data could include certain operating parameters such as acceleration and altitude for an aircraft) – note the ICAO GADSS includes this concept;
- c) regional Remotely Piloted Aircraft Systems (RPAS) SAR capability;
- d) inclusion of the SAR system and RCC access as a component of the new ICAO SWIM concept of operation and implementation;
- e) on-going development of standardized SAR training objectives and advanced training systems, including the use of high fidelity simulators; and
- f) enhanced technology oriented systems to improve SAR system effectiveness.

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MILESTONES, TIMELINES, PRIORITIES AND ACTIONS

Milestones

9.1 Section 7 (*Performance Improvement Plan*) provides a scheme for the implementation of a collective set of enhancements for a number of elements in the PSCS, effective 07 November 2020.

9.2 States should commence planning for the various PSCS elements from the approval date of this Plan, to ensure a smooth transition by 08 November 2018, and should include consideration of issues such as:

- safety/operational analysis and assessment;
- cost-effectiveness;
- budgetary issues;
- development of operational procedures; and
- training.

9.3 Section 8 (*Research and Future Development*) provides, subject to future agreement by concerned parties, possible SAR improvements beyond 2019 until 2028.

Priorities

9.4 It is a matter for each State to determine priorities in accordance with its own economic, environmental, safety and administrative drivers.

Actions

9.5 This Plan necessitates a number of implementation actions. It is expected that each MID State report progress on each applicable element to ICAO MID Office. All States should note the importance of SAR status monitoring.

9.6 Section 6 (*Current Situation*) provides analysis and major concerns in the region, which should be considered in the formulation of specific State Plan.

MID SAR Coordination Forums

9.7 The MID Region will benefit from the cooperation and coordination of States and International Organizations involved in SAR. The establishment of permanent joint ICAO/IMO Regional SAR Forums to enable collaboration and cooperation on SAR matters should be considered.

Gap analysis and MID SAR Plan Monitoring

9.8 The matrix at **Appendix 1** will be used to identify the capabilities of the States related to SAR, and a set of KPIs should be recommended to MIONPIRG for endorsement. The MIDANPIRG ATM SG is responsible to monitor the implementation of the Plan.

MID SAR Support Team

9.9 A MID SAR Support Team composed of SAR Aeronautical and Maritime experts would be established to support States meet their SAR obligations and implement the provisions of the MID SAR Plan.

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SAREX

9.10 A programme is expected to be established for an annual SAREX, with every second year being a desktop communications exercise, and alternate years being a full exercise. The SAREX outcomes and lessons learned should be reported to MIDANPIRG through the ATM Sub-Group. A sample for SAREX Work plan is at **Appendix 2**.

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APPENDIX 1.

SAR Capability Matrix

	Legislation	Oversight	SAR Committee	Training	Alerting	SAR Agreements	Relationships	Communications	Quality Control	Civil Military	Resources	SAREX	Library	Computerization	SAR Programme	Supply Dropping	Special Equipment	SAR aircraft	Navigation	ELTs	COSPAS-SARSAT Alerts
Bahrain																					
Egypt																					
Iran																					
Iraq																					
Jordan																					
Kuwait																					
Lebanon																					
Libya																					
Oman																					
Qatar																					
Saudi Arabia																					
Sudan																					
Syria																					
UAE																					
Yemen																					

A = Fully meets Annex 12 requirements

B = Meets Annex 12 requirements in most areas

C = Meets Annex 12 requirements in some areas

D = Initial implementation

E = Not implemented

Blank = No response

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SAR Matrix Element Descriptions

Training: The appropriate level and type of training for SAR coordinator, SAR mission coordinator, on-scene coordinator, and operational facilities. (IAMSAR Manual Vol. 1, Chapter 3)

Oversight: the effectiveness of the States' oversight activities conducted over the RCC and RSCs

Alerting: Fast and reliable means for the rescue coordination center to receive distress alerts. (IAMSAR Manual Vol. 1, Chapter 2)

Legislative: Statutes and related provisions that establish a legal foundation for establishing a SAR organization and its resources, policies, and procedures. (IAMSAR Manual Vol. 1, Chapter 1)

SAR committee: Typically established under a national SAR plan, the SAR coordinating committee is comprised of SAR system stakeholders. (IAMSAR Manual Vol. 1, Chapter 6 and Appendix J)

Agreements : States should enter into agreements with neighboring States to strengthen SAR cooperation and coordination. (Chapter 3 – *Cooperation*, in both Annex 12 – Search and Rescue, and the International Convention on Maritime SAR)

Relationships: Close cooperation between services and organizations which may contribute to improving SAR service in areas such as operations, planning, training, exercises and research and development.

Communications: Communication capability for receipt of distress alerts and operational coordination among the SAR mission coordinator, the on-scene coordinator and SAR facilities. (IAMSAR Manual Vol. 1, Chapter 3)

Quality Control: Procedures to focus on improving the quality of SAR services so as to improve results and reduce costs. (IAMSAR Manual Vol. 1, Chapter 6)

Civil/Military: Close cooperation between the various civilian and military organizations.

Resources: The primary operational facilities made available to the national SAR system by various authorities and arrangements with others. (IAMSAR Manual Vol. 1, Chapter 5 and Appendix C)

SAR Exercise: Exercise to test and improve operational plans, provide learning experience and improve liaison and coordination skills. (IAMSAR Manual Vol. 1, Chapter 3; Annex 12, and Annex 14 regarding Airport Emergency Plan)

Library: Quick access to the applicable international, national, and agency SAR publications that provide standards, policy, procedures and guidance.

Computerization: Use of or access to output of various computer resources including databases, computer aids for SAR system management, search planning software, etc. (IAMSAR Manual Vol. 1, Chapter 2)

SAR programme: National structure to establish, manage and support the provision and coordination of SAR services. (IAMSAR Manual Vol. 1, Chapter 1)

Supply dropping: Supplies and survival equipment carried by air and maritime SAR facilities to aid survivors and facilitate their rescue, as appropriate. (IAMSAR Manual Vol. 1, Chapter 2 and Appendix B)

Special equipment: Equipment created for specific rescue scenarios (such as mountain or desert rescue) and equipment typically carried on designated SAR units to support coordination and locating functions as well as special supplies and survival equipment to aid survivors and facilitate their rescue. (IAMSAR Manual Vol. 1, Chapter 2 and 4)

SAR aircraft: An aircraft provided with specialized equipment suitable for the efficient conduct of SAR missions (Annex 12, Chapter 2 - *Organization*)

Navigation: Suitable means provided within the SAR region to determine position, and the responding SAR facilities have the appropriate equipment on board to determine their position in the SAR region they are likely to operate. (IAMSAR Manual Vol. 1, Chapter 2)

ELT: National regulations for carriage of ELTs, and arrangements for registration of the 406 MHz beacon and rapid access to the beacon registration database. (Annex 6 – Operation of Aircraft and Annex 10 - Aeronautical Telecommunications; and IAMSAR Manual Vol. 1, Chapter 4)

Cospas-Sarsat Distress Alerts : A SAR Point of Contact (SPOC) designated for receipt of Cospas-Sarsat distress data, and arrangements for efficient routing of the distress data to the appropriate SAR authority (the aeronautical emergency locator transmitter ELT), maritime emergency position-indicating beacon (EPIRB), and personal locator beacon (PLB)). (Annex 12, paragraph 3.2.5 and Section 2.4; and, IAMSAR Manual Vol. 1, Chapter 4)

APPENDIX 2: WORK PLAN FOR THE [[JOINT]] SAREX COORDINATION MEETING

1. OBJECTIVES

State the objectives of the [joint] SAREX and what are to be achieved out of the SAREX by all participants.

1.1 The objectives of the [joint] SAREX are:

- a) To provide continuation of SAR exercise and improve cooperation between (participating agencies or State RCC) and (participating agencies or State RCC).
- b) To provide continuation training for personnel of SAR organizations from both (participating agencies or State RCC) and (participating agencies or State RCC)
- c) To test the communication facilities and procedures between (participating agencies or State RCC) and (participating agencies or State RCC); and
- d) To test and determine the effectiveness of the Search and Rescue Units of (participating agencies or State RCC) and (participating agencies or State RCC).

2 DATE AND TIMING OF SAREX

State the agreed date, time and year for the [joint] SAREX. Have alternate or contingency plan in the event that the full scale SAREX cannot be conducted due to weather or any unforeseen circumstances. It is recommended that a pre-SAREX brief be conducted to ensure all participants understand their roles and the required actions to be taken. State the agreed time for a pre-SAREX brief to be carried out for all participants and States may conduct simultaneous pre-SAREX brief at their own location for their local participants. For standardization and to avoid confusion, it is recommended that all timing and dates used should be in UTC as there may be difference in time and day for different States. After the SAREX, it is also recommended to conduct a de-brief for all participants.

For example:

- 2.1 Table Top SAREX or A Full Scale Exercise will be held between (participating agencies or States) and (participating agencies or State) on(date/month/year according to UTC)(day of the week according to UTC) from (time in UTC) to (time in UTC).
- 2.2 In the event of bad weather, the Full Scale SAREX will be converted into a Table Top SAREX. The cut off time will be at (time in UTC).
- 2.3 A Pre-SAREX brief will be held on (day/month/year according to UTC) (day of the week according to UTC) in (location of the pre- SAREX brief) at (time in UTC).
- 2.4 De-Brief will be held on (day/month/year according to UTC) (day of the week according to UTC) in (location of the de-brief) at (time in UTC).

3 SCENARIO

Discussion and development of exercise scenario with participating State or States and agencies involved. Scenario created should be as realistic as possible to simulate close to a real incident. A fictitious flight plan can be included to provide additional information pertaining to the distressed aircraft as required by the RCCs. Using fictitious call signs or airlines for distressed aircraft will avoid complication or confusion especially if it involves the social media.

For example:

- 3.1 At (time in UTC), a chartered(type of aircraft) (call sign of distressed aircraft) departed from (point of departure) to (destination) with (POB). At (time in UTC), aircraft declared “**MAY DAY**” due to (nature of emergency) at (location in Lat and Long or with reference to a prominent location known to all).
- 3.2 Other information like Pilot-in-command equipment carried on board, color of aircraft fuselage or tail.

4 PARTICIPATING ORGANISATIONS OR UNITS

Identify and list all participating agencies or agencies from both States. Agencies should include both government and private. ANSP, Aircraft Investigation Bureau, Airlines etc. should be involved in a SAREX as they are directly involved in any real air incident

For example:

- 4.1 From (participating local agencies or States)
- 1) Civil Aviation Authority of
 - 2) Local Air Force
 - 3) Local Navy
 - 4)
 - 5)

From (the other participating local or States):

- 1) Civil Aviation Authority of
- 2) Local Air Force
- 3) Local Navy
- 5)
- 6)

5 DEPLOYMENT OF EXERCISE SAR UNITS (SRUs) AND CALLSIGNS

State all the SAR assets that will take part in the SAREX. It is recommended that the call signs of the SRUs should be pre-fixed with the word “SAREX” to indicate that it is an exercise aircraft or surface vessel. This will not create any confusion between a SAREX and a real incident. Call sign assigned to a particular SAR asset should not be changed and to be used throughout the exercise. Different SAR asset should be assigned with an individual flight number.

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5.1 SRUs from (participating State) and their call signs are as follows:

<u>Type of SRUs</u>	<u>Call sign</u>	<u>Remarks</u>
Fokker 50	SAREX 01	Search
C130	SAREX 02	Search
Dolphin Helicopter	SAREX 03	Search and Rescue
.....	SAREX.....	
.....	SAREX.....	
.....	SAREX.....	

5.2 SRUs from (the other participating State) and their call signs are as follows:

<u>Type of SRUs</u>	<u>Call sign</u>	<u>Remarks</u>
Helicopter	SAREX 04	Search and Rescue
Ship	SAREX 05	Search and rescue
.....	SAREX....	

6 COMMUNICATIONS

State the agreed radio frequencies to be used in the SAREX. Make communication arrangements between the two RCCs as well as between the RCCs and the SRUs. It is recommended that a communication check be conducted between all parties before the SAREX to ensure serviceability of communication equipment. A standby day may be necessary if the communication check is found not satisfactory or unsuccessful.

6.1 The communications arrangement will be as follows:

- a) Between (participating agency or State RCC) and (the other agencies or participating State RCC)
 - Primary communication - KHz or Mhz or landlines
 - Secondary communication - KHz or Mhz or landlines
 - Standby communication - KHz or Mhz or landlines
- b) Between(participating agencies or State RCC) and SRUs)
 - Primary communication - KHz or MHz
 - Secondary communication - KHz or MHz
 - Standby communication - KHz or MHz

6.2 A communication test between (participating agency or State RCC) and (the other participating agencies or State RCC) will be conducted prior to the SAREX. The date for the test is on (date/month/year according to UTC) between (time in UTC) to (time in UTC).

6.3 In the case of unsatisfactory communication test, another test will be conducted on (date/month/year according to UTC) between (time in UTC) to (time in UTC). .

6.4 All messages pertaining to the exercise shall be prefixed with the words “SAREX SAREX SAREX”

7 SEARCH OBJECT

In a Full Scale SAREX, States can consider the deployment of a search object to add realism to the exercise. This will enable participating SRUs to practice visual search from air as well as on from the surface of the sea. If the homing capability of the SRUs is desired, a beacon can be placed on the search object for electronic search. Arrangement can be made for the search object to be deployed at the proposed distress location at the activation time of the SAREX. A search object with some significant marking or markings on it will enable easier visual sighting of search target on land or on water.

- 7.1 The search object will be provided by (one of the participating agency or State RCC) and will be deployed at (time in UTC) on(date of the SAREX according to UTC) at the position in which the distressed aircraft is assumed to have crashed.
- 7.2 Search target is marked with..... (bright color or with the words “SAREX” or some significant marking).

8 ALERTING AND ACTIVATION

State clearly on the alert and activation processes for the SAREX. Decide on which agency or State would initiate the distress phase and notify the other participating agencies or State or States so that [joint] SAR effort can be carried out. In a joint SAREX, if the distressed location is within the area of responsibility of a particular State, the State concern should carry out the alerting and activation phase. The other participating State or States should be notified and [joint] SAR operations can be carried out.

- 8.1 Since the crash will occur in (location or name the State FIR) or area of responsibility, ... (State concern) RCC will notify (participating State) . Both RCCs will coordinate the SAR Operations.

9 SEARCH AREA

Discuss on how to determine the search area or which State should determine the search area. In a joint SAR effort, the two RCCs can determine their own search areas and agree on a common search area.

- 9.1 The respective Search Mission Coordinators (SMCs) will work out a search area upon receipt of the distress location or crash report.
- 9.2 The two SMCs shall discuss with each other and agree on a common search area.
- 9.3 If there is a great difference between the two search areas, the controlling RCC shall decide on the most probable area and take the necessary action to promulgate the area as a restricted area for SAR operations accordingly.

10 DIPLOMATIC CLEARANCE

In a joint SAREX, make necessary arrangement for the application of Diplomatic Clearance required if State assets may or are required to enter into another State’s territorial airspace or waters. The process for application should be made known or if there is an agreement in place between the two States, then the agreed procedure should be followed. Provide information regarding the SRUs and particulars of the personnel on board. It is recommended that particulars of the SRUs be provided to the State concern prior to the SAREX. This will assist in the Diplomatic Clearance process.

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- 10.1 (State) SMC will request to (State) for diplomatic clearance to allow (State's) SRUs to enter (State's) territorial airspace and waters.
- 10.2 To obtain diplomatic clearance for (State's) SRU, ... (State) SMC shall provide the following particulars:
- a) Registration of SRU
 - b) Type of aircraft or vessel
 - c) Name of Captain/Pilot in Command
 - d) Names of crew on board (not required for sea asset)
 - e) Area of operation
 - f) Date and time of operation
- 10.3 The details of the (State's) SRU shall be provided to (State) one or two weeks before the exercise. Application for diplomatic clearances through the normal channel via the (agency for the process of the Diplomatic Clearance) is advised in order to accelerate the diplomatic clearance process.

11 SEARCH OPERATIONS

Note: Ensure the safe conduct of the SAREX especially with the air assets. It is recommended that there should be one controlling RCC providing instructions to search aircraft prior to entering the search area. It is also recommended that an Air Coordinator be deployed to provide instructions to search aircraft during transit to and fro from the search area as well as within the search area if the RCC personnel have no knowledge of Air Traffic Control.

- 11.1 All SRUs shall report to the controlling RCC or On Scene Coordinator (OSC) prior to entering the Search Area and while conducting search in the Search Area to ensure safety and efficiency in the [joint] SAR effort. All air search assets must observe and adhere to ATC instructions.
- 11.2 Non exercise aircraft shall keep clear of the search area unless clearance has been obtained for these aircraft to transit through.

12 RESCUE OPERATIONS

Note: Discuss on how the rescue operation is to be executed. Agency or States can decide on a simulated rescue operation by taking photographs of the search object once sighted or if actual personnel are deployed at the distressed location as survivors, actual rescue operations can be conducted. Actual rescue operation will provide training for the rescue of survivors from sea or land to hospitals or landing sites. If possible, recover the search object from the land or sea after the exercise, this will help to avoid the search object becoming an obstacle to others on land or sea. If recovering is not possible, make a general broadcast to warn others of the objects.

- 12.1 When the search object is sighted, the SRU shall inform the (State) RCC. The (State) RCC will disseminate the information to all other SRUs.
- 12.2 The SRUs to take photographs of the search object to simulate the rescue of the survivors.
- 12.3 Recovery of the search object will be by (agency that is recovering the search object).

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- 12.4 If the search object is unable to be recovered due to sea state or weather, an Urgent Marine Information Broadcast is provided by (maritime agency responsible for the area).

13 EMERGENCY LANDING OF SEARCH AIRCRAFT

Note: In a joint SAREX, make arrangement for search aircraft to land in airport or airfield of another State in the event of an emergency encountered by the search aircraft where immediate landing is required.

- 13.1 (State's) search aircraft will be given permission to land in (name of airport or airfield) if an emergency landing is required.

14 TERMINATION OF SAREX

Note: State the requirements or under what circumstances that will terminate the SAREX. Make arrangement in the event of a real incident that might occur during the SAREX. Consideration can be given to have a code word or words which are understood by all participating agencies and SRUs in the event of a real incident. Once the code word is broadcast to all concern, it will be understood by all participants and the SAREX will be converted into real SAR operations.

- 14.1 The SAREX will be terminated under any one of the following circumstances:
- a) When the all the SRUs have returned to base.
 - b) When the time for the SAREX has expired and no search object is sighted.
 - c) When there is an actual emergency.
- 14.2 In the case of a real emergency, the exercise will be converted into a real SAR Operations. The code word “**NO DUFF NO DUFF**” will be broadcast and all agencies to terminate the exercise immediately and prepare and convert it into a real SAR Operations.

15 SAREX De-brief

Note: Conduct of a SAREX de-brief is important as this is where the evaluation process of the exercise is presented by evaluation experts who observed the exercise and observations by people who actually participated in the exercise scenarios. This is the final step to identify weaknesses and development of recommendations for improvement. Agree on a date and venue to conduct a SAREX de-brief to all participants from both States.

- 15.1 SAREX Debrief will be held in on (date/month/year) at (time in UTC).
- 15.2 The venue for the SAREX De-brief will be at (name the venue).

16 SAREX CONTROLLERS/EVALUTORS/OBSERVERS

Note: Name the personnel who will be involved in the SAREX as observers, evaluators and controllers. As for evaluators and controllers, they must have expertise in the areas of SAR as they will understand what is to be evaluated and how to control the exercise to maximize the training value.

- 16.1 Personnel involved in the SAREX will be as follows:

From SAREX Controllers/Evaluators/Observers

..... (Agency or State) (name of personnel and their role)

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17 INVITATION TO FOREIGN OBSERVERS

Note: Agency or States may consider inviting observers from other agencies or foreign countries or international organizations to attend and observe the SAREX. These personnel can provide valuable feedbacks for improvement to the system. Arrangement to be made as to which State will do the invitation and who should be invited to attend.

- 17.1 Invitation to foreign observers to observe the SAREX at (indicate the venue for the observation of the SAREX) will be provided (State that is providing the invitation) on behalf of (the other State).
- 17.2 The following countries and organizations will be invited to attend:
- a) (name of country or organization)
 - b) (name of country or organization)
 - c) (name of country or organization)
 - d) (name of country or organization)

18 PRESS COVERAGE

Note: If there provision for any press coverage for the SAREX, made the arrangement for drafting of press release.

- 18.1 If there is a requirement for a [joint] press release on the SAREX to be issued, ...(Agency or State that will produce the draft) will draft the press release and forward to (the other participating agencies or State) for concurrence.

19 SAREX REPORT

Note: SAREX Report is important as it serve as a permanent record of the exercise. Each element of the exercise is recorded and lesson learnt during the exercise is captured. Make arrangement on who should produce the SAREX Report for dissemination to all participating agencies as well as others who may be interested.

- 19.1 (Agency or State) will produce the SAREX Report with assistance from (the other participating agencies or State). Photographs will be made available for the SAREX Report.
- 19.2 A copy of the report will be sent to each of the following countries and International Organizations.
- a) (agency or country or International Organization)
 - b) (agency or country or International Organization)

20 VENUE FOR THE NEXT SAREX

Note: It will be good to plan for an annual [joint] SAREX with relevant agencies or neighbouring State or States. State the tentative date and venue if possible for the next SAREX coordination meeting and SAREX.

- 20.1 The next SAREX Coordination Meeting will be held at (venue) on (date/month/year).
- 20.2 The next Full Scale SAREX will be held on (date/month/year).

APPENDIX 3: BENEFITS TO THE SAR SYSTEM OF STATES ASSISTING OTHER STATES

MID States Face Demanding SAR Responsibilities with Few Resources

2.1 Many MID States have the challenging responsibility of providing SAR services over vast and remote land and oceanic areas and several have few resources available to meet Annex 12 requirements.

Taking A Regional Approach Improves Effectiveness and Efficiency

2.2 To provide an effective and efficient SAR service in the region it is important that States focus not only on meeting their own national obligations, but also take the broader view that their State SAR system is only one part of the wider regional SAR system. States therefore need to cooperate, collaborate and share resources and technical expertise with their neighboring and regional RCCs.

When Developed SAR States Support Less Developed Neighbors, Everyone Wins

2.3 Sometimes simple measures can reduce the incidence of SAR operations in a State's Area of Responsibility.

2.4 An example of this is where New Zealand has been regularly requested to send resources to Kiribati, which is not in New Zealand's SRR, to conduct aerial searches for people missing in small vessels at sea. New Zealand recognized that with the provision of basic aids, the number of people going missing at sea could be reduced. The work was completed through an aid program and the benefit was immediate and twofold. There has been a large reduction in the number of people going missing at sea and New Zealand has reduced costs through less aerial searches being required.

2.5 Another example is where Australia has recognized that increasing aircraft and vessel traffic in the north and western areas of its SRR in the Indian Ocean region comes with increased likelihood of more frequent SAR responses in that region. As a result, Australia has commenced a new project in partnership with the Maldives, Mauritius and Sri Lanka to fund and provide technical assistance to improve the SAR capabilities of those countries that will also assist Australia's SAR response obligations in that area of its SRR. Similarly, since 2008 Australia has been providing funding and development assistance to Indonesia to improve SAR capability and cooperation.

2.6 States who aren't compliant with Annex 12 SARPs and who are unable to meet the minimum SAR service requirements could consult and seek assistance from 'champion' States who are compliant and have well developed SAR systems in place.

2.7 Examples of assistance that could be provided by States, International Organizations (such as IMO/ICAO) or multi-lateral initiatives include:

- a) conduct of a SAR Gap Analysis;
- b) advice on the establishment of a SAR organizational framework;
- c) advice for the establishment of a National SAR Committee;
- d) technical assistance in the development of a National SAR Plan;
- e) providing copies of relevant SAR documents to be used as templates;
- f) technical assistance on the establishment of SAR agreements;
- g) technical assistance in the development of RCC position descriptions;
- h) training of SAR personnel;
- i) provision of SRU where appropriate and training of SRU crews;

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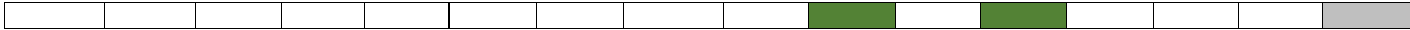
- j) provision/sharing of computerized SAR tools including incident management systems, databases, maritime drift modelling software, etc.;
- k) establishing data and information sharing agreements between RCCs;
- l) the provision of operational search plan data;
- m) provide advice on how to conduct a SAREX and post-SAREX analysis; and
- n) set up of SAR system publicity and safety awareness campaigns.

APPENDIX 5.3P

Part I: Data Communication, the table below shows the required intra-regional data connection over CRV Network

State	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi	Sudan	Syria	UAE	Yemen
Bahrain															
Egypt															
Iran															
Iraq															
Jordan															
Kuwait															
Lebanon															
Libya															
Oman															
Qatar															
Saudi															
Sudan															
Syria															
UAE															
Yemen															

Formatted Table



Notes:

- 1- Package A is selected for all states in the MID Region.
- 2- The bandwidth of each data connection is 64K.
- 3-  Means data connection between two states
- 4- The table below shows the required inter-regional connections between APAC and MID regions over the CRV Network:

State	Inter-regional connection with APAC Region
Bahrain	Singapore
Iran	Pakistan
Kuwait	Pakistan, China
Oman	India, Pakistan

5.3P-3

Safety Assessment

The following Intra-regional connections should be maintained as backup in case of total CRV disruption

State	Inter-regional Backup line
Bahrain	Oman, Saudi and UAE
Egypt	Saudi Arabia
Iran	UAE
Iraq	Bahrain, Jordan
Jordan	Lebanon, UAE
Kuwait	Lebanon
Lebanon	Jordan, Kuwait
Libya	Egypt
Oman	Bahrain, UAE
Qatar	Bahrain , UAE
Saudi	Egypt
Sudan	Egypt
Syria	Kuwait
UAE	Jordan, Oman
Yemen	VSAT Net.

|

Required Bandwidth for data

State	Number of data Connections	Total Bandwidth
Bahrain	7	512 K
Egypt	2	128 K
Iran	5	256 K
Iraq	4	256 K
Jordan	2	128 K
Kuwait	8	512 k
Lebanon	4	256 K
Libya	1	64 K
Oman	5	256 k
Qatar	5	256 K
Saudi	10	1024 K
Sudan	2	128 K
Syria	2	128 K
UAE	6	512 K
Yemen	2	128 K

5.3P-5

Part II: Voice Communication (pls fill)

State	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi	Sudan	Syria	UAE	Yemen
Bahrain															
Egypt															
Iran															
Iraq															
Jordan															
Kuwait															
Lebanon															
Libya															
Oman															
Qatar															
Saudi															
Sudan															
Syria															
UAE															
Yemen															

The table shows the required intra-regional **Voice** connection over CRV Network.

Notes:

- 1- Package A is selected for all states in the MID Region.
- 2- Each voice call session requires 104Kbps as voice will be converted to VoIP.
- 3-  Means **VOIP** connection between two states

4- The table below shows the required inter-regional VOIP between APAC and MID regions over the CRV Network:

State	Inter-regional connection with APAC Region
Iran	Pakistan
Kuwait	Pakistan, China
Oman	India, Pakistan

Safety Assessment

In case of total failure of the CRV service, the dialup connection may be used or *mention any voice connection you wish to maintain*

State	Voice Backup line
Egypt	Dialup with Jordan
Jordan	Dialup used with all
Qatar	Bahrain, UAE

5.3P-7

Required Bandwidth for VOIP

State	Number of Voice Connections	Total Bandwidth
Bahrain	Jeddah (3X) Riyadh (3X) Abu Dhabi (4x) Muscat (1x) <i>Iran (1x)</i> <i>Kuwait (2X)</i> <i>Qatar (4X)</i>	2080 Kpbs
Egypt	1 with Jordan	128 K
Iran		
Iraq		
Jordan	3	512 k (Cairo,Jeddah,Riyadh)
Kuwait		
Lebanon		
Libya		
Oman		
Qatar	10	1 M
Saudi		
Sudan		
Syria		
UAE	15	1560 K
Yemen		

Notes:

- 1- The preferred National Telecommunication provider for UAE is “Etisalat”
- 2- Jordan does not prefer to contract with “Orange” as National Telecom. Provider

APPENDIX 5.3Q

MID Doc 011



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)**

GUIDANCE ON GNSS IMPLEMENTATION IN THE MID REGION

EDITION DECEMBER, 2018

AMENDMENTS

The GNSS Guidance in the MID Region should be reviewed and updated by the CNS Sub-Group. States shall submit their proposal for amendment to the Plan to the ICAO MID Regional Office, the changes can be coordinated by correspondence with main CNS focal points/ or State letters.

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	Comment	Section affected
V0.1	11/2/2018		All
V0.2	1/4/2018	Add NDB IDs to the Appendix A	Page 26-28

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ACRONYMS

AO	Aircraft Operators
AAIM	Aircraft Autonomous Integrity Monitoring
ABAS	Aircraft Based Augmentation System
APCH	Approach
CAPEX	Capital Expenditure
DME	Distance Measuring Equipment
DOP	Dilution of Precision
EGNOS	European Geostationary Navigation Overlay Service
FD	Fault Detection
FDE	Fault Detection and Exclusion
GAGAN	GPS Aided GEO Augmented Navigation
GBAS	Ground Based Augmentation System
GLONASS	Global Navigation Satellite System
GLS	GBAS Landing System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
ILS	Instrument Landing System
INS	Inertial Navigation System
IRS	Inertial Reference System
LNAV	Lateral Navigation
MLS	Microwave Landing System
MSAS	MTSAT Satellite based Augmentation System
NDB	Non-Directional Beacon
NPA	Non-precision Approach
NSE	Navigation Sensor Error
OPEX	Operating Expense
PA	Precision Approach
PBN	Performance Based Navigation
RAIM	Receiver Autonomous Integrity Monitoring
RNAV	Area Navigation
RNP	Required Navigation Performance
SBAS	Satellite Based Augmentation
SDCM	System of Differential Correction and Monitoring
VOR	Very High Frequency Omni Directional Radio Range

THE OBJECTIVE AND SCOPE OF THE DOCUMENT

The objective of this document is to provide States in the Middle East Region with guidance for GNSS implementation based on the Global Air Navigation Plan and Regional Requirements.

The document outlines the status of Satellite constellations and Augmentation systems worldwide, with focus on the available Augmentation systems that can be implemented in the MID Region; the services provided, and requirements to exploit these Navigation services. Moreover, the document provides practical information on GBAS deployment, with reference to other Regions experience and factors to be considered in the process of cost estimation for the cost benefit analysis.

The GNSS application is out of scope of this document and addressed in the MID PBN implementation plan and the MID Region Surveillance Plan. As the GNSS is the key enabler for PBN implementation, this guidance document developed to complement the information in the MID PBN implementation Plan; ICAO MID DOC 007.

This document is divided into three parts; Part one includes information about the GNSS and Augmentation systems worldwide, and ICAO GANP Navigation Roadmap.

Part II identifies the current conventional Navigation aids infrastructure in the MID Region. And focuses on the SBAS Systems that may extends their services to the MID states.

Part III addresses the GNSS vulnerabilities due to intentional and unintentional sources of interference and to certain ionospheric effects. Also, it defines mitigation strategies to be deployed by States to reduce the likelihood and impact of the GNSS interference as defined by ICAO.

Part I: General Navigational Infrastructure

Navigation Aids Infrastructure refers to the ground and space-based NAVAIDs and provides positioning capability.

1- TERRESTRIAL NAVIGATIONS

Terrestrial Navigation Aids “conventional” refers to ground-based navigations such as NDB, ILS, VOR, TACAN, DME, ..., etc.

The basic principle of all of these navigation facilities is the fact that aircraft in general navigate towards and away from the navigation aid itself, “point to point”. This means that the location of the navigation aid must be in an optimized location. This optimized position is, in many cases, not achievable (due to being situated in high terrain, open seas, politically unacceptable areas, etc.). Therefore, the route structure must be aligned with the position of the navigation aid and not aligned in the ideal position for its purpose. This results in additional distances being flown by aircraft which has a number of disadvantages including economic, environmental and efficiency drawbacks.

In addition to the additional distance flown a number of other problem areas arise;

- High terrain. At airports located in high terrain with difficult accessibility arrival procedures, based upon conventional ground based navigation aids, may result in aircraft being unable to land at the airport safely during periods of low visibility.
- Lateral containment of tracks. With conventional ground based navigation aids the accuracy of the track to be flown is a factor of how close to the aid the aircraft is. The closer the aircraft is to the aid the more accurate the track keeping capability. As the aircraft gets further away from the aid the accuracy reduces. This requires that a maximum distance for the aid to be used must be published and that the route spacing requires to be established on the worst case scenario.

In the global context, GNSS based PBN procedures have been implemented, and several GLS (CAT I) procedures are in place.

2- GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)

GNSS is a satellite-based navigation system utilizing satellite signals, for providing accurate and reliable position, navigation, and time services to airspace users. It provides location and time information anywhere on, or near, the earth in all weather conditions.

In 1996, the International Civil Aviation Organization (ICAO) endorsed the development and use of GNSS as a primary source of future navigation for civil aviation. ICAO noted the increased flight safety, route flexibility and operational efficiencies that could be realized from the move to space-based navigation. Today several GNSS systems are available in the world, the first system in operation was the Global Positioning System (GPS).

2-1 GPS

The Global Positioning System (GPS) is a space-based radio-navigation system consisting of a constellation of satellites and a network of ground stations used for monitoring and control. Currently 32 GPS satellites

orbit the Earth at an altitude of approximately 11,000 miles providing users with accurate information on position, velocity, and time anywhere in the world and in all weather conditions.

GPS is operated and maintained by the Department of Defense (DoD).

2-2 GLONASS

The Russian Global Navigation Satellite System, which began operation in 1993. GLONASS network provides real-time positioning and speed data for surface, sea and airborne objects with an accuracy of one meter (three feet).

A group of 28 GLONASS satellites was in orbit as of April 2014, with 24 in operation, three spares, and one in the test-flight phase.

2-3 Galileo

Galileo is Europe's Global Satellite Navigation System (GNSS), providing improved positioning and timing information with significant positive implications for many European services and users. The system is still under deployment.

2-4 BeiDou

The BeiDou Navigation Satellite System (BDS) built and operated by China with a three-step strategy of development: to complete the construction of the BDS-1 and provide services to the whole country by the end of 2000; to complete the construction of the BDS-2 and provide services to the Asia-Pacific region by the end of 2012; and to complete the construction of the BDS and provide services worldwide around 2020.

2-5 RNSS

Regional Navigation Satellite System (RNSS) like NAVIC and QZSS. The Indian Regional Navigation Satellite System (IRNSS) with an operational name of NAVIC. QZSS is a system especially for usage in the Asia-Oceania regions, with a focus on Japan.

3- AUGMENTATION

Augmentation System provides additional data to users of GNSS equipment to improve accuracy, integrity, availability, or any other improvement to positioning, navigation, and timing. A wide range of different augmentation systems have been developed.

3-1 Space Based Augmentation System (SBAS)

SBAS systems are designed to augment the navigation system constellations by broadcasting additional signals from geostationary (GEO) satellites. The basic scheme is to use a set of monitoring stations (at very well-known position) to receive GNSS signals that will be processed in order to obtain some estimations of these errors that are also applicable to the users (i.e. ionospheric errors, satellite position/clock errors, etc.). Once these estimations have been computed, they are transmitted in the form of "differential corrections" by means of a GEO satellite.

Wide range of SBAS systems, designed according to the same standard have already been commissioned by the US (Wide Area Augmentation System WAAS) and Japan (MTSAT Satellite based Augmentation System MSAS).

Other systems are under commissioning or deployment in other regions of the world (e.g. GPS Aided GEO Augmented Navigation GAGAN in India and System of Differential Correction and Monitoring SDCM in Russia).

The current and planned SBAS systems coverage depicted in the figure (1-1)

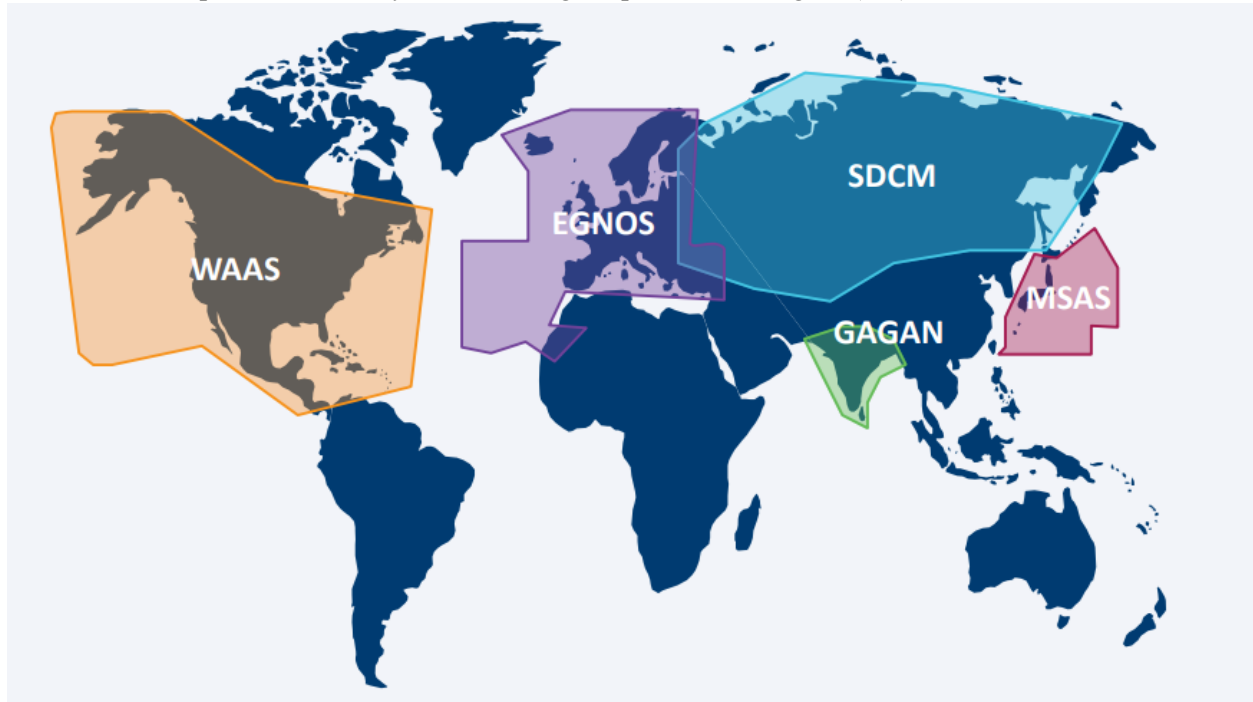


Figure (1-1)

3-1-1 WAAS

The Wide Area Augmentation System (WAAS) is an Air navigation aid developed by the Federal Aviation Administration to augment the Global Positioning System (GPS), with the goal of improving its accuracy, integrity, and availability.

3-1-2 EGNOS

The European Geostationary Navigation Overlay Service Navigation (EGNOS) is the European implementation of SBAS. Originally it was planned to augment GPS and GLONASS. Today, EGNOS augments GPS signals. EGNOS provides corrections and integrity information to GPS signals over a broad area centered over Europe and it is fully interoperable with other existing SBAS systems.

EGNOS provides three services:

- Open Service (OS), freely available to any user;
- Safety of Life (SoL) Service, that provides the most stringent level of signal-in-space performance to all Safety of Life user communities;
- EGNOS Data Access Service (EDAS) for users who require enhanced performance for commercial and professional use.

The main objective of the EGNOS SoL service is to support civil aviation operations down to Localizer Performance with Vertical Guidance (LPV) minima. In order to provide the SoL Service, the EGNOS

system has been designed so that the EGNOS Signal-In-Space (SIS) is compliant to the ICAO SARPs for SBAS.

The Services provided by EGNOS:

- Non-Precision Approach operations and other flight operations supporting PBN navigation specifications other than RNP APCH, not only for approaches but also for other phases of flight.
- Approach operations with Vertical Guidance supporting RNP APCH PBN navigation specification down to LPV minima as low as 250 ft.
- Category I precision approach with a Vertical Alert Limit (VAL) equal to 35m and supporting RNP APCH PBN navigation specification down to LPV minima as low as 200 ft.

A NOTAM (Notice to Airmen) is a notice issued to alert pilots of potential hazards along a flight route that could affect the safety of the flight. The objective of the EGNOS NOTAM proposal generation is to:

- Predict APV-I and LPV-200 services outages at given airports.
- Create and format the corresponding NOTAM proposals into an ICAO format and according to the European Concept for GNSS NOTAM to ease the validation process to be performed by the NOF (NOTAM Offices).
- Distribute the NOTAM proposals to the concerned NOFs through the AFTN network.

3-1-3 GAGAN

GAGAN is the acronym for GPS Aided GEO Augmented Navigation. The GAGAN uses a system of ground stations to provide necessary augmentations to the GPS standard positioning service (SPS) navigation signal. A network of precisely surveyed ground reference stations (INdian Reference Stations INRES) is strategically positioned across the country to collect GPS satellite data. Using this information, the master control center (Indian Master Control Centre INMCC) generates messages to correct any signal errors. These correction messages are then uplinked through (Indian Land Uplink Station INLUS) and broadcast through communication satellites (Geostationary) to receivers onboard aircraft using the same frequency as GPS.

The Indian Space Research Organization (ISRO) and Airports Authority of India (AAI) have implemented the GPS Aided Geo Augmented Navigation-GAGAN project as a Satellite Based Augmentation System (SBAS) for the Indian Airspace. The objective of GAGAN to establish, deploy and certify satellite based augmentation system for safety-of-life civil aviation applications in India has been successfully completed. The system is inter-operable with other international SBAS systems like US-WAAS, European EGNOS, and Japanese MSAS etc. GAGAN GEO footprint extends from Africa to Australia and has expansion capability for seamless navigation services across the region. GAGAN provides the additional accuracy, availability, and integrity necessary for all phases of flight, from enroute through approach for all qualified airports within the GAGAN service volume.

The services provided by GAGAN are the following:

- RNP 0.1 within India FIR
- APV-1 in the landmass of Indian FIR.

Due to impact of ionosphere behavior over the equatorial regions, availability of GAGAN APV -1 service is better than 76% of landmass on nominal iono days.

3-1-4 SDCM

The System for Differential Corrections and Monitoring (SDCM) is the SBAS currently being developed in the Russian Federation as a component of GLONASS.

3-1-5 MSAS

MTSAT Satellite Based Augmentation System (MSAS) is the Japanese SBAS, the system in operation since September 27, 2007.

MSAS provide GPS Augmentation Information for RNAV, from En-route through NPA (RNP 0.3) within Fukuoka FIR. Due to ionosphere horizontal navigation information only provided.

MSAS provide users with NOTAM when required, including alert for Service Interruption or Predicted Service Outage.

3-2 GROUND BASED AUGMENTATION SYSTEM (GBAS)

GBAS is an augmentation system in which the user receives augmentation information directly from a ground-based transmitter. GBAS support precision approach, landing, departure and surface movement.

GBAS cat I is now operational at many Airports, GBAS classified based on approach service type as following:

- GAST-A : APV I Performance
- GAST-B : APV II Performance
- GAST-C : CAT I Performance
- GAST-D : CAT III Performance (amendment 91 to Annex 10 Vol I)
- GAST-F : CAT III Performance (multiconstellation, multifrequency, ICAO Standards will be available 2025-2028)

The cost of a single certified GBAS ground station is from SESAR studies and deployment in Europe 1,5 to 2 M€ per airport, which is equal roughly to the cost of three ILSs.

3-3 AIRCRAFT BASED AUGMENTATION SYSTEM (ABAS)

ABAS is achieved by features of the onboard equipment designed to overcome the performance limitations of the GNSS constellations. The two systems currently in use are Receiver Autonomous Integrity Monitoring (RAIM) and the Aircraft Autonomous Integrity Monitor (AAIM). ABAS considered low cost integrity supervision.

3-3-1 Receiver autonomous integrity monitoring (RAIM)

RAIM is a technology developed to assess the integrity of the GPS in a GPS receiver system and can predict areas in which the GPS signal may be compromised. RAIM requires no data from outside the satellite receiver, only from GPS.

Fault detection and Exclusion (FDE) mechanism is used in RAIM, minimum five (5) satellite is needed for 'fault detection' and six (6) for 'fault exclusion'.

3-3-2 Aircraft Autonomous Integrity monitoring (AAIM)

AAIM uses the redundancy of position estimates from multiple sensors, including GNSS, to provide integrity performance that is at least equivalent to RAIM. An example is the use of an inertial navigation system or other navigation sensors as an integrity check on GPS data when RAIM is unavailable but GPS positioning information continues to be valid. AAIM requires data from GPS and other sensor (INS).

AAIM uses GNSS signal plus onboard Inertial (INS) to achieve primary means for enroute though non-precision approach.

4- Global Air Navigation Plan

The GANP and ASBUs recognize the Global Navigation Satellite System (GNSS) as a technical enabler supporting improved services. Roadmaps in the GANP outline timeframes for the availability of GNSS elements, the implementation of related services and the rationalization of conventional infrastructure. The ICAO Navigation roadmap depicted in figure (1-2)

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Part II: GNSS in ICAO Middle East Region

1- The Conventional Ground Based Navigation systems in the MID

States Should introduce rationalizing terrestrial navigation aids, retaining a minimum network of terrestrial aids necessary to maintain safety of aircraft operations; in accordance with AN-Conf/12 recommendations 6/10. Some ILSs may be retained to support precision approach and to mitigate GNSS outage.

Removal of conventional ground infrastructure should be planned carefully to ensure that safety is not compromised, such as by performance of safety assessment, consultation with users through regional air navigation planning.

The NDB should be rationalized based on need and equipage, MIDANPIRG/12 urged states to plan for complete decommissioning of NDBs by 2012 and to terminate the use of NDB for approach operations not later than 2012. The list of current NDBs and purpose of use in the MID Region is at Appendix A.

Furthermore, table (2-1) shows the current conventional infrastructure in the MID Region.

System	Frequency	Ground Stations	Status
NDB	200 – 1600 MHz	150 NDBs in (Egypt, Iraq, Iran, Jordan, Libya, Qatar, Syria, UAE, and Yemen)	States should plan for Complete decommissioning of NDBs by 2012 unless its operational justified.
ILS	108 – 112 MHz 329 – 335 MHz		-
VOR	108 – 118 MHz		-
TACAN	960 – 1215 MHz	38 TACANs	TACAN used in Egypt, Iran, Iraq, Qatar and Saudi Arabia
DME	960 – 1215 MHz		
MLS	5031 – 5091 MHz	MLS is not implemented in the MID Region	-

Table (2-1)

2) SBAS

The implementation of GNSS and augmentations systems in the MID Region should be in full compliance with ICAO Standards and Recommended Practices and PANS; due to geographic location of some MID States, taking advantages of adjacent SBAS services (EGNOS and GAGAN) is possible.

SBAS-based procedure does not require any infrastructure at the Airport served, but SBAS elements (e.g. reference stations, master station, satellites) must be in place to support required service level*

2-1 EGNOS

Some of MID Region States who are member in the EUROMED* can exploit the use of EGNOS in various applications, mainly in the transport sectors. As of the time of developing this document; five (5) States have officially notified their interest in EGNOS implementation (Algeria, Jordan, Lebanon, Libya, and Tunisia).

**Euromed countries (Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine, Syria and Tunisia)*

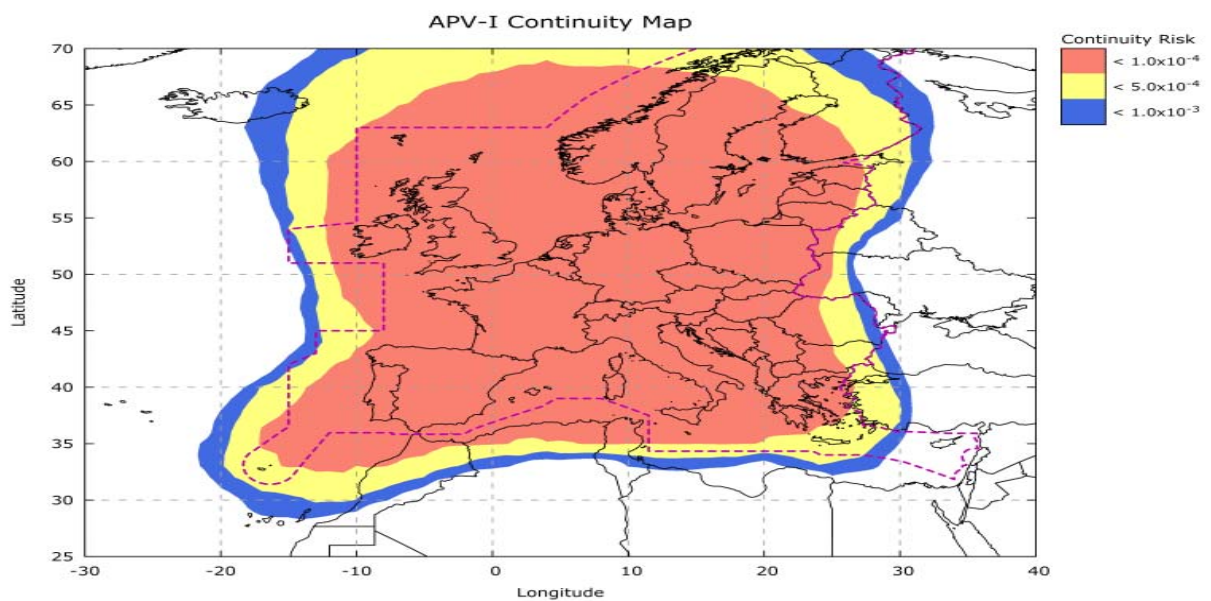
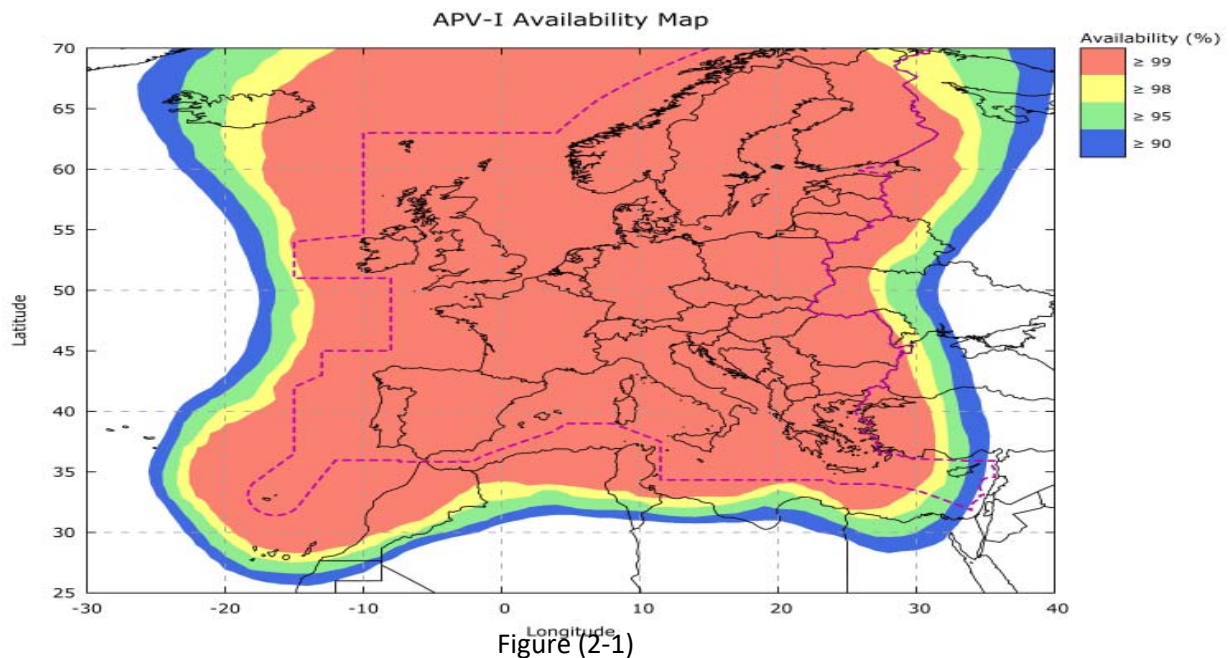
The requirements to use EGNOS services are as follow:

- a) Installation of additional RIMS, three RIMS Stations are sufficient to extend the service to EURCOMED States.
- b) Air Navigation Service Providers should sign an EGNOS Working Agreement (EWA) with the ESSP (Certified provider of Safety of Life service in aviation in EU) to be able to activate use of EGNOS SoL.
- c) International bilateral agreements should be signed between EU and each State to define liability in case of EGNOS failure which results in death/injury/loss/damage to equipment.

EGNOS Service Maps

The current service maps shown in the figures (2-1, 2-2, 2-3 and 2-4), the current availability and continuity for APV-I and LPV service level in the MID Region are less than the minimum required signal-in-space performance specified in Annex 10 Vol. I., the requirements are shown in table (2-2)

a) APV-I Service Level



b) LPV200 Service Level

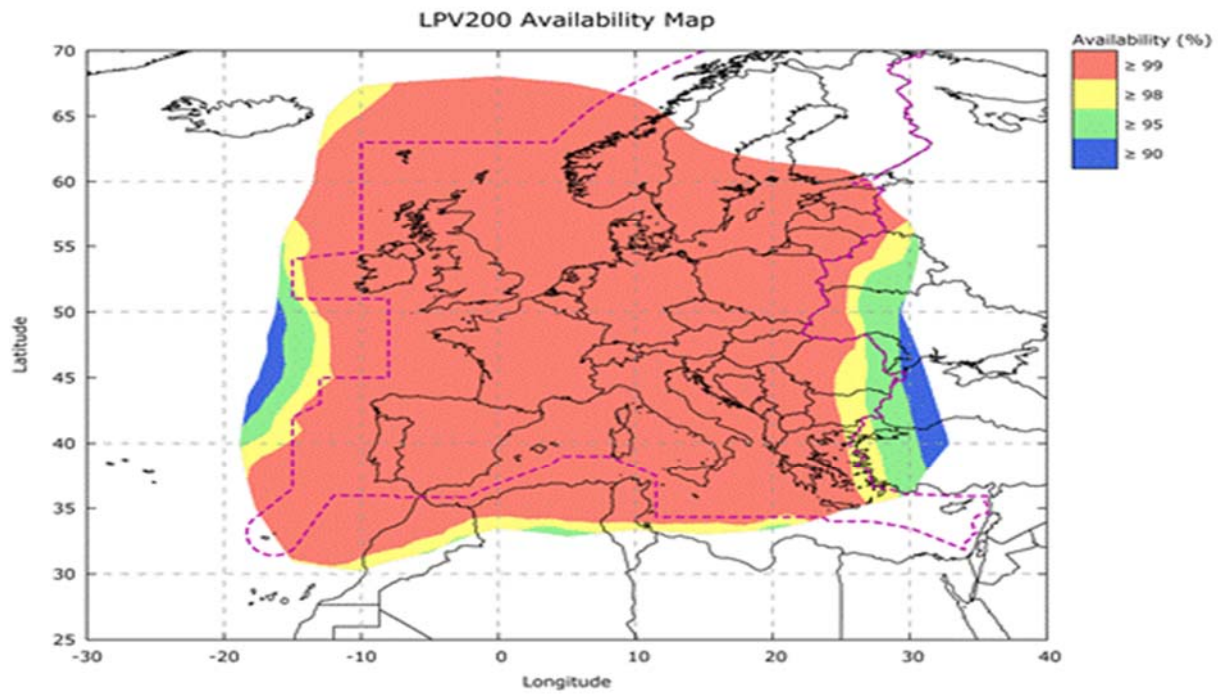


Figure (2-3)

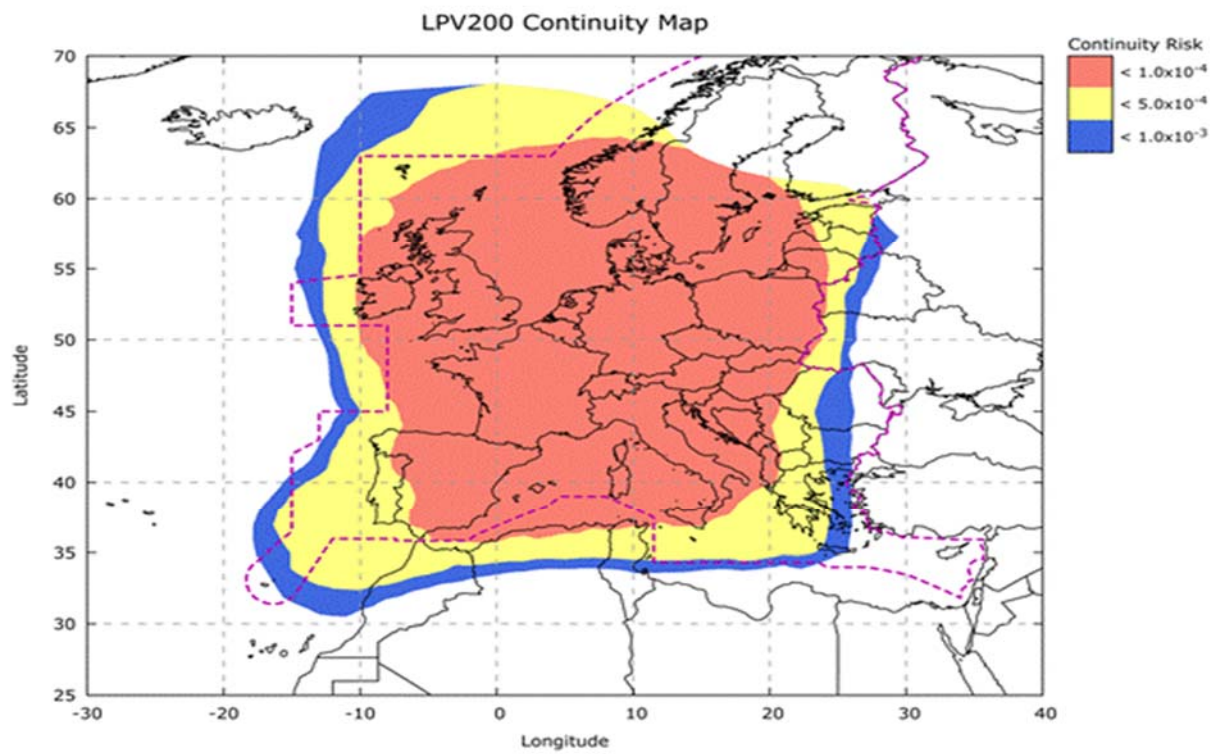


Figure (2-4)

Typical operation	Accuracy horizontal 95% (Notes 1 and 3)	Accuracy vertical 95% (Notes 1 and 3)	Integrity (Note 2)	Time-to-alert (Note 3)	Continuity (Note 4)	Availability (Note 5)
En-route	3.7 km (2.0 NM)	N/A	$1 - 1 \times 10^{-7}/h$	5 min	$1 - 1 \times 10^{-4}/h$ to $1 - 1 \times 10^{-8}/h$	0.99 to 0.99999
En-route, Terminal	0.74 km (0.4 NM)	N/A	$1 - 1 \times 10^{-7}/h$	15 s	$1 - 1 \times 10^{-4}/h$ to $1 - 1 \times 10^{-8}/h$	0.99 to 0.99999
Initial approach, Intermediate approach, Non-precision approach (NPA), Departure	220 m (720 ft)	N/A	$1 - 1 \times 10^{-7}/h$	10 s	$1 - 1 \times 10^{-4}/h$ to $1 - 1 \times 10^{-8}/h$	0.99 to 0.99999
Approach operations with vertical guidance (APV-I)	16.0 m (52 ft)	20 m (66 ft)	$1 - 2 \times 10^{-7}$ in any approach	10 s	$1 - 8 \times 10^{-6}$ per 15 s	0.99 to 0.99999
Approach operations with vertical guidance (APV-II)	16.0 m (52 ft)	8.0 m (26 ft)	$1 - 2 \times 10^{-7}$ in any approach	6 s	$1 - 8 \times 10^{-6}$ per 15 s	0.99 to 0.99999
Category I precision approach (Note 7)	16.0 m (52 ft)	6.0 m to 4.0 m (20 ft to 13 ft) (Note 6)	$1 - 2 \times 10^{-7}$ in any approach	6 s	$1 - 8 \times 10^{-6}$ per 15 s	0.99 to 0.99999

NOTES.—

1. The 95th percentile values for GNSS position errors are those required for the intended operation at the lowest height above threshold (HAT), if applicable. Detailed requirements are specified in Appendix B and guidance material is given in Attachment D, 3.2.
2. The definition of the integrity requirement includes an alert limit against which the requirement can be assessed. For Category I precision approach, a vertical alert limit (VAL) greater than 10 m for a specific system design may only be used if a system-specific safety analysis has been completed. Further guidance on the alert limits is provided in Attachment D, 3.3.6 to 3.3.10. These alert limits are:

Table (2-2)

2-2 GAGAN

Gulf region falls within the GAGAN GEO footprint as shown in figure (2-5), GCC States can take advantage of GAGAN infrastructure to implement the RNP 0.1 and APV 1 service in the respective states without having the full SBAS infrastructure in their country.

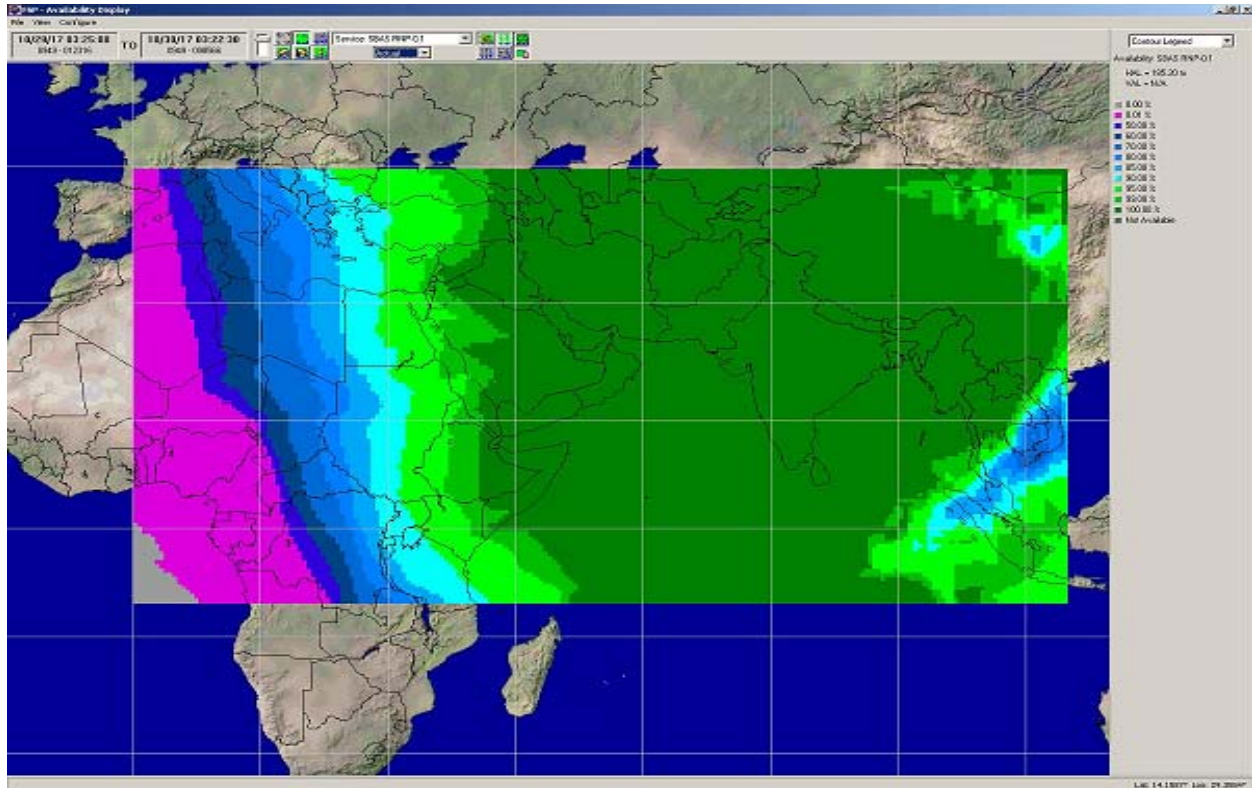


figure (2-5)

India and Gulf regions are on equatorial anomaly region. Ionosphere Scintillation is most intense and most frequent in that equatorial region. It can severely affects the performance of SBAS, Therefore, An MLDF (Multi-Layer Data Fusion) iono model suitable to serve the equatorial anomaly region was implemented in GAGAN system .

The Requirements to use GAGAN as follow:

- 1- Installing additional reference stations at strategic locations in gulf region and forward the measurements data to GAGAN-INMCC, RNP 0.1/APV 1 services can be extended to gulf region.
- 2- States to notify Indian Airport Authority (IAA) about their interest to use GAGAN

3-GNSS Application in the MID Region

The GNSS is the foundation for the Regional implementation of PBN, Automatic dependent surveillance (ADS-B), the Multilateration System (MLAT), in addition to many other aircraft and ground applications that require position or time information.

4-GBAS

Transition from ILS to GBAS should be based on an economic assessment, an operational assessment and from a safety and security perspective. Cost benefits analysis should be conducted taking on consideration that one GBAS can be used for several runways ends and even in some cases more than one Airports.

5- Cost Benefits Analysis

The use of GNSS in PBN applications reduces the overall running cost of Navigation infrastructure. Also deploying GBAS reduces the cost for ground infrastructure since a single GBAS ground station can provide approach guidance to all runways at an airport. GBAS can increase the Airport capacity, because it does not have sensitive areas that must be protected. However, the CBA is very dependent on specific operational and airport infrastructure aspects.

States may consider the following factors during the process of estimating the cost associated with competing alternative in CBA:

- a) CAPEX
 - a.1 Installation Cost;
 - One GBAS costs around 1.5 -2 M euro (equal to the cost of 3 ILSs).
 - ILS(s) must be retained to ensure the service continuity during the GNSS/GBAS outage.
 - a.2 Training for operational and technical staff.
- b) OPEX
 - c.1 Cost of Flight Check (Calibration).
 - c.2 Maintenance costs (Preventive, Reactive, maintenance Contract, less Spare parts).

It has been reported by several CBA studies, that GBAS initial investment is higher than for ILS, and lower OPEX. However, Net Present Cost need to be calculated based on Airport infrastructure and operational requirements.

6- GBAS Implementation in the MID Region

Currently GBAS is not implemented in the MID Region.

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PART III: GNSS VULNERABILITIES

1- Introduction

GNSS signals are very weak at the receiver antenna therefore the signal is vulnerable, and also susceptible to ionosphere effects. Current GNSS use a single frequency band common to GPS, GLONASS and SBAS. This makes it easier to intentionally jam GNSS signals.

2- Unintentional Interference Sources

There are a number of sources of potential interference to GNSS, including mobile and fixed VHF communications, Solar effect and other sources. The likelihood and operational effect of interference vary with the environment.

Unintentional interference is not considered a significant threat provided that States exercise proper control and protection over the electromagnetic spectrum for both existing and new frequency allocations.

2-1 Solar Effect

GNSS signals are delayed by varying amounts of time depending on the density of ionized particles (ionosphere) which itself depends on the intensity of solar radiation and other solar energy bursts. The solar activity can cause GNSS service to be degraded or temporarily lost.

The type and severity of ionospheric effects vary with the level of solar activity, the region of the world and other factors such as time of year and time of day. Rare solar storms can affect GNSS service over a wide area. The Solar activity peaks happens every eleven years.

The availability of a second frequency will allow avionics to calculate ionospheric delay in real time, effectively eliminating a major error source.

2-2 Radio Frequency Interference

Harmonics of television stations, certain radars, mobile satellite communications and military systems can cause interference with GNSS signals.

2-3 On-board systems

Many reported instances of GNSS interference have been traced to on-board systems; such interference can be prevented by installing advanced avionics.

3-Intentional Interference Sources

3-1 Jamming

Personal privacy devices (PPDs) have been recognized as being responsible for causing interference to GPS receivers in many occurrences. The intention of PPDs is to protect the privacy of the user so that the user's location is not revealed, therefore the user will not be tracked or monitored. PPDs are low-cost jammers to mask GPS signal.

3-2 Spoofing

Spoofing is the broadcast of GNSS-like signals that cause avionics to calculate erroneous positions and provide false guidance. It is considered that the spoofing of GNSS is less likely than the spoofing of traditional aids because it is technically much more complex.

Spoofing of the GBAS data broadcast is virtually impossible, because of an authentication scheme that has been developed.

4-Reducing the Likelihood of Interferences

The likelihood of interference depends on such factors as population density and the motivation of individuals or groups in an area to disrupt aviation and non-aviation services

- a) Effective spectrum management, this comprises creating and enforcing regulations/laws that control the use of spectrum and carefully assessing applications for new spectrum allocations.
- b) The introduction of GNSS signals on new frequencies will ensure that unintentional interference does not cause the complete loss of GNSS service (outage) although enhanced services depending upon the availability of both frequencies might be degraded by such interference
- c) State should develop and enforce a strong regulatory framework governing the use of intentional radiators, including GNSS repeaters, pseudolites, spoofers and jammers, should forbid the use of jamming and spoofing devices and regulate their importation, exportation, manufacture, sale, purchase, ownership and use.
- d) Multi-constellation GNSS would allow the receiver to track more satellites, reducing the likelihood of service disruption.

5- Mitigation Strategies

The disruption of GNSS signals will require the application of realistic and effective mitigation strategies to both ensure the safety and regularity of air services and discourage those who would consider disrupting aircraft operations.

There are three principal methods which can be applied in combination:

- a) taking advantage of on-board equipment, such as IRS;
- b) taking advantage of conventional navigation aids and radar; and
- c) employing procedural (aircrew and/or ATC) methods.

Mitigation of GNSS vulnerabilities needs to be balanced in the context of the overall threats to communications, navigation, and surveillance/air traffic management (CNS/ATM) operations to ensure that the applied effort is neither too small (leading to potentially unacceptable risks and/or preventing realization of GNSS enabled benefits) nor too large (in comparison with the effort expended on mitigating other risks).

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- 11- <http://www.eurocontrol.int/press-releases/egnos-operational-aviation>

APPENDIX A

LIST OF NDBs IN THE MID REGION AND PURPOSE OF RETAIN

NO.	State	NDB ID	Purpose of retain	Plan to remove
1.	EGYPT	MB	Used at local airport for homing	Until the end of lifetime
2.	EGYPT	NWB	Used for enroute	Until the end of lifetime
3.	EGYPT	OCT	Used at local airport for homing	Until the end of lifetime
4.	IRAN	ABD		
5.	IRAN	ABM		
6.	IRAN	AJ		
7.	IRAN	ARB		
8.	IRAN	ARK		
9.	IRAN	AWZ		
10.	IRAN	BAM		
11.	IRAN	BND		
12.	IRAN	BRD		
13.	IRAN	BRG		
14.	IRAN	BRN		
15.	IRAN	BUZ		
16.	IRAN	DNZ		
17.	IRAN	DZF		
18.	IRAN	ESH		
19.	IRAN	FSA		
20.	IRAN	GGN		
21.	IRAN	GSN		
22.	IRAN	HAB		
23.	IRAN	HAM		
24.	IRAN	HAS		
25.	IRAN	IFN		
26.	IRAN	IKA		
27.	IRAN	ILM		
28.	IRAN	ISR		
29.	IRAN	JAM		
30.	IRAN	JIR		
31.	IRAN	JRM		
32.	IRAN	JSK		
33.	IRAN	KAZ		
34.	IRAN	KER		
35.	IRAN	KHG		
36.	IRAN	KHM		
37.	IRAN	KHY		
38.	IRAN	KIH		
39.	IRAN	KLH		
40.	IRAN	KMS		
41.	IRAN	KRD		
42.	IRAN	LAM		
43.	IRAN	LAR		
44.	IRAN	LEN		

45.	IRAN	LVA		
46.	IRAN	MSD		
47.	IRAN	NSR		
48.	IRAN	OMD		
49.	IRAN	PAD		
50.	IRAN	PIM		
51.	IRAN	PRG		
52.	IRAN	PSR		
53.	IRAN	RAF		
54.	IRAN	RST		
55.	IRAN	SAV		
56.	IRAN	SBZ		
57.	IRAN	SHD		
58.	IRAN	SHR		
59.	IRAN	SIR		
60.	IRAN	SKD		
61.	IRAN	SMN		
62.	IRAN	SNJ		
63.	IRAN	SR		
64.	IRAN	SRN		
65.	IRAN	SRS		
66.	IRAN	TBS		
67.	IRAN	TBZ		
68.	IRAN	UMH		
69.	IRAN	VR		
70.	IRAN	YSJ		
71.	IRAN	YZD		
72.	IRAN	ZAJ		
73.	IRAN	ZAL		
74.	IRAN	ZD		
75.	IRAQ	ALI		
76.	JORDAN	AQC		
77.	JORDAN	MDB		
78.	JORDAN	QA		
79.	Lebanon	BOD	Used by Helicopters and light aircraft	Not Determined
80.	LIBYA	BNA		
81.	LIBYA	CW		
82.	LIBYA	GAD		
83.	LIBYA	GAL		
84.	LIBYA	GHT		
85.	LIBYA	GRT		
86.	LIBYA	GS		
87.	LIBYA	HON		
88.	LIBYA	IZD		
89.	LIBYA	JFR		
90.	LIBYA	KDR		
91.	LIBYA	KFR		
92.	LIBYA	KH		
93.	LIBYA	LAB		

94.	LIBYA	MB		
95.	LIBYA	OA		
96.	LIBYA	OB		
97.	LIBYA	OJ		
98.	LIBYA	OR		
99.	LIBYA	OV		
100.	LIBYA	OXY		
101.	LIBYA	PRB		
102.	LIBYA	PRC		
103.	LIBYA	RAG		
104.	LIBYA	ROO		
105.	LIBYA	SAH		
106.	LIBYA	SEB		
107.	LIBYA	SRT		
108.	LIBYA	STF		
109.	LIBYA	TRO		
110.	LIBYA	TZR		
111.	LIBYA	UBR		
112.	LIBYA	VA		
113.	LIBYA	VG		
114.	LIBYA	VH		
115.	LIBYA	VO		
116.	LIBYA	VR		
117.	LIBYA	WF		
118.	LIBYA	WLD		
119.	LIBYA	XS		
120.	LIBYA	XY		
121.	LIBYA	ZAR		
122.	LIBYA	ZEL		
123.	LIBYA	ZT		
124.	LIBYA	ZUE		
125.	QATAR	AK		
126.	QATAR	QPC	Used for Qatar Petroleum Company	-
127.	SYRIA	ABD		
128.	SYRIA	ALE		
129.	SYRIA	DAL		
130.	SYRIA	DAN		
131.	SYRIA	DRZ		
132.	SYRIA	HAS		
133.	SYRIA	KAM		
134.	SYRIA	KAR		
135.	SYRIA	LTK		
136.	SYRIA	MER		
137.	SYRIA	MEZ		
138.	SYRIA	PAL		
139.	UAE	BH		
140.	UAE	JD		
141.	UAE	RNZ		

142.	UAE	ZKU		
143.	YEMEN	BDE		
144.	YEMEN	GDA		
145.	YEMEN	HD		
146.	YEMEN	MRB		
147.	YEMEN	SCT		
148.	YEMEN	SYE		
149.	YEMEN	SYN		
150.	YEMEN	TZ		

NUMBER OF RETAINED NDBs PER STATES

STATE	NUMBER OF NDBs
EGYPT	3
IRAN	71
IRAQ	1
JORDAN	3
LEBANON	1
LIBYA	45
QATAR	2
SYRIA	12
UAE	4
YEMEN	8
TOTAL	150

APPENDIX 5.3R

RASG-MID SAFETY ADVISORY – 14
(RSA-14)
June 2018

MID-Region

GUIDANCE MATERIAL REALTED TO
GNSS VULNRABILTIES

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Disclaimer

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DRAFT

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ACRONYMS

ABAS	AIRCRAFT BASED AUGMENTATION SYSTEM
ADS-B	AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST
AHRS	ATTITUDE AND HEADING REFERENCE SYSTEMS
ANS	AIR NAVIGATION SERVICES
ATC	AIR TRAFFIC CONTROLLER
DME	DISTANCE MEASURING EQUIPMENT
EGPWS	ENHANCED GROUND PROXIMITY WARNING SYSTEM
FIR	FLIGHT INFORMATION REGION
FMS	FLIGHT MANAGEMENT SYSTEM
GBAS	GROUND BASED AUGMENTATION SYSTEM
GLONASS	GLOBAL NAVIGATION SATELLITE SYSTEM
GNSS	GLOBAL NAVIGATION SATELLITE SYSTEM
GPS	GLOBAL POSITION SYSTEM
HAL	HORIZONTAL ALERT LIMIT
ILS	INSTRUMENT LANDING SYSTEM
IRS	INERTIAL REFERENCE SYSTEM
ITU	INTERNATIONAL TELECOMMUNICATION UNION
MIDANPIRG	MID AIR NAVIGATION PLANNING AND IMPLEMENTATION GROUP
NAV	NAVIGATION
NOTAM	NOTICE TO AIRMEN
PBN	PERFORMANCE BASED NAVIGATION
POS	POSITION
RAIM	RECEIVER AUTONOMOUS INTEGRITY MONITORING
RF	RADIO FREQUENCY
RNAV	AREA NAVIGATION
RNP	REQUIRED NAVIGATION PERFORMANCE
SBAS	SPACE BASED AUGMENTATION SYSTEM
TAWS	TERRAIN AVOIDANCE WARNING SYSTEM
TSO	TECHNICAL STANDARD ORDER
VHF	VERY HIGH FREQUENCY
VNAV	VERTICAL NAVIGATION
VOR	VERY HIGH OMNI DIRECTIONAL RADIO RANGE
WAAS	WIDE AREA AUGMENTATION SYSTEM

GNSS VULNERABILITIES

1. INTRODUCTION

GNSS supports positioning, navigation and timing (PNT) applications. GNSS is the foundation of Performance Based Navigation (PBN), automatic dependent surveillance – broadcast (ADS-B) and automatic dependent surveillance – contract (ADS-C). GNSS also provides a common time reference used to synchronize systems, avionics, communication networks and operations, and supports a wide range of non-aviation applications.

GNSS Vulnerability has been identified as a safety issue and one of the main challenges impeding the implementation of PBN in the MID Region. The sixteenth meeting of the MID Air Navigation planning and Implementation Regional Group (MIDANPIRG/16Kuwait, 13-16 February 2017) recognized the impact of the GNSS signal interference and vulnerabilities and agreed that the subject should be addressed by the Regional Aviation Safety Group-Middle East (RASG-MID) in order to agree on measures to ensure effective reporting of GNSS interferences, which could be mandated by the States' regulatory authorities. The meeting invited the RASG-MID to consider the development of a RASG-MID Safety Advisory (RSA) related to GNSS vulnerabilities, highlighting the Standard Operating Procedures (SOP) for pilots, including the reporting procedures.

The RASG-MID/6 (Bahrain, 26 – 28 September 2017) agreed that IATA and ICAO MID Office should develop a RSA on GNSS vulnerabilities.

With the increasing dependence on GNSS, it is important that GNSS vulnerabilities be properly addressed. This Safety Advisory provides guidance on set of mitigation measures that States would deploy to minimize the GNSS vulnerabilities impact on safety and air operation. The RSA also includes the regional reporting and monitoring procedures of GNSS anomaly with the aim to analyze the threat and its impact on performance, and assess the effectiveness of the mitigation measures in place.

2. DESCRIPTION

Dependence on GNSS is increasing as GNSS is used for an ever-expanding range of safety, security, business and policy critical applications. GNSS functionality is being embedded into many parts of critical infrastructures. Aviation is now dependent on uninterrupted access to GNSS positioning, navigation and timing (PNT) services.

Aviation relies heavily on GNSS for area navigation and precision approach. Aircraft avionics such as the Flight Management Systems (FMS) require GNSS timing for a large number of onboard functions including Terrain Avoidance Warning System (TAWS) or Enhanced Ground Proximity Warning Systems (EGPWS). Onboard avionics are highly integrated on commercial aircraft and are very dependent on GNSS timing data. At the same time, GNSS vulnerabilities are being exposed and threats to denial of GNSS services are increasing.

There are several types of threat that can interfere with a GNSS receiver's ability to receive and process GNSS signals, giving rise to inaccurate readings, or no reading at all, such as radio frequency interference, space weather induced ionospheric interference, solar storm, jamming and spoofing. The disruption of GNSS, either performance degradation in terms of accuracy, availability and integrity or a complete shutdown of the system, has a big consequence in critical infrastructure. For example, local interference in

an airport could degrade position accuracy or lead to a total loss of the GNSS based services, which could put safety of passengers in jeopardy.

There are two types of GNSS Interference Sources; Intentional and Unintentional sources, the latter is not considered a significant threat provided that States exercise proper control and protection over the electromagnetic spectrum for both existing and new frequency allocations. Solar Effect, Radio Frequency Interference and On-board systems are examples of Unintentional GNSS interference sources. However, the Intentional sources such as Jamming and spoofing are considered as serious threats to the continued safety of air transport.

GNSS Jamming occurs when broadcasting a strong signal that overrides or obscures the signal being jammed. The GNSS jamming might occur deliberately by a military activity or by Personal Privacy Devices (PPDs). GNSS jamming has caused several GNSS outages in the MID Region.

In some States, military authorities test the capabilities of their equipment and systems occasionally by transmitting jamming signals that deny GNSS service in a specific area. This activity should be coordinated with State spectrum offices, Civil Aviation Authorities and ANS providers. Military and other authorities operating jamming devices should coordinate with State/ANS providers to enable them to determine the airspace affected, advise aircraft operators and develop any required procedures.

Spoofing is another source of intentional GNSS Interference, which is a deliberate interference that aims to mislead GNSS receivers into general false positioning solution.

Detailed information about the GNSS Implementation and Vulnerabilities can be found in MID DOC 010 – The Guidance on GNSS implementation in the MID Region.

3. RISK ASSESSMENT

The risk assessment covers affected operations during en-route, terminal, and approach phase of flights. In addition, the aircraft impact at table (1), which presents an overview of different potential impacts from GNSS interference, needs to be considered for risk assessment.

Understanding the different types of threat and how likely they are to occur is key to conducting an accurate risk assessment. Broadly, the threat types break down as follows:

Threat Source	Threat Type	Description	Impact on the User
Solar Storms	Unintentional	Electromagnetic interference from solar flares and other solar activity “drowns out” the satellite signals in space.	Loss of signal, or range errors affecting the accuracy of the location or timing information.
Jamming	Intentional	Locally-generated RF interference is used to “drown out” satellite signals.	Loss of signal (if the jammer is blocking out all satellite signals) or range errors affecting the accuracy of the location or timing information

Spoofing	Intentional	Fake satellite signals are broadcast to the device to fool it into believing it is somewhere else, or at a different point in time.	False location and time readings, with potentially severe impacts on automated and autonomous devices and devices that rely on precise GNSS timing.
RF Interference	Unintentional	Noise from nearby RF transmitters (inside or outside the device) obscures the satellite signals.	Loss of signal (if the transmitter is blocking out all satellite signals) or range errors affecting the accuracy of the location reading (if the receiver is at the edge of the transmitter's range).
Signal Reflection	Unintentional	Reflection due objects such as buildings	GNSS signals can reflect off relatively due to distant objects, such as buildings, which would cause gross errors in position accuracy if the receiver falsely locks onto the reflected signal instead of the direct signal
User Error	Unintentional	Users over-rely on the GNSS data they are presented with, ignoring evidence from other systems or what they can see.	Can lead to poor decision-making in a range of scenarios

Table 1: Threats types

Depending on the nature of the interference and the nature of the application, a user may be affected in several ways; the impact may range from a small nuisance to an economic, operational or a safety impact. The detailed risk assessment methodology is addressed at **Appendix B**.

4. MITIGATION STRATEGIES

To minimize the risks associated with GNSS vulnerabilities, several mitigation strategies can be deployed to reduce the likelihood and impact of the threat.

4.1 REDUCING THE LIKELIHOOD OF GNSS INTERFERENCES

The likelihood of interference depends on many factors such as population density and the motivation of individuals or groups in an area to disrupt aviation and non-aviation services. To reduce the likelihood of GNSS interference, the following measures may be applied:

- a) Effective spectrum management; this comprises creating and enforcing regulations/laws that control the use of spectrum and carefully assessing applications for new spectrum allocations.
- b) The introduction of GNSS signals on new frequencies will ensure that unintentional interference does not cause the complete loss of GNSS service (outage) although enhanced services depending upon the availability of both frequencies might be degraded by such interference.

- c) State should forbid the use of jamming and spoofing devices and regulate their importation, exportation, manufacture, sale, purchase, ownership and use; they should develop and enforce a strong regulatory framework governing the use of intentional radiators, including GNSS repeaters, pseudolites, spoofers and jammers. The enforcement measures include:
 - detection and removal of jammers / interference sources; and
 - direct or indirect detection (e.g. use of dedicated interference detection equipment).
- d) Education activities to raise awareness about legislation and to point out that ‘personal’ jammers can have unintended consequences.
- e) Multi-constellation GNSS would allow the receiver to track more satellites, reducing the likelihood of service disruption.

4.2 REDUCING THE IMPACT OF THE GNSS VULNERABILITIES

The GNSS signal disruption cannot be ruled out completely and States/ANSPs must be prepared to deal with loss of GNSS signals, and that States conduct risk assessment and implement mitigation strategies. The risk and impacts from these threats can be managed by evaluating the growing threat of GNSS interference, jamming and spoofing.

The disruption of GNSS signals will require the application of realistic and effective mitigation strategies to both ensure the safety and regularity of air services and discourage those who would consider disrupting aircraft operations. There are three principal methods, which can be applied in combination:

- a) taking advantage of on-board equipment, such as Inertial Reference System (IRS);

IRS provides a short-term area navigation capability after the loss of GNSS updating. Many air transport aircraft are equipped with IRS and these systems are becoming more affordable and accessible to operators with smaller, regional aircraft. Most of these systems are also updated by DME.

- b) Development of contingency procedures and processes to enable operations in a fallback mode in case of loss of GNSS (aircrew and/or ATC).

Procedural (aircrew or ATC) methods can provide effective mitigation in combination with those described above, taking due consideration of:

- the airspace classification;
 - the available ATC services (radar or procedural);
 - the avionics onboard
 - aircrew and air traffic controller workload implications;
 - the impact that the loss of GNSS will have on other functions, such as ADS-B based surveillance; and
 - the potential for providing the necessary increase in separation between aircraft in the affected airspace.
- c) taking advantage of conventional navigation aids and radar, conventional aids can provide alternative sources of guidance.

The regulator should conduct safety oversight of the service provider's GNSS based Services and validate the safety aspects of mitigation strategies, considering the impact on ATM operations. Details on Risk assessment process including some examples are at **Appendix B**.

The data analysis of the reported GNSS vulnerabilities for the period January 2015 to June 2018, showed that the impact of the GNSS interference on Aircraft Operations in the MID Region were as follows:

1. Loss of GPS1 (fault)/ Loss of GPS2 (fault)
2. Observation of "Map shift" on Navigation display
3. Switching to an alternative navigation mode (IRS displayed, VOR/DME)
4. Degraded PBN Capability (NAV Unable RNP)
5. GPS POS Disagree
6. EGPWS warning
7. ADS-B Traffic triggered

5. MONITORING

The success of many of countermeasures is dependent on having a detailed understanding of the threats. In order to establish this understanding and to maintain an up-to-date knowledge of the threats - in terms of both types and number of threats – it is necessary to States to monitor the threat environment and the impact on performance.

Monitoring and reporting is required to inform stakeholders of the threats that exist. This would help directly with enforcement (detecting and removing sources of interference) as well as monitoring the response to changes in legislation or education activities.

Receiver autonomous integrity Monitoring (RAIM) provides integrity monitoring by detecting the failure of a GNSS satellite. It is a software function incorporated into GNSS receivers.

In the event of GNSS performance degrading to the point where an alert is raised, or other cause to doubt the integrity of GNSS information exists, the pilot in command must discontinue its use and carry out appropriate navigation aid failure procedures. Should RAIM detect an out-of-tolerance situation, an immediate warning will be provided. When data integrity or RAIM is lost, aircraft tracking must be closely monitored against other available navigation systems.

States may consider the deployment of GNSS threat monitoring system, which allows monitoring of local GNSS interference environment; signal recording and monitoring for situational awareness of any drop in signal quality or signal outage and ground validation of GNSS-based flight procedures. The detection equipment may include localization utilities.

With reference to ICAO Doc 9849:

Given the variety of avionics designs, one service status model cannot meet all operators' requirements. A conservative model would produce false alarms for some aircraft. A less conservative model would lead to missed detection of a service outage for some and false alarms for others. Regardless, only the aircrew, not ATC, is in a position to determine whether, for example, it is possible to continue an ABAS-based instrument approach. In contrast, ATC has access to ILS monitor data and can deny an ILS approach clearance based

on a failure indication. The real time monitor concept is neither practical nor required for GNSS ABAS operations. It may be practical for SBAS and GBAS, but implementation would depend on a valid operational requirement.

Aircraft operators with access to prediction software specific to their particular ABAS/RAIM avionics will find it advantageous to employ that software rather than use the general notification service. In the case of SBAS and GBAS, operators will rely on service status notifications.

6. REPORTING

ANSP must be prepared to act when anomaly reports from aircraft or ground-based units suggest signal interference. If an analysis concludes that interference is present, ANS providers must identify the area affected and issue an appropriate NOTAM.

From the perspective of the aircrew, a GNSS anomaly occurs when navigation guidance is lost or when it is not possible to trust GNSS guidance. In this respect, an anomaly is similar to a service outage. An anomaly may be associated with a receiver or antenna malfunction, insufficient satellites in view, poor satellite geometry or masking of signals by the airframe. The perceived anomaly may also be due to signal interference, but such a determination requires detailed analysis based on all available information.

In case of GNSS anomaly detected by aircrew, **Pilot** action(s) should include:

- a) reporting the situation to ATC as soon as practicable and requesting special handling as required;
- b) filing a GNSS Interference Report using the Template at **Appendix A**, and forwarding information to the IATA MENA (sfomena@iata.org) and ICAO MID Office (icaomid@icao.int) as soon as possible, including a description of the event (e.g. how the avionics failed/reacted during the anomaly).

Controller action(s) should include:

- a) recording minimum information, including aircraft call sign, location, altitude and time of occurrence;
- b) cross check with other aircraft in the vicinity;
- c) broadcasting the anomaly report to other aircraft, as necessary;
- d) notify the AIS Office in case NOTAM issuance is required; and enable the fallback mode and implement related procedure and process (contingency measures).

ANSP action(s) should include:

- a) ensuring the issuance of appropriate advisories and NOTAM, as necessary;
- b) attempting to locate/determine the source of the interference, if possible;
- c) notifying the agency responsible for frequency management (the Telecommunication Regulatory Authority);
- d) locate and eliminate source in cooperation with local regulatory & enforcement Authorities;
- e) tracking and reporting all activities relating to the anomaly until it is resolved; and
- f) review the effectiveness of the mitigation measures for improvement.

ICAO MID Office action(s) should include:

- a) collect anomaly related information and determine the course of action required to resolve reported anomalies;
- b) follow-up with State having interference incident to ensure implementation of required corrective actions;
- c) coordinate with concerned adjacent ICAO Regional Office(s) to follow-up with States under their accreditation areas, when needed; and
- d) Communicate with ITU Arab Office and Arab Spectrum Management Group to resolve frequent interference incidents, when needed.

DRAFT

7. REFERENCES:

- Annex 10 Aeronautical Telecommunications, Volume I — Radio Navigation Aids
- Annex 11 Air Traffic Services
- PANS-ATM, ICAO doc 4444
- ICAO Doc 9613 PBN Manual
- ICAO Electronic Bulletin 2011/56, Interference to Global Navigation Satellite System (GNSS) Signals.
- GNSS Manual, ICAO Doc 9849
- Standardization of GNSS Threat reporting and Receiver testing through International Knowledge Exchange, Experimentation and Exploitation, STRIKE3 EUROPEAN Initiative, Paper 74
- The report of Vulnerabilities Assessment of the Transportation Infrastructure relying on the Global Position System, US Department of Transportation.
- Operational Impacts of Intentional GPS Interference. (A Report of the Tactical Operations Committee in Response to Tasking from the Federal Aviation Administration. March 2018.
- CANSO Cyber security and Risk Assessment guide.
- ICAO GNSS RFI Mitigation Plan and associated EUROCONTROL Efforts, 8 Nov 2016
- European Global Satellite Agency System, GNSS Market Report issue 4, March 2015

Appendix A

1. GNSS interference reporting form to be used by pilots

** Mandatory field*

Originator of this Report:	
Organisation:	
Department:	
Street / No.:	
Zip-Code / Town:	
Name / Surname:	
Phone No.:	
E-Mail:	
Date and time of report	
Description of Interference	
*Affected GNSS Element	☐ GPS ☐ GLONASS ☐ other constellation ☐ EGNOS ☐ WAAS ☐ other SBAS ☐ GBAS (VHF data-link for GBAS)
Aircraft Type and Registration:	
Flight Number:	
*Airway/route flown:	

Coordinates of the first point of occurrence / Time (UTC):	UTC: Lat: Long:
Coordinates of the last point of occurrence / Time (UTC):	UTC: Lat: Long:
*Flight level or Altitude at which it was detected and phase of flight:	
Affected ground station (if applicable)	Name/Indicator; [e.g. GBAS]
*Degradation of GNSS performance:	☐ Large position errors (details): ☐ Loss of integrity (RAIM warning/alert): ☐ Complete outage (Both GPSs), ☐ Loss of GPS1 or Loss of GPS 2 ☐ Loss of satellites in view/details: ☐ Lateral indicated performance level changed from: __ to __ ☐ Vertical indicated performance level changed from: __ to __ ☐ Indicated Dilution of Precision changed from __ to __ ☐ information on PRN of affected satellites (if applicable) ☐ Low Signal-to-Noise (Density) ratio ☐ Others
*Problem duration:	☐ continuous for 20 minutes ☐ intermittent

Note: Only applicable fields need to be filled!

Appendix B

Risk Assessment

Threats and vulnerabilities

A threat assessment should be performed to determine the best approaches to securing a GNSS against a particular threat. Penetration testing exercises should be conducted to assess threat profiles and help develop effective countermeasures.

Table (B1) presents an overview of different potential impacts from GNSS interference. This is a snapshot of impacts based on input from two manufacturers and not intended to be a comprehensive list of all impacts:

Effect	Affected Operation	Impact
Loss of GNSS-based navigation	Enroute/ Terminal/ Approach	Aircraft with Inertial Reference Unit (IRU) or Distance Measuring Equipment (DME)/DME may have degraded RNP/RNAV. Aircraft may deviate from the nominal track May increase workload on aircrew and ATC May result in missed approach or diverting to other runway in case the aerodrome operating minima cannot be met through conventional precision or visual approaches. Conventional ATS routes, SIDs and STARs would be used.
Larger than normal GNSS position errors prior to loss of GNSS	Enroute/ Terminal/ Approach	Interference could cause the GNSS position to be pulled off but not exceed the HAL (2NM , 1NM, 0.3NM for enroute, terminal and approach phases, respectively).
Loss of EGPWS/ TAWS	Enroute/ Terminal/ Approach	Reduced situational awareness and safety for equipped aircraft. Terrain Awareness and Warning System (TAWS) is required equipment for turbine-powered airplanes > 6 passengers. Loss of GPS results in loss of terrain/obstacle alerting. Position errors as GPS degrades can result in false or missed alerts.
Loss of GPS aiding to AHRS	Flight Control	Can result in degradation of AHRS pitch and roll accuracy with potential downstream effects such as was experienced by a Phenom 300 flight.

Loss of GNSS to PFD/MFD	All flight phases	Can result in: -Loss of synthetic vision display and flight path marker on PFD -Loss of airplane icon on lateral and vertical electronic map displays, georeferenced charts, and airport surface maps without DME-DME or IRU -Loss of airspace alerting and nearest waypoint information without DME-DME or IRU Overall loss of situational awareness to flight crew and increased workload.
No GNSS position for ELT	Search and Rescue	Loss of GNSS signal could result in larger search areas for the Emergency Locator Transmitters (ELTs)

Table B1: Potential Impact from GNSS

Consequence/Impact of risk occurring

Category	Effect on Aircrew and Passengers	Overall ATM System effect
Catastrophic 1	Multiple fatalities due to collision with other aircraft, obstacles or terrain	Sustained inability to provide any service.
Major 2	Large reduction in safety margin; serious or fatal injury to small number; serious physical distress to air crew.	Inability to provide any degree of service (including contingency measures) within one or more airspace sectors for a significant time.
Moderate 3	Significant reduction in safety margin.	The ability to provide a service is severely compromised within one or more airspace sectors without warning for a significant time.
Minor 4	Slight reduction in safety margin.	The ability to provide a service is impaired within one or more airspace sectors without warning for a significant time
Negligible 5	Potential for some inconvenience.	No effect on the ability to provide a service in the short term, but the situation needs to be monitored and reviewed for the need to apply some form of contingency measures if the condition prevails.

Table B2: Impact of Risk Occurring

Likelihood of risk occurring

The definitions in the table (B3) were adopted for estimating the likelihood of an identified risk occurring, for this purpose, five situations are considered:

Event is expected to occur	
1	More frequently than hourly
2	Between hourly and daily
3	Between daily and yearly
4	Between yearly and 5 yearly
5	Between 5 and 50 years
6	Less frequently than once every 50 years

Table B3: Likelihood of risk occurring

Assessment of the level of risk and risk tolerance

All identified risks were reviewed and provided for each an overall risk ranking which is a combination of the two characteristics of consequence and likelihood. For example, a risk with a major consequence but a “5” likelihood would be described as having a “A” or “unacceptable” risk rating. The conversion of the combination of consequence and likelihood into a risk rating has been achieved by use of the following matrix.

Likelihood Criteria		Consequence Criteria				
Event expected to occur:		Catastrophic 1	Major 2	Moderate 3	Minor 4	Insignificant 5
1	More frequently than hourly	A	A	A	A	C
2	Between hourly and daily	A	A	A	B	D
3	Between daily and yearly	A	A	B	C	D
4	Between yearly and 5 yearly	A	B	C	C	D
5	Between 5 and 50 years	A	B	C	D	D
6	Less frequently than once every 50 years	B	C	D	D	D

Table B4: Risk Assessment Table

The previous matrix provides a guide to determine which risks are the highest priorities from the perspective of the timeliness of the corrective action required. The following table outlines the position in more definitive terms.

Safety tolerability risk matrix

Risk Index Range	Description	Recommended Action
A	Unacceptable	Stop or cut back operation promptly if necessary. Perform priority/immediate risk mitigation to ensure that additional or enhanced preventive controls are put in place to bring down the risk index to the moderate or low range
B	High Risk	Urgent action. Perform priority/immediate risk mitigation to ensure that additional or enhanced preventive controls are put in place to bring down the risk index to the moderate or low range
C	Moderate Risk	Countermeasures actions to mitigate these risks should be implemented.
D	Low Risk	Acceptable as is. No further risk mitigation required

Table B5: Risk Tolerability Matrix

Sample risk assessment

The risk assessment table (B6) could be used to identify and capture the threats, select the risk rating based on the risk matrix above considering the existing controls. In addition, recommended actions could be selected to minimize the risk.

L = Likelihood

C = Consequence

R = Risk

Threat	Initial Risk			Existing controls	Accept/Reduce	Recommended controls	Residual Risk		
	L	C	R				L	C	R

Table B6: Sample Risk Assessment tables

The table (B7) below is an example of risk assessment for approach phase of flight, the detailed Risk assessment process is at Appendix B

L = Likelihood
C = Consequence
R = Risk

Threat	Initial Risk			Existing controls	Accept/Reduce	Recommended controls	Residual Risk		
	L	C	R				L	C	R
Between daily and yearly	3	2	A	-Error message notification by avionic	Reduce	1)using of on-board equipment (IRS); 2)Interference detector by ANSPs 3) executing miss-approach	3	4	C

Table B7: Example Risk Assessment for Approach phase of flight

Another example risk assessment for en-route phase of flight at table (B8)

L = Likelihood
C = Consequence
R = Risk

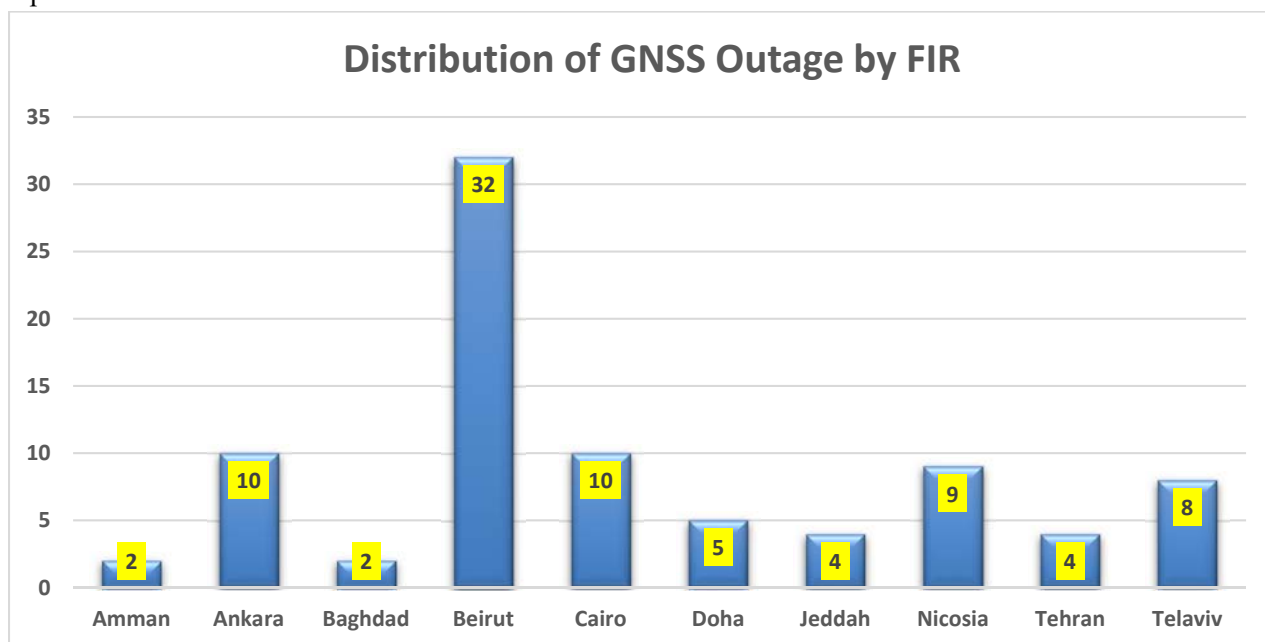
Threat	Initial Risk			Existing controls	Accept/Reduce	Recommended controls	Residual Risk		
	L	C	R				L	C	R
Between 5 and 50 years (short time GNSS Outage)	5	5	D	-Error message notification by avionic -Regulations/ law to protect the GNSS signal	Accept	-			

Table B8: Example risk assessment for enroute phase of flight

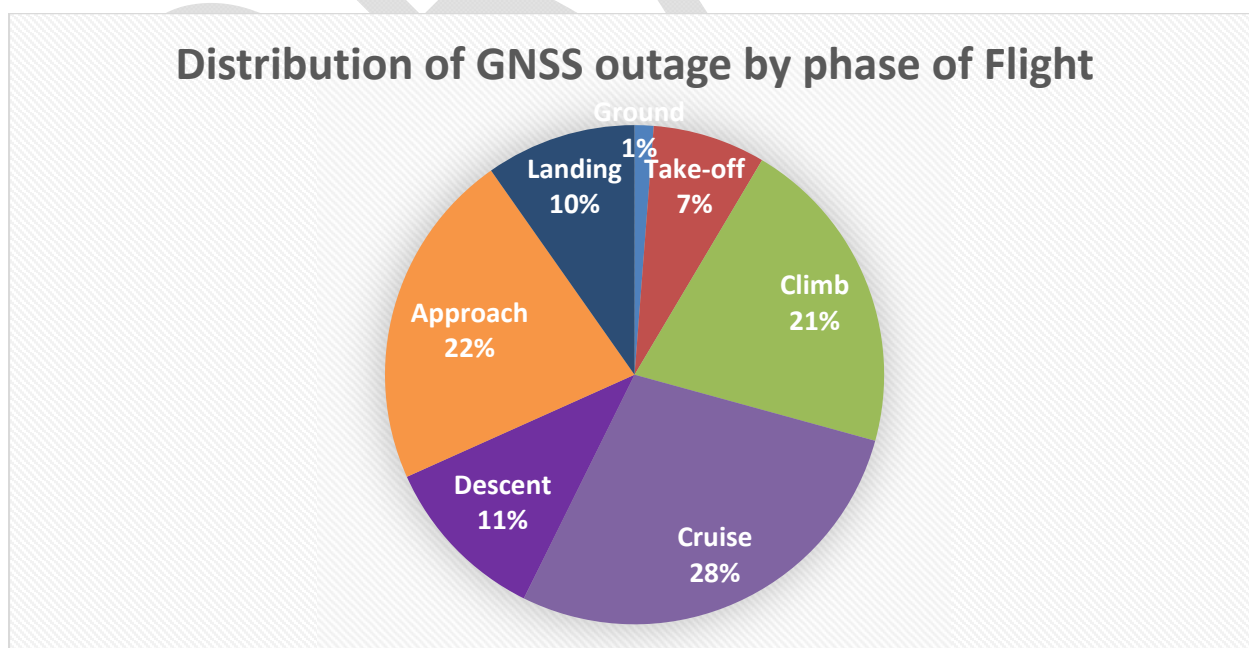
Appendix C

GNSS Anomaly for the Period January 2015- June2018

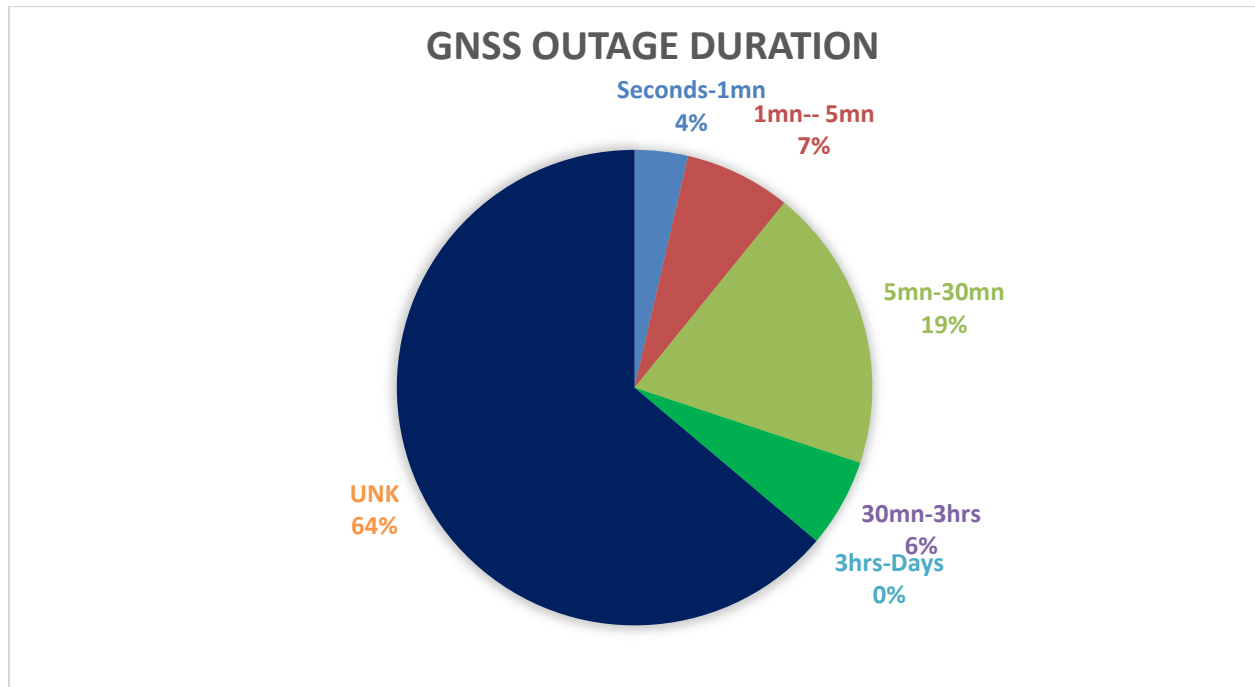
Brief data analysis of the incidents reported during Brief data analysis of the incidents reported by Air Operator are as follows:



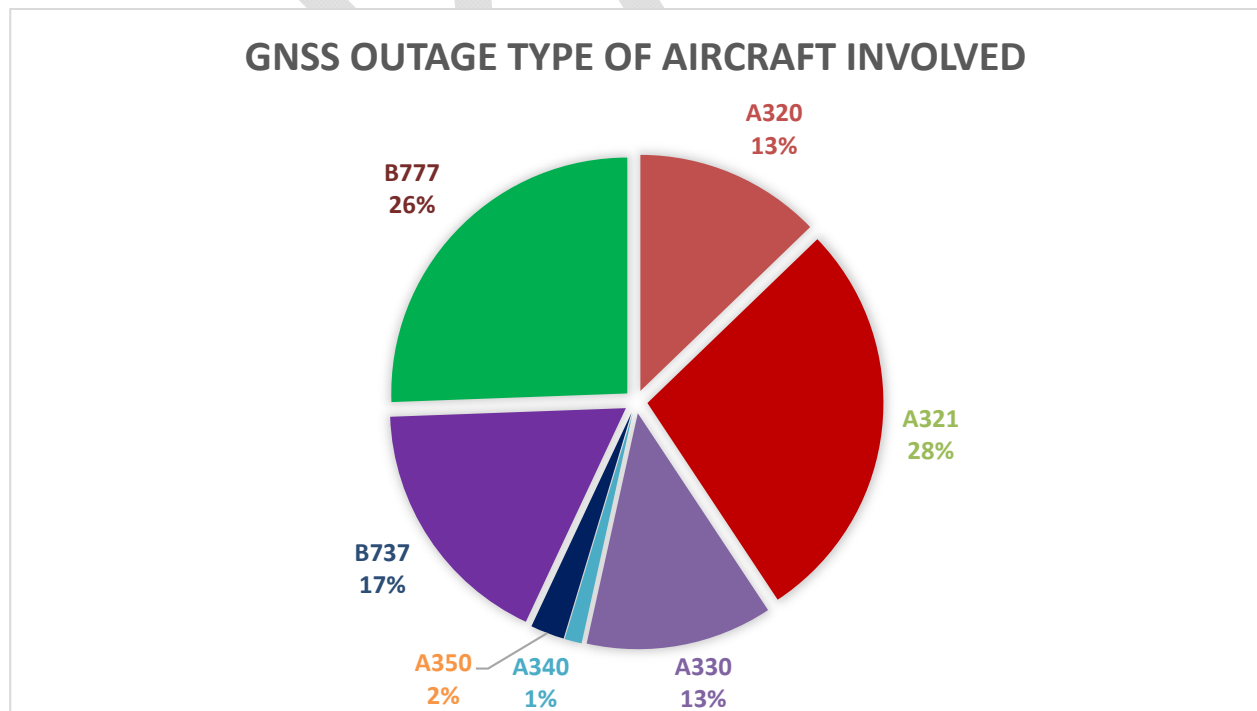
The data revealed that the most significant Flight Information Regions (FIRs) affected Beirut, followed by Cairo, Ankara, and Nicosia.



The data shows that the highest GNSS Outage occurred during the phase of flights cruise, approach, climb, and descent.



The data shows the highest GNSS outage duration was between 5 minutes- 30 minutes. Regarding the Unknown (UNK) it could not be determined as the data was not provided.



The A321, B777, and B737 were most flown aircraft type in areas most affected.

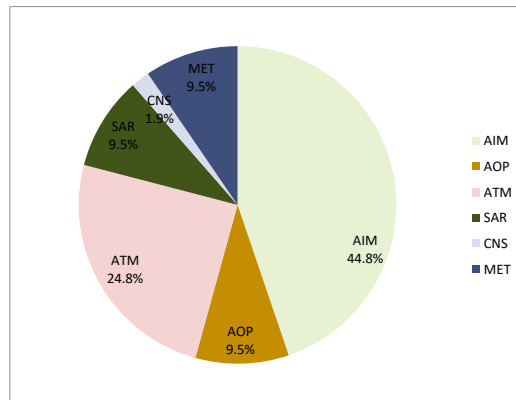
APPENDIX 6A

AIR NAVIGATION DEFICIENCIES IN THE THE MID REGION

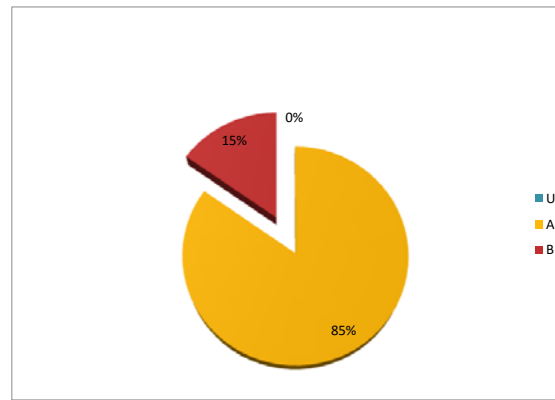
STATE	AIM							Total AIM	AOP							Total AOP	ATM							Total ATM	SAR							Total SAR	CNS							Total CNS	MET							Total MET
	Priority			Rational					Priority			Rational					Priority			Rational					Priority			Rational					Priority			Rational					Priority			Rational				
	U	A	B	F	H	S	O		U	A	B	F	H	S	O		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								0													0			
Egypt	1						1	1				1	1	1	1									0									0												0			
Iran	1						1	1				1	1	1	1			1	2		1	1	2	3								0													0			
Iraq	6	1		5	5	1	6	7			1	1	1		1		4				4	1	5		2					2	2												1	1				
Jordan	2	1		3	3			3							0					1			1									0													0			
Kuwait								0							0	1					1		1		1		1						0												0			
Lebanon	3	1			2		2	4			1		1	1	1		1				1		1		1							0										2	2					
Libya	5	1					6	6			1		1	1	1		1	2			1	1	2	2				2	2			0											1	1				
Oman	4						4	4							0	1					1		1																					1	1			
Qatar								0							0	1					1		1									0													0			
Saudi Arabia	1						1	1							0		1					1		1									0												0			
Sudan	3						3	3			1				1		1				1	1	1	1									0											0				
Syria	8	1		6	7	1	2	9			3		3	3	3		2	2			2	2	1	4		2				2	2											3		3	3			
UAE								0							0		1	1				1	1	2									0												0			
Yemen		7	1	4	2		4	8			1		1	1	1		1	3			3			2	3		2																	2	2			
Total	0	41	6	18	19	2	30	47	0	10	0	10	10	1	1	10	0	17	9	0	9	15	10	26	0	10	0	0	2	2	10	10	0	1	1	0	0	0	2	2	0	10	0	0	0	10	10	

TOTAL DEFICIENCIES:105

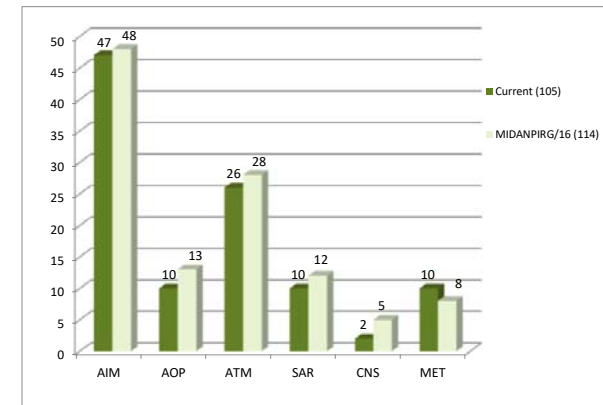
Distribution of Air Navigation deficiencies by field in %

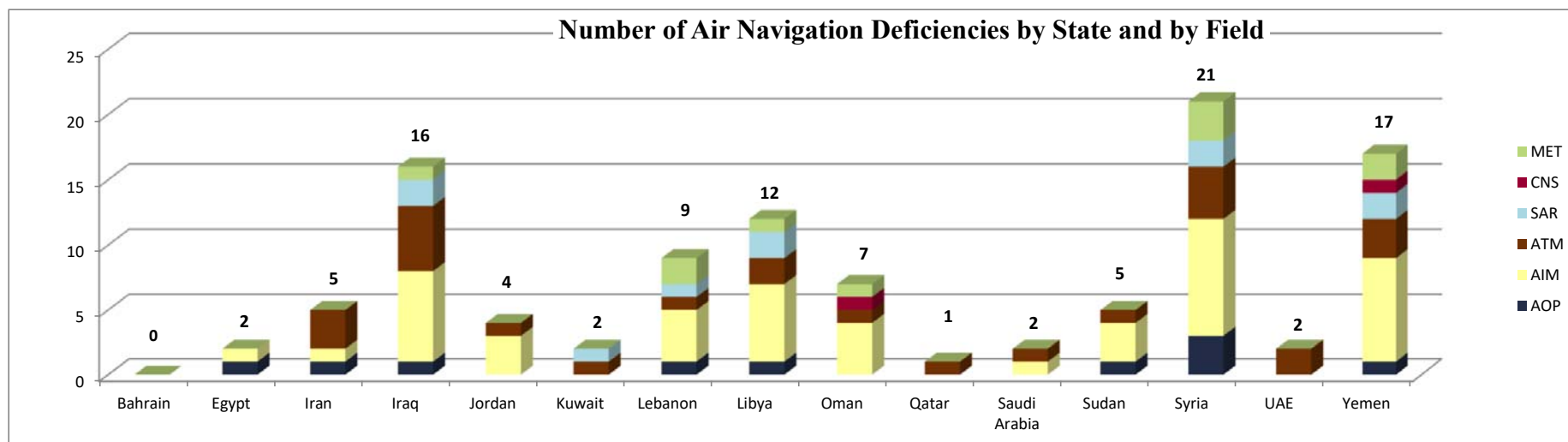


Distribution of Air navigation deficiencies by priority in %



Reported Deficiencies by field (MIDANPIRG/16 vs MIDANPIRG/15)





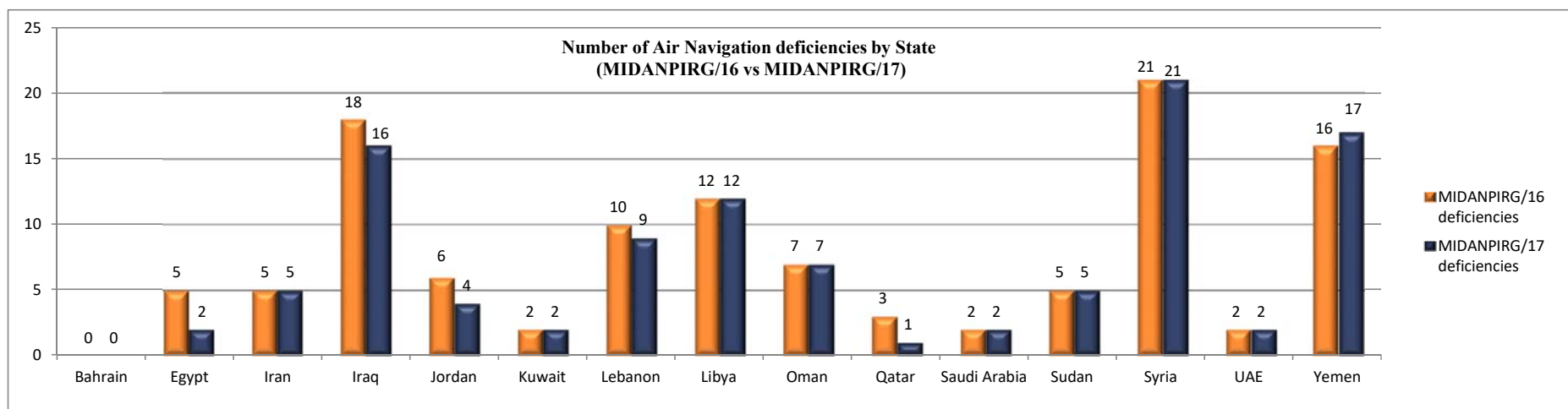
Deficiencies approved by MIDANPIRG/17

	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen	Total
AOP	0	1	1	1	0	0	1	1	0	0	0	1	3	0	1	10
AIM	0	1	1	7	3	0	4	6	4	0	1	3	9	0	8	47
ATM	0	0	3	5	1	1	1	2	1	1	1	1	4	2	3	26
SAR	0	0	0	2	0	1	1	2	0	0	0	0	2	0	2	10
CNS	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2
MET	0	0	0	1	0	0	2	1	1	0	0	0	3	0	2	10
TOTAL	0	2	5	16	4	2	9	12	7	1	2	5	21	2	17	105

Deficiencies approved by MIDANPIRG/16

	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen	Total
AOP	0	2	1	1	2	0	1	1	0	0	0	1	3	0	1	13
AIM	0	1	1	7	3	0	5	6	4	0	1	3	9	0	8	48
ATM	0	2	3	5	1	1	1	2	1	1	1	1	4	2	3	28
SAR	0	0	0	2	0	1	1	2	0	2	0	0	2	0	2	12
CNS	0	0	0	2	0	0	0	0	1	0	0	0	1	0	1	5
MET	0	0	0	1	0	0	2	1	1	0	0	0	2	0	1	8
TOTAL	0	5	5	18	6	2	10	12	7	3	2	5	21	2	16	114

	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Qatar	Saudi Arabia	Sudan	Syria	UAE	Yemen	Total
MIDANPIRG/16 deficiencies	0	5	5	18	6	2	10	12	7	3	2	5	21	2	16	114
MIDANPIRG/17 deficiencies	0	2	5	16	4	2	9	12	7	1	2	5	21	2	17	105



APPENDIX 7A

MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP (MIDANPIRG)

LIST OF MEMBERS/ALTERNATES/ADVISERS

NO	STATE	MEMBER	ALTERNATE	ADVISER
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9	OMAN (LAST UPDATE) FEB 2016	Mr. Hamad Ali Mohamed Al-Abri Director General of Air Navigation Services Public Authority for Civil Aviation P.O. Box 1 – Code 111 Muscat International Airport Muscat-Oman Fax: (968) 24 51 8078 Tel: (968) 24 51 9519 E-mail : h.alabri@paca.gov.om	Mr. Nasser Hamdan Alkindi Director Air Navigation Safety Public Authority for Civil Aviation P.O. Box 1 – Code 111 Muscat International Airport Muscat-Oman Fax: (968) 24 511 425 Tel: (968) 24 51 9277 E-mail: n.alkindy@paca.gov.om	Mr. Nasser Salim Al-Mazroui Chief of Muscat ACC Public Authority for Civil Aviation P.O. Box 1 – Code 111 Muscat International Airport Muscat-Oman Fax: (968) 24 511 425 Tel: (968) 24 51 9277 E-mail: nassers2008@paca.gov.om

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12	SUDAN (LAST UPDATE) 7 MAY 2015	Mr. Abdulmonem Elshaikh ANS Director Civil Aviation Authority P.O.Box 137 Code 11112, Khartoum, Sudan Fax: (249) 183 779715 Tel: (249) 183 772360 Email: abdulmonem_caa@yahoo.com	Mr. Hayder Mohamed AIM Director Civil Aviation Authority P.O.Box 137 Code 11112, Khartoum, Sudan Fax: (249) 183 770534 Tel: (249) 183 770534 Email: aishayder@scaa.gov.sd	Mr. Abas Babiker ANS Regulatory Director Civil Aviation Authority P.O.Box 137 Code 11112, Khartoum, Sudan Fax: (249) 183 527 422 Tel: (249) 183 520079 Email: abas@scaa.gov.sd

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14	UAE (LAST UPDATE) 2 MAY 2016	Mr. Ahmed Al Jallaf Assistant Director General Air Navigation Services, General Civil Aviation Authority Sheikh Zayed Air Navigation Centre P.O. Box 666 Abu Dhabi United Arab Emirates Fax: (971-2) 599 6883 Tel: (971-2) 599 6888 Mobile: (971-50) 614 9065 Email: aljallaf@szc.gcaa.ae	Mr. Abdalla Al Rashidi Director Aeronautical Information Management General Civil Aviation Authority Sheikh Zayed Air Navigation Centre P.O. Box 666 Abu Dhabi United Arab Emirates Fax: (971-2) 599 6889 Tel: (971-2) 599 6891 Mobile: (971-50) 611 9865 Email: akaabi@szc.gcaa.ae Mr. Mohammad Faisal Al Dossari Director Air Navigation & Aerodromes Department General Civil Aviation Authority P.O.Box 6558 Abu Dhabi - United Arab Emirates Fax: (971-2) 4054 4406 Tel: (971-2) 405 4395 Mobile: (971-55) 559 4943 Email: aldossari@gcaa.gov.ae	Mr. Ahmed Al Saabri Quality and Safety Manger General Civil Aviation Authority Sheikh Zayed Air Navigation Centre P.O. Box 666 Abu Dhabi United Arab Emirates Fax: (971-2) 599 6883 Tel: (971-2) 599 6887 Mobile: (971-50) 611 9357 Email: aalsaabri@szc.gcaa.ae

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No	STATE	MEMBER	ALTERNATE	ADVISER
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Oman	Juma Said Al Maskari	Director General of the Directorate General of Meteorology of PACA - Oman		j.almaskari@met.cgov.om
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Yemen				

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MID REGION PBN SUB-GROUP FOCAL POINTS CONTACT DETAILS

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