INTERNATIONAL CIVIL AVIATION ORGANIZATION

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

REPORT OF THE SEVENTH MEETING OF MET SUB-GROUP (MET SG/7)

(Cairo, Egypt, 14 - 16 November 2017)

The views expressed in this Report should be taken as those of the MIDANPIRG MET Sub-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 Seventh meeting of the Meteorology Sub-Group of the Middle East Air Navigation Planning and Implementation Regional Group (MET SG/7) was held at the ICAO Middle East Office – Cairo, Egypt, from 14 to 16 November 2017.

2. OPENING

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

2.2 Mr. Smaoui underlined the importance of the implementation of ASBU B0-AMET as well as IWXXM as prerequisite for B1-AMET and SWIM. He highlighted that the status of implementation of B0-AMET indicated that QMS, SADIS and SIGMET have not yet been implemented in some States. In addition, initial OPMET statistics showed that there would be a need to provide required OPMET data for International Aerodromes in a timely manner.

2.3 In closing, Mr. Smaoui thanked the participants for their attendance and wished the meeting every success in its deliberations.

3. ATTENDANCE

3.1 The meeting was attended by a total of sixteen (16) participants, from Six (6) States (Egypt, Iran, Jordan, Kuwait, United Arab Emirates and United Kingdom). The list of participants is at the **Attachment A**.

4. OFFICERS AND SECRETARIAT

4.1 The meeting was chaired by Mr. Omar Al-Qudah, Chief of Safety and Standards/MET Inspector, Civil Aviation Regulatory Commission of Jordan. The Secretary of the meeting was Mr. Christopher Keohan, Air Navigation Systems Implementation (Meteorology), Europe and North Atlantic, supported by Mr. Abbas Niknejad, Regional Officer, Aeronautical Information Management/Air Traffic Management from the ICAO Middle East Office.

5. LANGUAGE

5.1 The meeting was conducted in English and documentation posted under meetings on the ICAO MID Regional Office website.

6. AGENDA

6.1 The following Agenda was adopted:

Agenda Item 1: Adoption of the Provisional Agenda and election of Chairperson

Agenda Item 2: Follow-up on MIDANPIRG/16 Conclusions and Decisions relevant to MET

Agenda Item 3: Global/Regional developments related to MET

Agenda Item 4: Performance Framework for MET implementation in the MID Region:

- 4.1 Review of the implementation of WAFS and SADIS
- 4.2 Review implementation of the Meteorological Advisories and Warnings:
  - a) International Airways Volcano Watch (IAVW);
  - b) Tropical Cyclone Warning System; and
  - c) SIGMET and AIRMET information, and other warnings
- 4.3 Review of requirements for OPMET data and status of implementation of Regional OPMET Centre (ROC) Jeddah and back-up ROC Bahrain as well as IWXXM Implementation
- 4.4 Review and update of the draft MID Air Navigation Strategy parts related to MET
- 4.5 Quality Management System
- 4.6 Review of the MET Provisions in the MID electronic Air Navigation Plan

Agenda Item 5: Review of air navigation deficiencies in the MET field

Agenda Item 6: Future Work Programme

Agenda Item 7: Any other business

7. CONCLUSIONS AND DECISIONS - DEFINITIONS

7.1 All MIDANPIRG Sub-Groups and Task Forces record their actions in the form of Conclusions and Decisions with the following significance:

a) **Conclusions** deal with the matters which, in accordance with the Group's terms of reference, merit directly the attention of States on which further action will be initiated by ICAO in accordance with established procedures; and

b) **Decisions** deal with matters of concern only to the MIDANPIRG and its contributory bodies.

8. LIST OF DRAFT CONCLUSIONS AND DRAFT DECISIONS

DRAFT CONCLUSION 7/1:	*IWXXM IMPLEMENTATION SURVEY*
DRAFT CONCLUSION 7/2:	*GUIDELINES FOR THE IMPLEMENTATION OF OPMET DATA EXCHANGE USING IWXXM*
DRAFT DECISION 7/3:	*UPDATE THE BMG TERMS OF REFERENCE*
DRAFT CONCLUSION 7/4:	*AMENDMENT OF THE MID eANP VOLUMES III (B0-AMET, INCLUDING TABLE B0-AMET 3-5 "SIGMET AVAILABILITY)*

PART II: REPORT ON AGENDA ITEMS

REPORT ON AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA AND ELECTION OF CHAIRPERSON

1.1 The subject was addressed in WP/1 presented by the Secretariat. The meeting reviewed and adopted the Provisional Agenda as at Para 6 of the History of the Meeting.

1.2 The meeting noted with concern that the level of attendance was below expectation (6 States). Furthermore, the MET Sub-Group Chairperson, Mr. Fahad Al-Malki, Saudi Arabia, and the MET Sub-Group Vice-Chairperson, Dr. Hussain Al Sarraf, Kuwait, were not able to attend the meeting.

1.3 The meeting agreed that Mr. Omar Al-Qudah, Chief of Safety and Standards/MET Inspector, Civil Aviation Regulatory Commission of Jordan, Chair the MET SG/7 Meeting.

REPORT ON AGENDA ITEM 2: FOLLOW-UP ON MIDANPIRG/16 CONCLUSIONS AND DECISIONS RELEVANT TO MET

2.1 The subject was addressed in WP/2 presented by the Secretariat. The meeting noted the status of the MIDANPIRG/16 Conclusions and Decisions relevant to MET and the follow-up actions taken by concerned parties as at **Appendix 2A**.

REPORT ON AGENDA ITEM 3: GLOBAL/REGIONAL DEVELOPMENTS RELATED TO MET

3.1 The subject was addressed in IP/3 presented by the Secretariat. The meeting was apprised of the outcome of the second meeting of the MET Panel (Montreal, Canada, 17 to 21 October 2016) and associated Working Groups (METP WG-MRI/3, METP WG-MISD/3, METP WG-MIE/3, METP WG-MOG/4 and 5).

3.2 The meeting was informed of the upcoming provisions to Annex 3, in particular the proposals for Amendment 78 including the use of a cylinder of radius up to 30 km for SIGMET on Radioactive Cloud when detailed information on the release was not yet available; the introduction of provisions of space weather service information; and the requirement to exchange METAR and SPECI, TAF, SIGMET, AIRMET, VAA,TCA and space weather information in XML/GML (note this part of Amendment 78 to Annex 3 is expected to be applicable in November 2020).

REPORT ON AGENDA ITEM 4: PERFORMANCE FRAMEWORK FOR MET IMPLEMENTATION IN THE MID REGION

4.1 Review of the implementation of the WAFS and SADIS

4.1.1 The subject was addressed in WP/12, WP/13 and PPT/1 presented by the SADIS Provider.

4.1.2 The meeting was presented with WAFS developments including the introduction of additional flight levels (FL080 (750hPa); FL210 (450hPa); and FL480 (125hPa)) to WAFS Upper Air Forecasts that were implemented on 9 November 2016. The SADIS Provider suggested that users should contact their SADIS Workstation provider to ensure that software is updated to benefit from the additional vertical levels.

4.1.3 The meeting was informed of SADIS developments including trials related to Low Level Area Forecasts in Graphical Format on SADIS FTP since 28 March 2017. Low Level Area Forecasts in Graphical Format are being provided by Croatia, Germany, Ireland, Romania and the United Kingdom. The SADIS Provider encouraged States in the MID Region to contact the SADIS Manager if they decide to provide their Low Level Area Forecasts in Graphical Format for distribution on SADIS.

4.1.4 Furthermore, the meeting noted that the SADIS Provider developed a trial web-based SADIS User survey for the SADIS Users (in addition to the State based survey). The SADIS Provider encouraged States to respond to the State level SADIS efficacy questionnaire and Users to respond to the separate User level survey.

4.1.5 The SADIS Provider encouraged Users to apply for WAFS Internet File Service (WIFS) accounts for the establishment of backup/contingency processes in the rare event of a failure of SADIS. Policies on accessing data from SADIS and WIFS, and the use of such backup/contingency accounts can be accessed at http://www.icao.int/airnavigation/METP/MOG/Pages/SADIS.aspx.

4.1.6 The meeting was informed of WAFS developments related to the current and future demands of stakeholders, such as significantly higher granularity in space and time of WAFS forecasts; distribution of OPMET data in IWXXM; automation of the SIGWX charts; and providing the proper platform in delivering this information in support of SWIM. More detailed proposals for WAFS and SADIS developments will be presented at METP-MOG/6 in April 2018.

4.2 Review of the implementation of the Meteorological Advisories and Warnings

4.2.1 The subject was addressed in WP/3 presented by the Secretariat.

4.2.2 The meeting was apprised of the outcome of the SIGMET and Special Air-Report Tests (MIDANPIRG Conclusion 16/27 refers) conducted on 6 and 7 September 2017 for other phenomena and volcanic ash. The results of the SIGMET test for tropical cyclone (WC SIGMET) conducted on 1 November 2017 at 0800 UTC were not yet available.

4.2.3 The meeting noted the results provided by ROC Vienna as follows:

Test	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Libya	Oman	Saudi Arabia	Sudan	Syria	UAE	Yemen
Special Air-Report	N	N	N	N	Y	N	N	N	N	N	Y	N	N	N
SIGMET for other phenomenon	Y	Y	N	N	Y	N	N	N	Y	Y	Y	N	Y	N
SIGMET for Volcanic Ash	N	N	N	N	Y	Y	N	N	N	N	Y	N	N	N
Special Air-Report for Volcanic Ash	N	N	N	N	Y	Y	N	N	Y	N	Y	N	N	N

White – test message received at one of the participating COM Centres
Gray – test message not received at any of the participating COM Centres

4.2.4 The meeting encouraged States to verify routing if a test message was sent and not indicated in the above table; and to actively participate in future SIGMET and Special Air-Report tests.

4.3 Review of requirements for OPMET data and status of implementation of Regional OPMET Center (ROC) Jeddah and back-up ROC Bahrain as well as IWXXM implementation

Implementation of ROC Jeddah and back-up ROC Bahrain

4.3.1 The subject was addressed in WP/4 and PPT/2 presented by the Secretariat. The meeting was apprised of the status of implementation of ROC Jeddah and back-up ROC Bahrain in support to MIDANPIRG Conclusions 14/30 and 15/33.

4.3.2 The meeting noted that, as of February 2017, nine (9) States (Iraq, Lebanon, Libya, Jordan, Oman, Qatar, Saudi Arabia, Sudan and United Arab Emirates) have fully implemented the appropriate OPMET exchange scheme. Four (4) States (Bahrain, Egypt, Iran and Kuwait) have partially implemented this scheme, while two (2) States (Syria and Yemen) have not started implementation in this regard.

4.3.3 It was noted that one of the challenges in the implementation of the ROC was the identification of the OPMET data needed in a State to meet operators' needs. ROC Jeddah and back-up ROC Bahrain need this information in order to provide this State with relevant OPMET data from the MID Region and other Regions.

4.3.4 The meeting was also apprised of the progress related to back-up ROC Bahrain. It was noted that routing tables for Lebanon, Jordan, Kuwait, Oman, Qatar and United Arab Emirates were completed. In addition, OPMET data was routed from Bahrain to Vienna for Iran, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia and Yemen.

4.3.5 The meeting noted the outcome of the ROC/IWXXM Implementation Workshop (Cairo, Egypt, 12-13 November 2017) related to the ROC implementation, and agreed on the following actions:

- ROC Jeddah and back-up ROC Bahrain to verify that they can provide OPMET data currently provided from ROC Vienna to Kuwait and Iran; and
- Kuwait and Iran to verify that their National OPMET Centres (NOCs) can provide their OPMET data internally in their States according to the stakeholders needs.

Note – ICAO MID Office, ROC Jeddah and back-up ROC Bahrain, ROC Vienna, Kuwait and Iran would follow-up on these actions.

ROC/IWXXM Implementation Workshop

4.3.6 The subject was addressed in PPT/2 presented by the Secretariat.

4.3.7 The meeting reviewed of the outcome of the ROC/IWXXM Implementation Workshop held from 12 to 13 November 2017 at the ICAO MID Office in Cairo, Egypt. The meeting noted the challenges identified by the Workshop and supported the Recommendations related to IWXXM and ROC implementation in the MID Region, as at **Appendix 4.3A**. The meeting agreed in particular to the Recommendation related to the development of an IWXXM implementation survey for the MID States in order to gather and analyse information pertaining to States' action plans for IWXXM implementation.

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

DRAFT CONCLUSION 7/1: IWXXM IMPLEMENTATION SURVEY

That,

a) an IWXXM Implementation Survey be developed in order to gather and analyse information pertaining to States' action plans for IWXXM implementation in the MID Region; and

b) the results of the survey be presented to MIDANPIRG/17.

Guidelines for the Implementation of OPMET data exchange using IWXXM

4.3.9 The subject was addressed in WP/5 presented by the Secretariat. The meeting recalled that the Second Meeting of the Meteorology Panel (METP/2) held in Montréal from 17 to 21 October 2016 recommended the endorsement of the "*Guidelines for the Implementation of OPMET data exchange using IWXXM*" as guidance for Planning and Implementation Group (PIRGs) (Recommendation 5/5).

4.3.10 The guidance was developed to:

- define the purpose of transiting to IWXXM;
- describe current operations and capabilities, including the definition of data producers, National OPMET Centres, Regional OPMET Centres and Interregional OPMET Gateways;
- describe the changes required;
- propose the service concept including specifying the Operating Principles and making recommendations;
- elaborate on functional requirements in the form of a Framework; and
- define the requirements for successful transition, in three proposed phases.

4.3.11 The meeting noted that this document was maintained by the Meteorology Panel (METP) Working Group on Meteorological Information Exchange (WG-MIE) and that any update to this document would be promulgated to the Regions, when appropriate.

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

DRAFT CONCLUSION 7/2: GUIDELINES FOR THE IMPLEMENTATION OF OPMET DATA EXCHANGE USING IWXXM

*That the "Guidelines for the Implementation of OPMET data exchange using IWXXM" at **Appendix 4.3B** be presented to MIDANPIRG/17 for endorsement and publication as MID Doc 010.*

BMG TORs

4.3.13 The subject was addressed in WP/6 presented by the Secretariat. The meeting reviewed and updated the terms of reference of the MID OPMET Bulletin Management Group (BMG) as at **Appendix 4.3C**. Accordingly, the meeting agreed to the following Draft Decision:

DRAFT DECISION 7/3: UPDATE THE BMG TERMS OF REFERENCE

*That, the Terms of Reference (TORs) of the Bulletin Management Group (BMG) be updated as at **Appendix 4.3C**.*

4.4 REVIEW AND UPDATE OF THE MID AIR NAVIGATION STRATEGY PARTS RELATED TO MET

4.4.1 The subject was addressed in WP/7 presented by the Secretariat. The meeting noted the status of implementation of B0-AMET – *Meteorology information supporting enhanced operational efficiency and safety.*

4.4.2 The meeting recalled that the revised MID Region Air Navigation Strategy (MID Doc 002, Edition February 2017) was endorsed by MIDANPIRG/16. It was noted that this version of the Strategy included a new element related to the implementation of SIGMET.

4.4.3 The meeting reviewed the MID Air Navigation Strategy parts related to B0-AMET and agreed to the proposal to add a new element related to OPMET as at **Appendix 4.4A**.

4.4.4 The meeting also noted that providing wind shear information was part of B0-AMET. Various automated wind shear systems were described such as the Low-Level Wind Shear Alert System (LLWAS) used in Kuwait. In addition, air-reports on wind shear were used in providing warnings to aircraft (example provided by the UAE for Dubai). The meeting noted that in selecting the appropriate wind shear system, it is important to know what wind shear types (e.g. microbursts due to convection) occur at their aerodromes. The meeting recalled that the Manual on Low-Level Wind Shear (ICAO Doc 9817) could assist States in the selection of the appropriate wind shear system(s). The meeting agreed that the ANSIG/3 and MET SG/8 meetings 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). In parallel, necessary monitoring Tables (enablers) should be developed for inclusion in the MID eANP Vol III to support the monitoring of wind shear implementation.

4.5 QUALITY MANAGEMENT SYSTEM

4.5.1 The subject was addressed in WP/8 presented by the Secretariat. The meeting was apprised of the status of implementation of Quality Management System related to MET.

4.5.2 The meeting recalled that implementation of Quality Management System (QMS) is a key element of the B0-AMET and a crucial requirement of Annex 3.

4.5.3 The meeting noted that nine (9) States (Bahrain, Egypt, Iran, Jordan, Kuwait, Qatar, Saudi Arabia, Sudan and the United Arab Emirates) have implemented QMS. The meeting reviewed and updated status of QMS implementation (Table B0-AMET 3-4).

4.5.4 The meeting also noted that the International Organization for Standardization (ISO) made a revision to the ISO 9001 quality management systems (QMS) standards. The latest ISO 9001:2015 standards were published in September 2015 and the ISO 9001:2008 certificate will no longer be valid after September 2018. It was noted that, in order to assist States in the QMS implementation, WMO was in the process of updating WMO-No. 1100, *Guide to the implementation of a quality management system for national meteorological and hydrological services*. Other information from ISO on the ISO 9001:2015 standard can be found at:

- https//www.iso.org/standard/62085.html
- https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/iso_9001_-_moving_from_2008_to_2015.pdf

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4.6 REVIEW OF THE MET PROVISIONS IN THE MID ELECTRONIC AIR NAVIGATION PLAN (eANP)

4.6.1 This subject was addressed in WP/9 presented by the Secretariat. The meeting noted that the MID electronic Air Navigation Plan Volumes I, II and III are available at http://www.icao.int/MID/Pages/MID-eANP.aspx.

4.6.2 The meeting reviewed the MET Parts of the MID eANP VOL I, II and III, and agreed to update the Vol III as at **Appendix 4.6A**.

4.6.3 Furthermore, the meeting reviewed the draft Table B0-AMET 3-5 (SIGMET Availability), at **Appendix 4.6A** for inclusion in Volume III of the MID eANP. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 7/4: AMENDMENT OF THE MID eANP VOLUME III (B0-AMET, INCLUDING TABLE B0-AMET 3-5 "SIGMET AVAILABILITY"

That the MID eANP Volume III (B0-AMET) be updated as at ***Appendix 4.6A***.

4.6.4 The meeting also recalled that the proposed changes to Volume I and II were endorsed by MIDANPIRG/16 (MIDANPIRG Conclusion 16/29 refers); however, since these proposals concern the General MET Parts of Volumes I and II, the proposal should be presented to the Global eANP Working Group, which is scheduled to be held in Montreal, Canada from 16 to 19 April 2018.

REPORT ON AGENDA ITEM 5: REVIEW OF AIR NAVIGATION DEFICIENCIES IN THE MET FIELD

5.1 The subject was addressed in WP/10 presented by the Secretariat.

5.2 The meeting recalled that MIDANPIRG/16 reviewed and endorsed list of Air Navigation Deficiencies. The total number of deficiencies in the MET field had decreased from 10 to 8 priority 'A' deficiencies since MIDANPIRG/15. The non-implementation of QMS for MET represented more than 75% of these deficiencies.

5.3 The meeting noted that the majority of deficiencies listed in the MANDD still do not have any specific Corrective Action Plan (CAP). The meeting recalled that MIDANPIRG/16 urged States to implement the provisions of MIDANPIRG Conclusion 15/35 related to eliminating Air Navigation Deficiencies, and in particular, providing a specific CAP for each deficiency.

5.4 The meeting reviewed the list of deficiencies and agreed that two new deficiencies related to the non-issuance of SIGMET in Damascus and Sana'a FIRs should be proposed to MIDANPIRG/17.

REPORT ON AGENDA ITEM 6: FUTURE WORK PROGRAMME

6.1 The subject was addressed in WP/11 presented by the Secretariat. The meeting reviewed the MET SG Terms of References (TORs) and agreed that they are still valid and current.

6.2 Taking into consideration, the planned ICAO MID Regional events, which are of relevance to the activity of the MET Sub-Group, in particular the MIDANPIRG/17 meeting, it was agreed that the MET SG/8 meeting be held during the second quarter of 2019. The venue will be Cairo, unless a State is willing to host the meeting.

6.3 The meeting agreed that the BMG/7 meeting will be tentatively scheduled to be held concurrently with the MIDANPIRG/17 meeting (Shiraz, Iran, 11-14 November 2018).

REPORT ON AGENDA ITEM 7: ANY OTHER BUSINESS

7.1 Nothing has been discussed under this Agenda Item.

APPENDICES

APPENDIX 2A

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

CONCLUSIONS AND DECISIONS	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	STATUS/REMARKS
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.	MIDANPIRG/16	MID AN Strategy (MID Doc 002)	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.	MIDANPIRG/16 ICAO	Amendment Notification of amendment	Feb. 2017 May 2017	**Completed** Amendment was approved by MIDANPIRG/16 Notification of amendment issued on 18 June 2017
CONCLUSION 16/7: MID REGION AIR NAVIGATION REPORT-2016 That, the MID Region Air Navigation Report-2016 is endorsed.	MIDANPIRG/16	MID AN Report	Feb. 2017	**Completed**
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.	 ICAO States States	 State Letter National ASBU Implementation Plan Data for AN Report 2017	 Sep. 2017 Nov. 2017 Nov. 2017	**Ongoing**
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	ICAO	State Letter	Jun. 2017	**Completed** SL Ref.: AN 8/28.1-17/175

CONCLUSIONS AND DECISIONS	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	STATUS/REMARKS
participate in the Interregional Seminar on "Service Improvement through Integration of Digital AIM, MET and ATM Information Services" (Brussels, Belgium, 2-5 October 2017).	States, Organizations and Industry	Actively participate in the Seminar	Oct. 2017	dated 14 June 2017
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.	MIDANPIRG/16	FTBP Testing Document	Feb 2017	**Completed**
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.	ICAO	State Letter	July 2017	**Completed** SL Ref: AN 10/16 – 17/208 dated 1 August 2017
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.	ICAO	MID Doc 009 updated	Feb 2017	**Completed**
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.	ICAO	Coordination with HQ	Dec 2017	**Ongoing** Coordination with HQ ongoing

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Main Outcome

ROC/IWXXM Implementation Workshop

Cairo, Egypt, 12–13 November 2017

Introduction

- **Date and Venue**
  - Date: 12-13 November 2017
  - Venue: ICAO MID Office, Cairo, Egypt
- **Attendance**
  - 16 Participants
  - 3 States: Egypt, Iran, UAE
  - 1 International Organization: World Meteorological Organization

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Workshop Objective

- The objective of the Workshop was to address issues related to the implementation of ICAO Meteorological Information Exchange Model (IWXXM); and Regional OPMET Centre (ROC) Jeddah and associated challenges/lessons learnt.
- The Workshop provided a forum to share experience and best practices, through presentations and discussions.

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Agenda

DAY 1 – SUNDAY, 12 NOVEMBER 2017 IWXXM IMPLEMENTATION

- **Opening Ceremony:** Workshop Introduction and set the scene
- **Outcomes of APAC/EUR/MID SWIM Workshop**
- **Global development related to IWXXM**
- **Regional guidance material**
- **Possible translation agreements**
- **Implementation status & survey**

DAY 2 – MONDAY, 13 NOVEMBER 2017 IWXXM IMPLEMENTATION / ROC IMPLEMENTATION – STATUS, CHALLENGES & LESSONS LEARNED

- **Bilateral testing**
- **State example of challenges and lessons learned**
- **Update to IWXXM implementation survey results**
- **ROC implementation status, challenges and lessons learned**
- **Conclusions and closing Ceremony**

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Challenges

- Implementation of B0-AMET is below the expectation
  - mainly QMS implementation and outstanding issues related to implementation of ROC Jeddah
- Annex 3 ambiguities
  - Entire FIR for SIGMET, N OF LINE, APRX
  - Vagueness of time in some areas (e.g. trend)
  - Until Amdt 78, did not include non-operational status (test, exercise)
- Efforts in implementation of B1 Modules requires regional coordination
- IWXXM schema 3.0 will not be backwards compatible with 2.1
- Outstanding implementation issues addressed by WG-MIE
  - Many issues such as compression type need to be addressed at global level
- States planning for necessary resources
  - Cost (human and finances) of software changes expected every two years
- Implementation of P3 interface with extended capability (NOC)
- Using IWXXM data in ATIS and VOLMET
- Cyber security

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Recommendations

- Completion of B0-AMET implementation
  - QMS implementation necessary
  - Action for Kuwait, ROC Jeddah, Iran on receiving EUR data
- Possibly relax constraints of Annex 3 in future IWXXM schemas
  - 2 ash clouds in SIGMET only allowed in Annex 3
- Address ambiguities in Annex 3
  - Best practices in avoiding vagueness of time (e.g. trend)
- Disseminate information on WG-MIE decisions (e.g. compression) to MET groups and CNS groups
  - Also provide feedback on implementation
- MIDANPIRG Sub-Groups (MET, CNS, AIM, ATM) need to continue work in their respective domains to facilitate planning for digital data provision in support to SWIM
  - Different disciplines work together
  - Conduct workshops when necessary
  - Progress will allow for consideration of future SWIM group
- IWXXM schema versions not backward compatible may require running three non-compatible versions (past, current, future) for an interim period

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Recommendations

- Relevant MIDANPIRG subsidiary bodies to keep pace of global SWIM developments
  - Update regional guidance accordingly
- States to support IWXXM implementation and further upgrades to the schema
  - Via contract or internally
- States deploy P3 interface with extended services (File Transfer Body Part) at NOCs
- States keep abreast of global developments on human readable representation of IWXXM data (e.g. for ATIS, VOLMET)
- Cyber security issue should be considered

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Conclusion

- Encourage States and Stakeholders to support States in IWXXM Implementation, in line with ICAO NCLB initiative
- The Workshop emphasized that States develop an action plan related to IWXXM implementation as well as other disciplines in association with AIXM and FIXM implementation in order to enable SWIM.
- The workshop was successful in achieving its objective; and such workshops/ seminars should be conducted on regular basis - next one after IWXXM schema 3.0.0 released (2019)

INTERNATIONAL CIVIL AVIATION ORGANIZATION

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

GUIDELINES FOR THE IMPLEMENTATION OF OPMET DATA EXCHANGE USING IWXXM

EDITION NOVEMBER, 2017

RECORD OF AMENDMENTS

Edition Number	Edition Date	Description	Pages Affected
3.0	23/09/2017	Reviewed by MET SG/7 (14-16 November 2017)	All

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1 Introduction

1.1 Purpose

The main intention of this document is to describe the activities relating to the transition of intra- and interregional operational meteorological (OPMET) data exchange in the 2016 to 2020 timeframe. During this period the amendments to ICAO Annex 3, *Meteorological Service for International Air Navigation*, requiring this transition towards digital data exchange will effectively become applicable for the international exchange of OPMET data.

1.2 Background

The bilateral exchange of IWXXM (ICAO Meteorological Information Exchange Model) based information has been introduced in amendment 76 to ICAO Annex 3 from November 2013, enabling States to exchange their OPMET data not only in TAC (Traditional Alphanumeric Code form) but also in Extensible Mark-up Language XML and more precisely geography markup language (GML). This represented the start of a huge change from the provision and exchange of textual OPMET data towards a digital environment supporting SWIM (System Wide Information Management). Since their inception, OPMET data have been promulgated to end systems and they were initially designed to be human readable, with a requirement to be highly compact because of limitations in bandwidth.

The current use of OPMET in a TAC format presents an obstacle to the digital use of the data as it is not geo-referenced. This makes the handling of global data difficult to use correctly and expensive to maintain, this has been exemplified in significant difficulties during code changes. The current coding practices also present an obstacle to efficient automation as State coding exceptions are quite commonly used.

IWXXM represents the first step to move to an environment where the systems handling this data can make more use of standard applications and techniques. The development of new systems which provide and support digital OPMET requires initial investment but the use of enabling data exchange standards for other domains such as AIXM (Aeronautical Information Exchange Model) and FIXM (Flight Information eXchange Model) along with IWXXM will lead to cost reduction due to the implementation of widely used data modelling techniques including OGC (Open Geospatial Consortium) segments.

Consequently, users are presented with opportunities to create new products at lower cost by fusing this data.

It is essential that the transition towards the use of IWXXM is adequately planned and equipped to make reliable data sets available to users for exploitation as soon as possible at a Regional- and Global-scale. This Concept of Operation provides elements and steps for consideration in achieving that aim by defining common definitions, concepts as well as structured phases to be implemented in relation to the International exchange of OPMET data.

1.3 Intended Audience

This document is intended to be used by centres considering being involved in the exchange of IWXXM data, both within a region and interregionally.

2 Current Operations and Capabilities

2.1 Current Capabilities

The current capabilities are dedicated to Traditional Alphanumeric Code (TAC) data exchange, via the Aeronautical Fixed Service (AFS), primarily the aeronautical fixed telecommunications network through AFTN and AMHS protocols, SADIS and WIFS.

2.2 Data Producer/Originating Unit

The TAC Data Producer provides TAC data only.

2.3 Data Aggregator

The function of the Data Aggregator is to take individual TAC reports and aggregates them into bulletins. Bulletins shall consist of one or more reports of the same type (e.g. METAR).

2.4 Data Switch

A Data Switch will route the data according to the WMO abbreviated header structure, TTAAiiCCCC, of the bulletin. The bulletin header fulfils the regulations described in WMO doc No 386, *Manual on the Global Telecommunication System*.

2.5 National OPMET Centre (NOC)

The role of the NOC is to collect and validate all - international required OPMET messages – required AOP and agreed exchanged non AOP - (refer to the (electronic) Regional Air Navigation Plans) generated by all originating units within a State, to compile national data into bulletins and to distribute them internationally according to the regional distribution schema.

A NOC should perform the following functions:

- Data Aggregator; and
- Data Switch.

2.6 Regional OPMET Centre (ROC)

A ROC is responsible for the collection from NOCs and validation of all required AOP and agreed exchanged non AOP required OPMET data in its area of responsibility (AoR) according to the regional distribution schema.

Each ROC is responsible for the collection of required OPMET data from the other ROCs in the region and the dissemination to the other ROCs of the required data from its AoR.

A ROC should perform the following functions:

- Data Aggregator; and
- Data Switch.

2.7 Interregional OPMET Gateway (IROG)

An IROG is responsible for the collection of all required OPMET data from its interregional area(s) of responsibility (IAoR) and its dissemination to the ROCs in its region.

Furthermore, the IROGs are responsible for collection and dissemination of their region's required AOP and agreed non AOP exchanged OPMET data to their partner IROGs.

The IROG is responsible for the validation of the bulletins sent to the IROGs of its IAoR and received from their IAoR.

For TAC data exchange, an IROG should perform the following functions:

- Data Aggregator; and
- Data Switch.

2.8 International OPMET Databank

An International OPMET Databank provides the capability for users to interrogate TAC data through the AFTN. In some regions the databank is known as a Regional OPMET Databank (RODB).

Operational principles:

- OPMET Databank Requests

- Requests for TAC data can be sent via AFTN. These requests work as described in current Regional OPMET Data Bank (RODB) Interface Control Documents (ICD).
- The above example describes the syntax of TAC requests:
  - "RQM/" is used as the start of the query
  - only the new T_1T_2 message types defined by the World Meteorological Organization (WMO) are allowed

  For example: RQM/SALOWW/WSEBBR/WSLFFF=
  - the request is sent to the AFTN address of the International Databank

- OPMET Databank Replies

- Replies to TAC requests are described in the current RODB Interface Control Documents.
- Reply reports of a request will be aggregated into one or more messages, according to the same rules used by the Data Aggregators, e.g. no mixing of message types in one file.
- The RODB Interface Control Documents should specify a set of standardized information & error replies, specifically when the required data are not defined (example: request for a SIGMET with a wrong location indicator)

3 Description of changes

ICAO Annex 3 defines what IWXXM capability is required at different time frames. These capabilities can also be considered in context of the ICAO SWIM-concept (Doc 10039, *Manual on System Wide Information Management (SWIM) Concept*).

- ***Amendment 76*** enabled the bilateral exchange of XML data for those States in a position to do so.
- ***Amendment 77*** recommends the international exchange of XML-formatted METAR/SPECI, TAF, AIRMET and SIGMET from November 2016.

- The ***planned Amendment 78*** will introduce the requirement for the international exchange of XML-formatted METAR/SPECI, TAF, AIRMET and SIGMET as a standard standard with proposed effect from November 2020 (subject to ANC approval).

Note: The intention of this Guidelines document is not to define Net Centric services but to provide guidance for a swift transition to IWXXM implementation as a first step towards SWIM.

4 Proposed service concept

4.1 Operating principles

This section outlines the general principles for transitioning the international exchange of OPMET data. These principles are still based on continued use of the WMO abbreviated header structure and all participating States using the ICAO Extended AMHS. The intention is to support the different identified phases that will lead to a managed IWXXM based international exchange of METAR/SPECI, TAF, TCA, VAA, AIRMET and SIGMET, Space Weather data by the Amendment 78 to Annex 3 applicability date. This could also support a global implementation of IWXXM exchange by the same date.

4.1.1 Managing the transition

A group responsible for managing the transition will be identified in MID and preferably in each ICAO region for the necessary intra- and inter-regional coordination and should be guided by a global ICAO body with the support of WMO. (**Recommendation 1**)

It is assumed that different regions will progress at different rates. It is necessary to create a plan that facilitates this different implementation pace.

Note: Groups such as Data Management Group for EUR, the Bulletin Management Group for MID and the Meteorological Information Exchange working group (MET/IE) for APAC could be the right groups to manage this transition (or equivalent groups in other regions).

Note: It is envisaged that the Meteorological Panels (METP) Working Group on Meteorological Information Exchange (WG-MIE) will coordinate at the global level.

4.1.2 Variances to the IWXXM Model

National Extensions (such as remark sections) could only be supported when accompanied by necessary XML tags and in a globally agreed standard way. The international exchange of these national extensions will only be supported for data fully compliant to the IWXXM model and abuse of extensions must be prevented.

Note: The term "IWXXM model" should here be understood as the XML schema including all necessary GML components (including metadata) necessary for the exchange of IWXXM data. The use of extensions within the IWXXM is discouraged and should only be utilised where absolutely necessary.

4.1.3 Translation

From Annex 3 Amendments 77 and 78, a State will be required to produce IWXXM data in addition to TAC data for international exchange. Generating both formats will help minimize, as much as possible, the translation between formats.

It will also avoid operational translation/conversion from IWXXM to TAC for and onforwarding, as the bi-directional conversion will not necessary result in the same TAC.

Where a translation from TAC to IWXXM is necessary and conducted, the translation centre and date/time of when the translation occurred will be identified within the XML message. The translation centre metadata will be defined as part of a globally accepted GML/XML model.

When TAC to IWXXM translation is necessary but fails an IWXXM message of the corresponding type (METAR, TAF, …) without any translated MET parameters but containing the original TAC message should be disseminated to users for their manual interpretation. It is also recommended that, if possible, an error message be sent to TAC originator encouraging the TAC orginator to re-issue a valid TAC message for subsequent translation and distribution.

4.1.4 Data collection

When creating a feature collection of the same type of IWXXM data (e.g. METAR) , further named as “bulletin”, the aggregating centre identifier and date/time group of when the collection was created will be indicated within the XML message. The aggregating centre metadata will be defined as part of a globally accepted GML/XML model.

Only regular reports (e.g. METAR and TAF) will be aggregated. Non regular reports (e.g. SIGMET, SPECI, AIRMET and VAA) will NOT be aggregated.

A single bulletin will only contain TAC or XML, never both.

A single file will contain only one bulletin.

4.1.5 Transmission & Routing

Given the size and character set of IWXXM messages, it will not be possible for these messages to be transmitted via AFTN. The file containing the bulletin will be compressed and FTBP (**File Transfer Body Part**) under Extended AMHS (**ATS Message Handling System)** will be used to exchange IWXXM data internationally through the AFS.

*The aviation meteorological services that will have to migrate from AFTN to AMHS to distribute IWXXM data should consider the guidance provided in **appendix A** of this document about a possible procedure to test initial connection to AMHS through the national ANSP providing international AFS connections for the State.*

The principles of exchanging IWXXM data on AMHS are further described in section **5.1.4** but, in general, rules close to the ones governing the TAC transmission are applied.

The WMO abbreviated header structure (TTAAiiCCCC) will be part of the filename of the File Transfer Body Part and used as data identifier. The routing of IWXXM messages will associate this data identifier with AMHS address(es) that the message should be sent to.

As a file name extension, the appropriate suffix developed by WMO will be used to identify compressed data using globally agreed compression techniques such as gzip.

Note: The number of FTBPs and the maximum message size are subject to the AMHS specifications. It would be highly desirable to have a common agreed maximum limit size for AMHS messages between all ICAO regions. A total size of AMHS message (including FTBP) up to 4MB should be considered, as already defined in some regions.

4.1.6 Compliance Testing

IWXXM compliance testing platforms or software will be made available in order to allow States to test the compliance of their XML data to the IWXXM model before operational international exchange. This is meant to assure that the future internationally disseminated data are operationally usable. (**Recommendation 2**)

4.1.7 Databank

In order to allow IWXXM data retrieval from International Databanks, a standard set of queries for IWXXM data will also need to be developed, agreed and documented. An Interface Control Document will be provided to describe the query structure, structure of the answer(s) and bulletin header(s) to be used by the International Databank, as well as all other information necessary for the automatic use of the query answers. The proposed query language for IWXXM data will follow similar rules as the TAC-requests (c.f. section **0**).

4.1.8 Aeronautical Information Metadata

The Aeronautical Information metadata are part of the XML model and should be transported by the IWXXM data. (**Recommendation 3**)

The metadata is additional information relevant to the type of the aeronautical information object i.e. an airport, an FIR. A challenge resides in getting the correct state of this aeronautical information, especially for centres that will perform translation from TAC to XML that will require this. Therefore, obtaining this from an authorized source (details to be determined) is implied, in order to provide the right piece of information that characterizes the data (e.g. for a METAR, which airport location indicator and official name, its altitude, longitude, latitude etc …).

The access to aeronautical metadata should be better provided by a link to the AIXM model, therefore avoiding possible inconsistencies between the transported metadata inside the IWXXM data and the current status of this aeronautical information as part of the AIXM model.

5 Framework

This section is intended to describe the generalized elements which can be used to establish a framework for the exchange of IWXXM data, both intraregionally and interregionally, with the neighbour regions. One key aspect is, that the framework needs to be flexible to permit development of an intra-regional structure suitable to the requirements, but at the same time allowing establishment of controlled and coordinated exchange between regions.

The framework is organized into a basic set of functions/type of operations as described in section 5.1. A list of requirements that should be met to carry out each respective function as well as illustrations on how these functions may be performed/combined are provided in the same section.

In section 5.2, more complex regional entities which comprise some of the above functions are described.

5.1 Functionalities definitions

5.1.1 Data Producer/Originating Unit

TAC Data Producer
This producer provides TAC data only.

IWXXM Data Producer
In line with the stated assumptions, this producer provides information in both TAC (until no longer requested in Annex3) and IWXXM forms.

The Data Producer-function may be performed by an aeronautical meteorological station (e.g. producing a METAR), a MWO producing AIRMET or SIGMETS or as well by an Aerodrome Meteorological Office (AMO) providing TAFs.

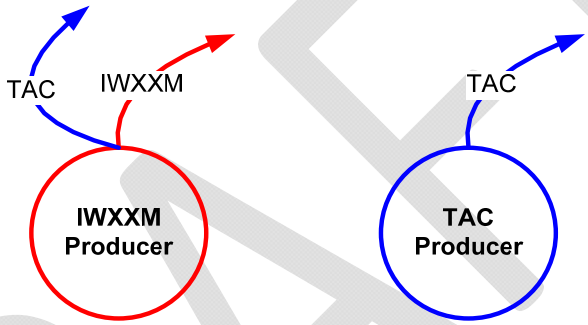

Figure 1: Comparison of IWXXM and TAC Producers

For an IWXXM Producer, the following functions could be the subject to compliance testing:

- The Producer output will conform to the IWXXM Schema
- The Producer output will pass IWXXM Schematron/business rules
- The Producer will apply appropriate (defined) metadata following agreed ICAO rules and regulations.

5.1.2 Data Aggregator

This function takes individual IWXXM reports - decompresses them if already compressed - aggregates them into bulletins and compresses them.

Bulletins shall consist of one or more reports of the same type (e.g. METAR).

When aggregating reports, the Aggregator shall collect and combine them as a bulletin – defined as a Feature collection - in conformance with the globally agreed GML/XML model. In particular, all required metadata information, as defined by the globally accepted GML model, should be indicated.

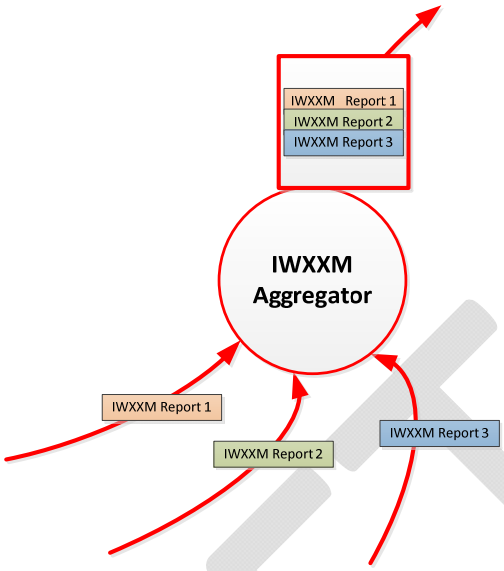

Figure 2: Data aggregation

For an IWXXM Aggregator, the following functions could be the subject of compliance testing.

- The Aggregator output will conform to the IWXXM Schema
- The Aggregator output will pass IWXXM Schematron/business rules
- The Aggregator will apply a correct filename to its output
- The Aggregator correctly compresses data applying an appropriate suffix.
- The Aggregator will apply appropriate (defined) metadata following agreed ICAO rules e.g. for monitoring and validation issues.

5.1.3 International functions for Data Translation Centre

A data translator converts TAC data into IWXXM on behalf of their State and/or another State (i.e. when the data producer is unable to do so). A bi-lateral or regional agreement should be defined for such circumstances. To do so, it shall be able to parse incoming TACs and apply the data to IWXXM schema. It is expected that this will be carried out on a bulletin basis so that the translator will always be associated with an aggregator function.

The translator should provide an indication of where and when the translation has been carried out in order to provide traceability. This shall be achieved by introducing agreed metadata elements (centre identifier and time stamp) that shall be defined as part of a globally accepted GML/XML model.

It is highly likely that not all incoming TACs will be translatable because of non-conformance with TAC standards. There will be a need to have procedures in place to deal with any non-compliant data, which may involve further translation where predefined arrangements have been made.

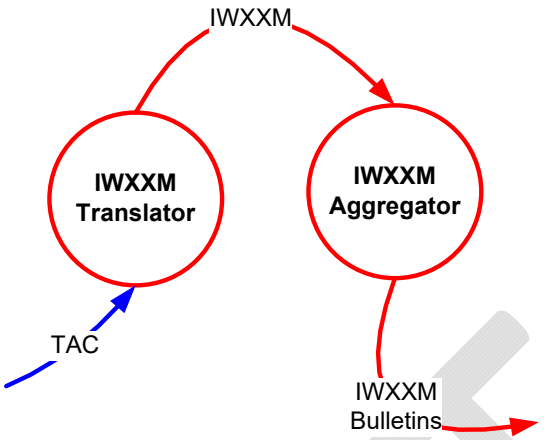

Figure 3: Data Translator generating IWXXM from TAC

For an IWXXM Translator, the following functions could be the subject of compliance testing.

- The Translator output will conform to the IWXXM Schema
- The Translator output will pass IWXXM Schematron/business rules
- The Translator will successfully translate a standard set of TAC test data
- The Translator provides metadata related to when and where data have been translated - such metadata conforms to the agreed metadata structure.
- The Translator will apply appropriate (defined) metadata following agreed ICAO rules e.g. for monitoring and validation issues.

Note: A Translation centre should also perform Aggregator functions.

5.1.4 Data Switch

A Data Switch will route IWXXM data according to the TTAAiiCCCC part of the filename of the File Transfer Body Part. The filename including the current WMO bulletin header will be structured as follows (WMO naming convention A):

A_TTAAiiCCCCYYGGgg*BBB*_**C**_CCCC_YYYYMMddhhmmss**.xml.[compression_suffix]**,

Where the elements in black and bold are fixed elements and:
TTAAiiCCCCYYGGgg is the current WMO header with the date time group
BBB is ***optional*** (as usual),
CCCC is the repeated CCCC part from TTAAiiCCCC,
YYYYMMddhhmmss is the date/time group

Note: **[compression_suffix]** *should be globally agreed, the ideal situation being to define the same compression techniques for all types of ICAO data. Compression software such as zip should be avoided as it may allow transportation of more than one file and directories as well.*

The routing table will associate this TTAAiiCCCC data identifier with the AMHS addresses where the data should be sent to. The compressed file will be named with the suffix appropriate to the compression and sent onto AMHS.

FTBP name examples with METAR from LFPW:

A_LAFR31LFPW171500_C_LFPW_20151117150010.xml.**[compression_suffix]**

1st retarded bulletin:
A_LAFR31LFPW171500RRA_C_LFPW_20151117150105.xml.**[compression_suffix]**

1st corrected bulletin:
A_LAFR31LFPW171500CCA_C_LFPW_20151117150425.xml.**[compression_suffix]**

WMO defined T1T2 (from TTAAii) for the following data types:

- Aviation Routine Report (*METAR*): *LA*
- Aerodrome Forecast (*"short" TAF*) (VT < 12 hours): *LC*
- Tropical Cyclone Advisory *LK*
- Special Aviation Weather Reports (*SPECI*): *LP*
- Aviation General Warning (*SIGMET*): *LS*
- Aerodrome Forecast (*"long" TAF*) (VT >= 12 hours): *LT*
- Volcanic Ash Advisory *LU*
- Aviation Volcanic Ash Warning (*VA SIGMET*): *LV*
- AIRMET *LW*
- Aviation Tropical Cyclone Warning (*TC SIGMET*): *LY*

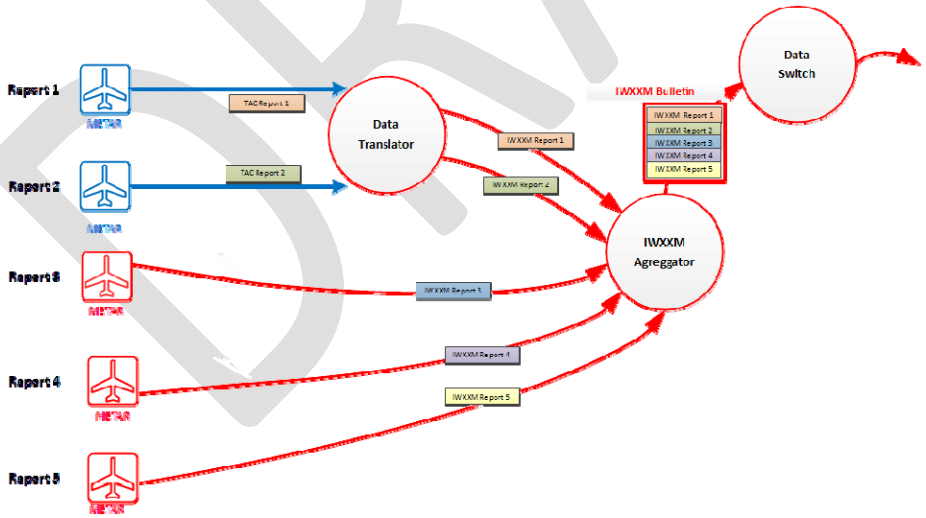

Figure 4: Example of showing the aggregation of TAC and IWXXM data

5.1.5 Databank

An International Databank (called Regional OPMET databank (RODB) in some regional documentation) will provide the capability for users to interrogate IWXXM data through the AFS in much the same way as the RODBs currently provide for TAC data.

There will be no TAC to IWXXM translation taking place by the Databank in case the requested OPMET is only available in TAC, as this translation should be done upstream by a Translation Centre.

Although the implementation of Net Centric Services is beyond the scope of this CONOPS, the Databank element could as well provide Net Centric services in addition to the AFS based IWXXM interrogation capabilities. As soon as agreed descriptions of the interface to request data via web-services are available, this additional feature may be added for the databank.

For an IWXXM Databank, the following functions could be the subject of compliance testing.

- The Databank output shall conform to the IWXXM Schema
- The Databank output shall pass IWXXM Schematron/business rules
- The Databank has an AMHS interface or is interconnected with a Data switch with an AMHS Gateway (connection with AMHS network)
- The Databank shall only send the response back to the originator.
- The Databank shall aggregate the reply reports according to the same rules used by the Data Aggregators
- The Databank shall apply a correct filename to its output
- The Databank base correctly compresses data applying an appropriate suffix.
- The Databank shall respond correctly to the standard interrogations.

The picture below illustrates a possible implementation of a RODB with combined TAC and IWXXM functionalities.

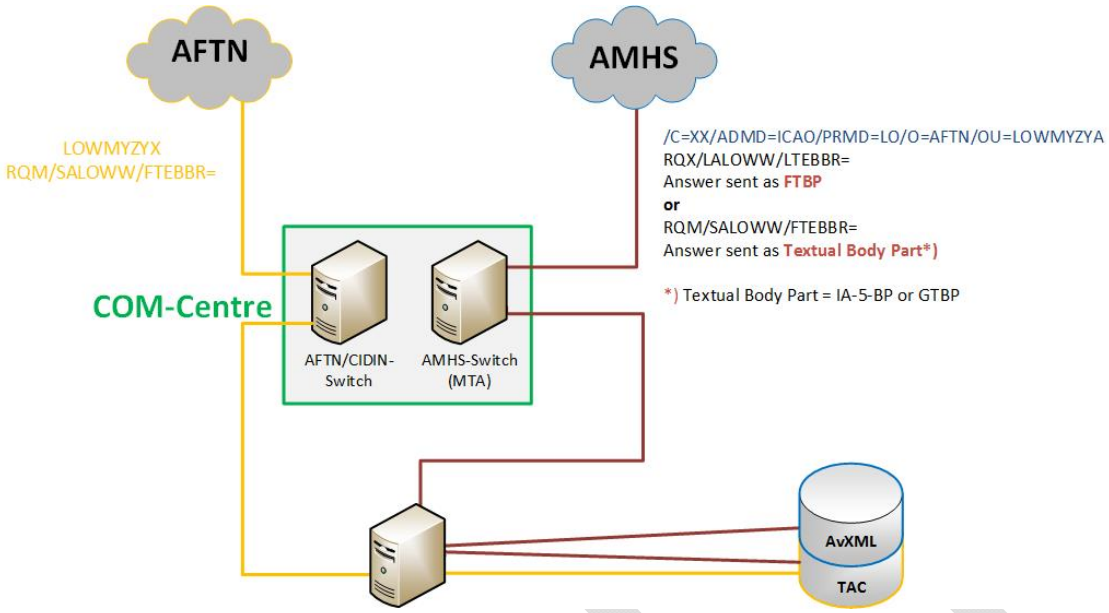

Figure 5: The implementation of a combined TAC & IWXXM Databank

Technical principles:

- Interfaces:

- the Databank has an AMHS P3 connection to the AMHS Message Transfer Agent (MTA) of a COM centre; and
- in case the COM Centre still serves AFTN users, the Databank may have a separate AFTN connection to the COM Centres AFTN switch or alternatively, the COM Centre will take care of the AFTN-AMHS conversion.

- Databank tables: data in IWXXM and data in TAC are stored in separate sets of tables.

Operational principles:

- DB Requests

- Requests for TAC data can be sent via AFTN or via AMHS as international reference alphabet number 5 (ia5 text). These requests will continue to work as described in the current RODB Interface Control Documents
- Requests for IWXXM data shall be sent via AMHS as Textual Body Part.
- Requesting data in IWXXM will work in a similar way as requesting TAC data. The above example uses a syntax similar to the TAC requests, but:
  - "RQX/" is used as the start of the query
  - only the new IWXXM T_1T_2 message types defined by WMO are allowed

  For example: RQX/LALOWW/LTEBBR/LSLFFF=
- Requests for TAC data and requests for IWXXM data shall not be mixed
- Any violation of the above principles (e.g. the request "RQX/LSLOWW=" received via AFTN), will result in an automatic reply sent by the databank, informing the user that this is not allowed.

- DB Replies

- Replies to TAC requests will continue to work as described in the current RODB Interface Control Documents.

- Reply reports of an IWXXM request will be aggregated into one or more files, according to the same rules used by the Data Aggregators, e.g. no mixing of message types in one file.
- These files will be compressed and a correct file name with appropriate suffix supplied.
- These files will be sent as FTBP through AMHS.
- The RODB Interface Control Documents will specify an extended set of standardized information & error replies.

5.2 Regional Centres Definitions

5.2.1 National OPMET Centre (NOC)

The role of the NOC is to collect and validate all required AOP and agreed exchanged non AOP OPMET messages generated by all originating units within a State, to compile national data into bulletins and to distribute them internationally according to the regional distribution schema.

Note: It is assumed that the data provided by NOCs is in accordance with the similar specifications as applicable for an International Data Aggregator

5.2.2 Regional OPMET Centre (ROC)

In its Area of Responsibility (AoR) according to the regional distribution schema, a ROC is responsible for the collection from NOCs of all required AOP and all non AOP agreed exchanged OPMET data and for the validation of all required AOP OPMET data.

Each ROC is responsible for the collection of required OPMET data from the other ROCs in the region and the dissemination to the other ROCs of the required data from its AoR.

For IWXXM exchange, a ROC should perform the following functions:

- Data Aggregator
- Data Translation centre
- Data Switch

5.2.3 Interregional OPMET Gateway (IROG)

An IROG is responsible for the collection of all required AOP and all non AOP agreed exchanged OPMET data from its Interregional Area(s) of Responsibility (IAoR) and its dissemination to the ROCs in its region.

Furthermore, the IROGs are responsible for collection and dissemination of their region's required OPMET data to their partner IROGs.

The IROG is responsible for the validation of the bulletins sent to the IROGs of its IAoR and received from their IAoR.

For IWXXM exchange, an IROG should perform the following functions:

- Data Aggregator
- Data Translation Centre
- Data Switch

5.2.4 Regional OPMET Databank

The Regional OPMET Databank(s) (called Regional OPMET databank (RODB) in some regional documentation and further labelled RODB in this document) are supplied with required OPMET data by the ROCs. These databases can be queried via the AFS by using a specified query language.

Details on the query language as well as the supported data types can be found in EUR Doc 018, Appendix A (EUR Regional Interface Control Document for OPMET Database Access Procedures). Those documents will be updated to integrate the new functions.

An RODB shall be able to fulfil the requirements to handle IWXXM-code as described in paragraph 5.1.5.

6 Requirements to Transition

The first necessary step is to define the prerequisites in order to be able to exchange IWXXM OPMET data. This will impact not only the network itself, but also the Message Switching Systems and most of the end-user systems.

6.1 Phase 1 Pre–Requisites to Transition – until Nov 2016

Phase 1 was enabled by Amendment 76 to Annex 3 in November 2013.

To achieve an efficient transition towards IWXXM, Phase 1 activities should be focused in the following areas and the particular elements identified per area.

Governance

Managing the transition

Regional group(s) should be designated to deal with the transition in order to further define and monitor:

- Intra-regional plan on AMHS infrastructure/links planning and IWXXM data exchange between the ROCs, and between ROC and RODB

- Intra-regional implementation plan on IWXXM data exchange planning by the States to their ROC

- Agreement to define how testing platform and software should be made available and accessible for every State should be reached.

It is desirable that responsible group(s) for managing the transition in other ICAO regions be established, that could be responsible for defining the Regions structure and capabilities in the context of the framework.

Furthermore a full liaison should be established and maintained between the ICAO groups in charge of meteorology & data exchange and groups in charge of the AFS network. The elements provided in Appendix A of this document - already defined and agreed in some ICAO regions - could be reviewed and agreed in those regions not having already provided such elements, to provide a clear guidance to States on how best considering the installation of an AMHS connexion from national aeronautical meteorological services.

For data translation purposes, if there is a systematic need for the translation of data on behalf of a State, this may be performed by the dedicated ROC for the part of the region under its Area of Responsibility and the IROGs for the interregional distribution.

Documentation

The region should define and have a plan in place to provide IWXXM data. This plan shall be published and maintained by the designated responsible groups (FAQ's etc. should be available).

ICAO and WMO documentation and provisions should be published/available describing the IWXXM code itself as well as documentation referencing the appropriate schemas and rules made available in order to handle this new format.

Facilities

An agreed process should be defined to ensure that data generated by Data Producers are compliant. In order to promote the use of IWXXM, the process should be widely known and shared and some tools to check the compliance state of the data easily accessible and usable.

An identical process should be agreed to initiate and enable the IWXXM exchange between regions.

An AMHS network will be available to support exchange IWXXM data by the use of FTBP between those States wishing to do so. Corresponding AMHS connections should be made available between those regions exchanging IWXXM data.

Cyber Security

Appropriate AFS security elements should be defined by the ICAO groups in charge of information management / networks in order to introduce the operational exchange of IWXXM data via AMHS.

Source of Metadata

Update process or notification on modifications about Aeronautical information metadata by the States should be in place at the end of the period or metadata sources should be defined and agreed.

Action plan to reduce Formatting Errors

Actions plans based on monitoring results about OPMET data not following the agreed coding rules should be undertaken in order to assist States in detecting and correcting wrong coding policies.

A task should be started to define a procedure that the ROC may use on how to deal with errors in IWXXM-messages, in particular taking into account errors detected in converting TAC-reports. This procedure would ideally provide a clear description on how to report errors to a State that provides these data and clearly define the service and its limitation.

Interregional cooperation/coordination

The following tasks should be started:

- The update process and notification on modifications on IWXXM bulletins headers between the MID and the adjacent regions.

- Identification of the interregional exchanges solely based on required AOP and agreed exchanged non AOP data: actions plans to define clearly the interregional data/bulletins to be exchanged.

- Interregional plan to follow the AMHS infrastructure/links planning between AFS nodes supporting interregional data exchange of neighbouring IROGs.

- Implementation plan for I/R exchange between IROGs.

- An update process to introduce IWXXM in the contingency plans for the IROGs.

6.2 **Phase 2** From Nov 2016 until Amendment 78 applicability date

The following elements should be ready prior the exchange of OPMET data in IWXXM format becoming an ICAO Annex 3 standard, which is proposed to be defined in Amendment 78, with effect in November 2020 (subject to ANC approval).

Operations

- The ROCs & IROGs should have the capability to act as translation centres, to aggregate and switch IWXXM data.

- The ROCs & IROGs may have the capability to act as translation centres.

- Each NOC should be ready to exchange IWXXM data at the end of the period.

- The RODBs should have all the capabilities to deal with IWXXM data as well as TAC data.

- Update process or notification on modifications about metadata should be in place not later than the end of the period

- The standard set of queries for IWXXM data for a RODB should be implemented and documented.

- Updated processes and notification on modifications on IWXXM bulletins headers between adjacent regions should be in place and tested.

Note: if it happens that some delays occur in having the IWXXM model including metadata structure and agreement in FTBP use available, it is assumed that the operations in exchanging IWXXM data will be delayed and probably not be ready globally at the start of the period.

Institutional issues and Technical issues

- A communication plan should be established and enacted to inform States and users - both on ICAO and WMO side - about the IWXXM code, the metadata use, and the new procedures to access the RODBs.

- The IWXXM model should integrate the metadata related to Data Aggregator and Data Translator functions.

- A procedure used by the ROC should be in place on how to deal with errors in IWXXM-messages, in particular taking into account errors detected when converting TAC-reports. This procedure includes items on how to report errors to a State that provides these data.

Action plan about data validation

- 'Validation' (validation against the XML schema) is the specific monitoring and gathering of statistics on schema conformance rather than meteorological data quality.

- Action plans based on monitoring results about TAC data not following the agreed coding rules should be in place in order to assist States in detecting and correcting wrong coding policies.

- A procedure that the ROC can use on how to deal with errors in IWXXM-messages, in particular taking into account errors detected in converting TAC-reports, should be agreed on and made available. This procedure would ideally provide information on how to report errors to a State that provides these data and clearly define this service and its limitation.

- Messages that do not pass validation against the XML schema will continue to be passed and not rejected by ROCs/RODBs.

- States shall arrange the validation of their IWXXM messages against the corresponding XML schema, and make corrections to the process of generating their IWXXM messages as necessary, as per quality management processes.

- The ROC/RODB should conduct validation of IWXXM messages within their region/area of responsibility, excluding validation of 'State extensions'.

- ROC/RODBs should collect statistics on long-term validation results, broken down by State and Region, and provide this information to the relevant ICAO Regional Office and the METP (in particular WG-MIE and WG-MOG) to identify common or troublesome data quality issues.

- Users should be encouraged to continue to validate messages and they will remain responsible for making sure that the received IWXXM messages are suitable for their purposes.

- Users should review the IWXXM PermissableUsage field to determine whether the message is suitable for operational, test or exercise purposes.

Regional Coordination/planning

- The regional group(s) designated to deal with the transition should define and monitor:
    - Intra-regional plan about AMHS infrastructure/links planning and IWXXM data exchange between the ROCs, and between ROCs and RODBs.
    - Intra-regional plan regarding the IWXXM data exchange by the States to their ROC.
- The Contingency plans for the ROCs should integrate the IWXXM data and be ready before the end of the period.
- Testing platform and software are made available and accessible for every State.

Interregional cooperation/coordination

- The interregional mechanism to follow the AMHS infrastructure/links planning between AFS nodes supporting interregional data exchange between IROGs should be in place, as should the interregional procedure to notify the changes and new IWXXM bulletins introduction.

- The Contingency plans for the IROGs should integrate the IWXXM data exchange and be ready at the end of the period

- It is proposed that bilateral agreements between IROGs are set up for the translation of TAC data. This agreement should include notification process on IWXXM data newly produced by the specific Region.

figure 6 below provides an example of a Region interfacing with 2 other Regions.

In this example, it is assumed that:

- There is no operational exchange of IWXXM data between Region 1 and 3.
- There is operational exchange of IWXXM data between Region 2 and 1.

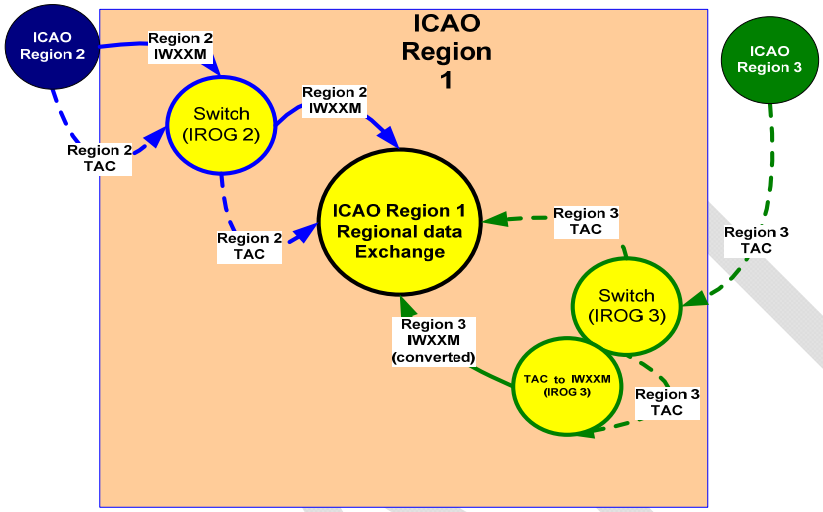

Figure 6: Phase 2, interregional exchange of OPMET with Region 2 (IWXXM & TAC capable) and Region 3 (TAC capable)

6.3 **Phase 3** After Amendment 78 applicability date

This section is reserved for capability that should be ready from ICAO Annex 3 Amendment 78 applicability date.

TBD

7 Acronyms and Terminology

AFS	Aeronautical fixed service
AFTN	Aeronautical fixed telecommunication network
AIXM	Aeronautical Information Exchange Model
AMD	Amendment
AMHS	ATS Message Handling System
AMO	Aerodrome Meteorological Office
AoR	Area of responsibility
COM	Communication
CONOPS	Concept of operations
DB	Databank
FAQ	Frequently asked questions
FASID	Facilities and services implementation document
FIR	Flight information region
FIXM	Flight Information exchange Model
FTBP	File Transfer Body Parts
GML	Geography markup language
I/R	Inter regional
IA-5	International Alphabet nr. 5
IAoR	Interregional area of responsibility
ICAO	International Civil Aviation Organization
ICD	Interface control document
IROG	Interregional OPMET Gateway
IWXXM	ICAO Meteorological Information Exchange Model
METAR	Meteorological Aerodrome Report
MTA	Message transfer agent
NOC	National OPMET Centre
OGC	Open Geospatial Consortium
OPMET	Operational Meteorological information
ROC	Regional OPMET Centre
RODB	Regional OPMET Databank
RODEX	Regional OPMET Data Exchange model
RQM	Meteorological databank request in TAC-format
RQX	Meteorological databank request in IWXXM-format
SIGMET	Significant Meteorological Information
SPECI	Special meteorological report
SWIM	System Wide Information Management
TAC	Traditional Alphanumeric Code form
TAF	Aerodrome forecast
TCA	Tropical Cyclone Advisory
VAA	Volcanic Ash Advisory
XML	Extensible Markup Language

Appendix A

Please Refer to EUR AMHS Manual, EUR DOC 020 Appendix H (subject to change based on WG-MIE)

APPENDIX 4.3C

Terms of Reference of the MID OPMET Bulletin Management Group

(OPMET BMG)

1. Terms of Reference

a. Support Regional OPMET Centre (ROC) Jeddah and back-up ROC Bahrain in the exchange of routine and non-routine OPMET data; OPMET bulletin updates; monitoring and management procedures; and implementation of IWXXM.

~~b. Review the OPMET exchange schemes to the MID Region and develop proposals for their optimization taking into account the current trends in the global OPMET exchange;~~

~~c. Develop monitoring and management procedures related to the ROBEX exchange and other exchanges of OPMET information;~~

d. Keep up-to-date the regional guidance material related to OPMET exchange;

e. Develop capabilities to support the ICAO Meteorological Exchange Model (IWXXM);

f. Develop key performance indicators for OPMET and keep under review;

g. Liaise with similar groups in the adjacent ICAO Regions in order to ensure harmonized and seamless OPMET exchange; and

h. The group will report to the MET Sub-Group of MIDANPIRG.

2. Work Programme

The work to be addressed by the MID OPMET BMG includes:

a. Supporting ROC Jeddah and back-up ROC Bahrain by:

i. Providing ROC Jeddah and back-up ROC Bahrain required routine OPMET data as per eANP, Volume II, Table MET II-2 for transmission to other Regions and to SADIS;

ii. Providing ROC Jeddah and back-up ROC Bahrain non-routine OPMET data: SIGMET as per eANP, Volume II, Table MET II-1 as well as special air-reports for transmission to other Regions and to SADIS;

iii. Requesting ROC Jeddah and back-up ROC Bahrain of necessary OPMET data from other Regions in order to support flight operations;

iv. Providing ROC Jeddah and back-up ROC Bahrain OPMET bulletin changes, when necessary, for implementation on AIRAC cycle;

v. Supporting ROC Jeddah and back-up ROC Bahrain on the development of monitoring and management procedures related to ROBEX exchange; and

vi. Coordinating with ROC Jeddah and back-up ROC Bahrain on the exchange of OPMET data using ICAO Meteorological Information Exchange Model (IWXXM).

b. Examine the existing requirements and any new requirements for the OPMET exchange in MID region and to assess the feasibility of satisfying these requirements, taking into account the availability of the data;

~~c. Review the ROBEX scheme and other OPMET exchange schemes and prepare proposal for updating and optimizing of the schemes;~~

~~d. Review and update the procedures for interregional exchange and for transmission of the regional OPMET data to SADIS;~~

e. Review and amend the regional guidance materials on the OPMET exchange and include procedures for the exchange of all required OPMET message types: SA, SP, FC, FT WS, WC, WV, FK, FV, UA, WA (IWXXM: LA, LP, LC, LT, LS, LY, LV, LK, LV, *special air-reports not defined yet*, LW);

f. Develop procedures for monitoring and management of the OPMET information, based on similar procedures used in the EUR and APAC Regions; and

g. Support ~~MARIE-PT or any subsequent governance group appointed by ICAO~~ the Information Management Panel and MET Panel Working Group on Meteorological Information Exchange (WG-MIE) in Regional implementation of IWXXM within MID. The initial implementation emphasis will be placed on States hosting ROCs/RODBs. Progress report to be provided to MID MET SG;

h. Use results from monitoring to measure OPMET (METAR and TAF) availability in MID Region against the required data listed in ~~FASID Table MET 1A~~ Table MET II-2, *Aerodrome Meteorological Offices*, of the MID Air Navigation Plan to support key performance index for OPMET component of ~~BO-MET~~ B0-AMET of the ~~new~~ implementation methodology called Aviation System Block Upgrade (ASBU) and keep under review; and

i. Provide regular progress reports to MET SG meetings.

3. Composition

a. The OPMET/BMG is composed of Bahrain (Back-up ROC), Egypt, Iran, Kuwait (co-rapporteur), Libya, Oman, Qatar, Saudi Arabia (co-rapporteur, ROC) and United Arab Emirates; and

b. Experts from the EUR ~~BMG~~ DMG, the VAAC Toulouse, APAC OPMET/M Task force and IATA are invited to participate in the work of the MID OPMET BMG.

4. Working Arrangements

It is expected that most of the work of the group will be conducted via correspondence by fax, e-mail or telephone. The group should establish a network of OPMET focal points at all MID COM/MET Centres dealing with OPMET data. When necessary, the Rapporteur, in coordination with the Regional Office, Cairo, will call teleconferences or meetings to discuss important issues.

APPENDIX 4.4A

PERFORMANCE FRAMEWORK FOR MET IMPLEMENTATION IN THE MID REGION

B0 – AMET: Meteorological information supporting enhanced operational efficiency and safety				
Elements	***Applicability***	***Performance Indicators/Supporting Metrics***	***Targets***	***Remarks***
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	Current status 12 out of 15 States (80%)
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	Current status 9 out of 15 States (60%)
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	Current status 12 out of 14 MWOs (86%)
OPMET	***All** States*	Indicator: % of AOP aerodromes whose METAR and TAF is available Supporting metric: number of AOP aerodromes where METAR and TAF is available	95% by Dec. 2018	Current status 50 of 59 AOP aerodromes (85%) Note: 54 of 59 AOP aerodromes require METAR and TAF. The other 5 aerodromes only METAR will be counted.

APPENDIX 4.6A

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	Y		
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, 5 Status of implementation of Quality Management System of meteorological information – 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~~ May 2015		
IRAN, ISLAMIC REPUBLIC OF			√	Oct 2015		
IRAQ	√				No Action Plan	
JORDAN			√	~~2 Apr 2014~~ 14 April 2017		
KUWAIT			√	~~23 Aug 2013~~ 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~~ 18 Dec 2015		
YEMEN	√				No Action Plan	

Table B0-AMET 3-5
SIGMET Availability

EXPLANATION OF THE TABLE

Column

1 FIR/UIR or State or MWO
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

FIR/UIR Or State Or MET Watch Office	Implementation		Action Plan	Remarks
	SIGMET Reception	SIGMET Format		
1	2	3	4	5
AMMAN (OJAC)	Y	Y		
BAGHDAD (ORBB)	Y	Y		Verify the header for Iraq is WSIQ01 ORBI for FIR ORBB – if so, update to MID Doc 009
BAHRAIN (OBBB)	Y	Y		
BEIRUT (OLBB)	Y	Y		
CAIRO (HECC)	Y	Y		
DAMASCUS (OSTT)	N	N	No Action Plan	
EMIRATES (OMAE)	Y	N		Guidance uses WMO codes for countries – UAE is ER; use header WSER31 OMAA (not WSAE20 OMAA)
JEDDAH (OEJD)	Y	Y		
KHARTOUM (HSSS)	Y	Y		
KUWAIT (OKAC)	Y	Y		
MUSCAT (OOMM)	Y	Y		
SANA A (OYSC)	N	N	No Action Plan	
TEHRAN (OIIX)	Y	Y		
TRIPOLI (HLLL)	Y	N		FIR code to use not certain (HLMC in guidance; HLLL received in monitoring; both are not in ICAO Doc 7910)

ATTACHMENT

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- END -