



INTERNATIONAL CIVIL AVIATION ORGANIZATION

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

**REPORT OF THE FOURTH MEETING OF
MET SUB-GROUP**

(Cairo, Egypt 25-27 June 2013)

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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MET SG/4
History of the Meeting

PART I – HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The fourth meeting of the Meteorology Sub-Group of the Middle East Planning and Implementation Regional Group (MET SG/4) was held in the conference hall of the ICAO Middle East (MID) Regional Office, Cairo, Egypt, from 25-27 June 2013. The third meeting of the MID Bulletin Management Group (BMG/3) was held in the conference hall of the ICAO MID Regional Office, Cairo, Egypt on 24 June 2013 and reflected in this Report.

2. OPENING

2.1 Mr. Mohamed R. M. Khonji, Regional Director of the ICAO Middle East Regional Office, opened the meeting. He welcomed all the participants to Cairo and noted that 7 States were represented at the meeting, which was a significant improvement from the MET SG/3 meeting. Mr. Khonji highlighted that important subjects would be addressed by the meeting such as a proposal to designate and establish a Regional OPMET Centre (ROC) in the MID Region to improve the efficiency of OPMET exchange intra- and inter-regionally; and the review/adaptation of the Air Traffic Management Volcanic Ash Contingency Plan template developed by the International Volcanic Ash Task Force.

2.2 Mr. Khonji wished the meeting success and emphasized the need to address the MET issues from a Regional perspective.

3. ATTENDANCE

3.1 The meeting was attended by a total of sixteen (16) participants, from seven (7) States (Bahrain, Egypt, Kuwait, Oman, Qatar, Saudi Arabia and the United Kingdom). The list of participants is at the **Attachment A** to the Report.

4. OFFICERS AND SECRETARIAT

4.1 The meeting was chaired by Mr. Ali Almotawa, Chief of Met Aviation, Meteorology Department of Kuwait. The Secretary of the meeting was Mr. Christopher Keohan, Air Navigation Systems Implementation (Meteorology), Europe and North Atlantic, assisted by Mr. Mohamed Smaoui, Regional Officer, Air Navigation Services/Aeronautical Information Management (ANS/AIM) of the ICAO Middle East Regional Office. Election of Chair and Vice Chair as per the MIDANPIRG Handbook took place.

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 Chairpersons

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- Agenda Item 2: Follow-up on MIDANPIRG/13 Conclusions and Decisions relevant to the MET field
- Agenda Item 3: Review of recent and forthcoming global developments
- Agenda Item 4: Status of implementation of the meteorological services in the MID Region:
- 4.1 Review 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 OPMET data exchange
 - 4.4 Review implementation of MET service for low-level flights
- Agenda Item 5: Review of the MET provisions in the MID Basic ANP and FASID
- Agenda Item 6: Identification, assessment and reporting of MET deficiencies
- Agenda Item 7: Quality Management System
- Agenda Item 8: Key Performance Indicators
- Agenda Item 9: Future work programme
- Agenda Item 10: 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.

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8. LIST OF DRAFT CONCLUSIONS AND DRAFT DECISIONS

DRAFT CONCLUSION 4/1: OPMET SHORTCOMINGS IN THE MID REGION

DRAFT CONCLUSION 4/2: ESTABLISHMENT OF MID REGIONAL OPMET CENTRE

DRAFT DECISION 4/3: UPDATE TO BULLETIN MANAGEMENT GROUP TERMS OF REFERENCE

DRAFT CONCLUSION 4/4: PROPOSAL FOR AMENDMENT TO PART VI (MET) OF THE MID AIR NAVIGATION PLAN VOLUME I AND VOLUME II (DOC 9708)

DRAFT CONCLUSION 4/5: MID REGION KEY PERFORMANCE INDICATORS - MET

DRAFT DECISION 4/6: UPDATE TO THE MET SG TERMS OF REFERENCE

PART II: REPORT ON AGENDA ITEMS

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

1.1 The meeting reviewed and adopted the Provisional Agenda as at Para 6 of the History of the Meeting noting that the election of Chairpersons were added to Agenda Item 1 and Key Performance Indicators were added as Agenda Item 8.

1.2 The meeting unanimously elected Mr. Ali Almotawa, Chief of MET Aviation, Meteorology Department of Kuwait as the Chairperson of the MET Sub-Group. Mr. Fahad Awad Al-Malki, Manager of Planning and Analysis, CNS/ATM Department, General Authority of Civil Aviation of Saudi Arabia, was unanimously elected as the Vice-Chairperson of the Sub-Group.

MET SG/4
Report on Agenda Item 2

REPORT ON AGENDA ITEM 2: FOLLOW-UP ON MIDANPIRG/13 CONCLUSIONS AND DECISIONS RELEVANT TO THE MET FIELD

2.1 The meeting noted the status of relevant MIDANPIRG/13 Conclusions and Decisions related to the MET field and the follow up actions taken by States, the secretariat and other parties concerned as at **Appendix 2A** to the Report on Agenda Item 2. The meeting agreed also to review the Conclusions and Decisions, which are still current, under the associated Agenda Items with a view to propose to MIDANPIRG/14 appropriate follow-up action.

MET SG/4
Appendix 2A to the Report on Agenda Item 2

FOLLOW-UP ACTION PLAN ON MIDANPIRG/12 AND MIDANPIRG/13 CONCLUSIONS AND DECISIONS

CONCLUSIONS AND DECISIONS	FOLLOW-UP	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	REMARKS
<p>CONC. 12/64: TRAINING FOR THE NEW WAFS FORECASTS</p> <p>That, in order to facilitate the implementation of the new WAFS forecasts by the WAFS users in the MID States, WAFC Provider States in coordination with the World Meteorological Organization (WMO) be invited to organize in 2011 or 2012 a training seminar for the MID Region on the use of the new gridded WAFS forecasts for convective clouds, icing and turbulence</p>	<p>Implement the Conclusion</p>	<p>WAFC Provider States WMO</p>	<p>Training Seminar</p>	<p>2012</p> <p>Change to</p> <p>“to be available by April 2013”</p>	<p>Ongoing</p> <p>(IOM Ref: AN 10/3 – 10/421 to WAFSOPSG Secretariat dated 14 Dec 2010)</p> <p>WAFSOPSG/7 Conclusion 7/13 – WAFC Provider States proceed with the development of computer-based (including voice over) initial training material for WAFS gridded global forecasts for CB clouds, icing and turbulence and, in coordination with Secretary, make it available on the WAFSOPSG website by April 2013 in order to support implementation under Amendment 76 to Annex 3.</p>

CONCLUSIONS AND DECISIONS	FOLLOW-UP	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	REMARKS
					<p>Sent for comments to WAFSOPSG members – due 26 April 2013</p> <p>Expected on WAFSOPSG website by July 2013</p>
<p>DEC.12/72: VOLCANIC ASH CONTINGENCY PLAN FOR THE MID REGION</p> <p>That, the ATM/SAR/AIS Sub-Group and MET Sub-Group be invited to develop a draft Volcanic Ash Contingency Plan for the MID Region for consideration at MIDANPIRG/13.</p>	<p>Implement the Decision</p>	<p>ICAO MID</p>	<p>Draft Volcanic Ash contingency plan</p>	<p>May 2011</p>	<p>Ongoing</p> <p>ATM VACP from IVATF available since Aug 2012 for consideration by MET SG/4 (and ATM SG as well as MIDANPIRG/14)</p>
<p>CONC 12/73: REVIEW OF PART VI (MET) OF THE MID AIR NAVIGATION PLAN VOLUME II (FASID)</p> <p>That, in time for MET Sub-Group 3, the ICAO MID Regional Office, in coordination with the MID OPMET Bulletin Management Group (BMG), is invited to review and propose amendments, as necessary, to FASID Tables MET 2A, 2C, 4A and 4B related to OPMET exchange.</p>	<p>Implement the Conclusion</p>	<p>ICAO BMG</p>	<p>FASID Amendment</p>	<p>May 2011</p>	<p>COMPLETE</p> <p>SL Ref.: AN10/5A-12/130 dated 15 May 2012 (amendment approved)</p>
<p>CONC.12/75: ELIMINATION OF AIR NAVIGATION DEFICIENCIES IN THE MID REGION</p> <p>That, MID States be urged to:</p>					<p>COMPLETE</p>

CONCLUSIONS AND DECISIONS	FOLLOW-UP	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	REMARKS
<p>a) review their respective lists of identified deficiencies, define their root causes and forward an action plan for rectification of outstanding deficiencies to the ICAO MID Regional Office prior to 31 March 2011;</p> <p>b) use the online facility offered by the ICAO MID Air Navigation Deficiency Database (MANDD) for submitting online requests for addition, update, and elimination of air navigation deficiencies;</p> <p>c) accord high priority to eliminate all air navigation deficiencies with emphasis on those with priority “U”; in particular by allocating the necessary budget to ensure that their Civil Aviation Authorities have and retain a sufficient number of qualified technical personnel, who are provided with appropriate initial, on-the-job and recurrent training; and</p> <p>d) seek support from regional and international organizations (i.e. ACAC, GCC, etc.) for the elimination of identified air navigation deficiencies.</p>	Implement the Conclusion	ICAO States	State Letter Feedback from States	January 2011	<p>SL Ref.: AN2/2 – 11/123 dated 25 May 2011</p> <p>Reference para 4.6.17 of MIDANPIRG/13</p>
<p>CONC. 13/52: SIGMET TEST PARTICIPATION</p> <p>That, States’ MID SIGMET Test focal points be invited to participate in the bi-annual SIGMET tests conducted by the EUR Region and report any deficiencies at each MET SG meeting</p>	Implement the Conclusion	ICAO	State Letter	31 Aug 2012	<p>COMPLETE</p> <p>SL AN10/12 – 12/257 Dated 29 August 2012</p>
<p>CONC. 13/53: UPDATE TO THE MID REGIONAL SIGMET GUIDE</p> <p>That, States with meteorological watch office responsibilities, and that have not yet done so, be invited to provide by 1 July 2012, the World Meteorological Organization Abbreviated Header Lines used for the issuance of SIGMET for flight information regions (FIRs) under their area of responsibility for inclusion in the MID Regional SIGMET Guide</p>	Implement the Conclusion	ICAO States	State Letter Necessary information	15 Jun 2012 1 Jul 2012	<p>COMPLETE</p> <p>SL AN10/12 – 12/170 Dated 13 June 2012</p>

CONCLUSIONS AND DECISIONS	FOLLOW-UP	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	REMARKS
<p>CONC. 13/54: DEVELOP RECOMMENDATION OF MID REGIONAL OPMET CENTRES FOR INTER-REGIONAL EXCHANGE OF OPMET DATA</p> <p>That,</p> <p>a) The MID Bulletin Management Group;</p> <p>i. Determine requirements associated with the establishment of Regional OPMET Centres (ROC) in the MID Region; and</p> <p>ii. Carry out a survey based on requirements developed in (i) to determine States' capabilities for establishing ROC(s),</p> <p>b) Concerned States be invited to complete the survey by 31 August 2012 in order for the MID BMG to report back to MET SG/4 with a recommendation of potential regional designation of ROC(s) for further consideration by MIDANPIRG/14.</p>	<p>Implement the Conclusion</p>	<p>ICAO States</p>	<p>State Letter</p> <p>Completed survey</p>	<p>15 Jun 2012</p> <p>31 Aug 2012</p>	<p>Ongoing</p> <p>SL AN 10/11 – 12/205 Dated 3 July 2012</p> <p>Received replies from Iran, Saudi Arabia, and United Arab Emirates</p> <p>To be reviewed at MID BMG/3 and MID MET SG/4 for consideration by MIDANPIRG/14</p>
<p>CONC. 13/55: OPMET DATA ERRORS AND DEFICIENCIES</p> <p>That,</p> <p>a) States be informed of:</p> <p>i) incorrect addressing to Regional OPMET Centre (ROC) Vienna as provided at Appendix 4.6A to the Report on Agenda Item 4.6;</p> <p>ii) multiple bulletins received at ROC Vienna as provided at Appendix 4.6B to the Report on Agenda Item 4.6 and assure only one bulletin is sent to ROC Vienna;</p> <p>iii) non-receipt of OPMET (SA, FC, FT) requests during monitoring as provided at Appendix 4.6C to the Report on Agenda Item 4.6; and</p> <p>b) States non-compliant with TAF requirements be included in ICAO MID deficiency list.</p>	<p>Implement the Conclusion</p>	<p>ICAO</p>	<p>State Letter</p>	<p>31 Aug 2012</p>	<p>Ongoing</p> <p>SL AN 10/11 – 10/183 Dated 18 June 2012</p> <p>Need to verify these errors have been corrected</p> <p>Compare DMG/7 or subsequent DMG results with appendices – persistent errors should be considered as deficiencies at MIDANPIRG/14</p>

CONCLUSIONS AND DECISIONS	FOLLOW-UP	TO BE INITIATED BY	DELIVERABLE	TARGET DATE	REMARKS
<p>CONC. 13/56: TIMELINESS OF OPMET DATA</p> <p>That, States be notified of procedures related to METAR and TAF compilation and dissemination times as per Appendix 4.6D to the Report on Agenda Item 4.6.</p>	<p>Implement the Conclusion</p>	<p>ICAO</p>	<p>State Letter</p>	<p>31 Aug 2012</p>	<p>COMPLETE</p> <p>SL AN 10/11 – 12/182 Dated 18 June 201</p>
<p>CONC. 13/57: REVISED TOR OF THE MET SG</p> <p>That, the Terms of Reference (ToR) of the Meteorology Sub-Group be updated as at Appendix 4.6E to the Report on Agenda Item 4.6</p>	<p>Implement the Conclusion</p>	<p>MIDANPIRG</p>	<p>Updated TOR and Procedural Handbook</p>	<p>April 2012</p>	<p>COMPLETE</p>

MET SG/4
Report on Agenda Item 3

REPORT ON AGENDA ITEM 3: REVIEW OF RECENT AND FORTHCOMING GLOBAL DEVELOPMENTS

3.1 The meeting noted developments at the global level, and in particular from the International Airways Volcano Watch Operations Group (IAVWOPSG), Meteorological Warnings Study Group (METWSG), Aerodrome Meteorological Observation and Forecast Study Group (AMOFSG) and Meteorological Aeronautical Requirements and Information Exchange Project Team (MARIE-PT).

3.2 The meeting reviewed developments related to the IAVWOPSG/6 (19 to 23 September 2011, Dakar) and IAVWOPSG/7 (18 to 22 March 2013, Bangkok) meetings which produced actions agreed of interest to the Region (<http://www.icao.int/safety/meteorology/iavwopsg/Pages/default.aspx>). In particular, the endorsement of draft amendments to Annex 3 and amendment of IAVW-related guidance (ICAO Doc 9766) concerning the coordination and transfer of responsibility between Volcanic Ash Advisory Centres (VAAC)s for volcanic ash events noting that the IAVWOPSG/7 agreed to develop examples and illustrations related to the definition of “lead VAAC” for inclusion in ICAO Doc 9766. The IAVWOPSG/6 also agreed to develop a concept of operations for the provision of accidental release of radioactive material into the atmosphere. IAVWOPSG/7 produced a proposal to amend Annex 3 regarding the introduction of a requirement for VAACs to monitor, where available, relevant ground-based and airborne data to detect the existence and extent of volcanic ash in the atmosphere. In addition guidance material will be developed to support VAAC monitoring of relevant ground-based and airborne data to detect the existence and extent of volcanic ash in the atmosphere. In addition, IAVWOPSG/7 endorsed the definitions of visible ash and discernible ash for operational use. That is, visible ash be defined as “volcanic ash observed by the human eye” and not be defined quantitatively by the observer and discernible ash be defined as “volcanic ash detected by defined impacts on/in aircraft or by agreed in-situ and/or remote-sensing techniques”. The IAVWOPSG/7 also agreed to continue work on expressing confidence at the time of observation of an ash cloud in the volcanic ash advisory/volcanic ash advisory in graphical format and evaluate forecast confidence to meet the needs of volcanic ash related safety risk assessment.

3.3 With reference to IAVW, the meeting recalled the Global Database of Area Control Centre (ACC) AFTN 8-Letter Addresses for the Notification by VAAC London Concerning the Release of Radioactive Material into the Atmosphere noting entries were missing from Iraq (Baghdad and Basrah ACCs), Iran (Tehran ACC, FIC, FIR), Lebanon (Beirut ACC), Yemen (Sanaa ACC), and Syria (Dam ACC). These States were encouraged to provide their ACC AFTN addresses to receive notification on the release of radioactive material into the Atmosphere. Saudi Arabia provided the address for the Sanna ACC (OYHQYAYX) that would be conveyed to the IAVWOPSG Secretariat in due time.

3.4 The meeting noted that this notification of a release of radioactive material into the atmosphere was for the ACC where the event was occurring as well as the adjacent ACCs. This information would also be available on SADIS. For flight planning, the meeting noted that SIGMET and NOTAM would be used and that information would be derived from the information available, and in particular, from the relevant Regional Specialized Meteorological Centre.

3.5 The meeting recalled one of the significant outcomes from the International Volcanic Ash Task Force which was the development of a template of an Air Traffic Management Volcanic Ash Contingency Plan (ATM VACP) for consideration by the regions, which is provided at **Appendix 3A** to the Report on Agenda Item 3.

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Report on Agenda Item 3

3.6 The meeting noted that Saudi Arabia was developing a national contingency plan to manage volcanic ash events. Saudi Arabia requested examples of steps from other States and/or Regions. With reference to the ATM VACP template, the meeting noted that most MID States would practice two of the four phases provided – ongoing and recovery phases – as the pre-eruption and start of eruption phases would only apply to the States where volcanoes erupt. Furthermore, the MID Region would receive volcanic ash advisories and volcanic ash advisories in graphic form from VAAC Toulouse (noting the rare event that another VAAC would provide the information due to a backup situation or an agreement that the lead VAAC is other than VAAC Toulouse due to a long duration eruption under the lead of another VAAC). The Secretariat would also encourage future participation by VAAC Toulouse in the MID MET SG meetings.

3.7 The meeting concurred that the MET SG should focus on developing examples of SIGMET, NOTAM (in coordination with AIM) and special air-reports on volcanic ash in time for the MIDANPIRG/14 meeting (in support to MIDANPIRG Decision 12/72 – volcanic ash contingency plan for the MID Region). These examples would be provided by the Secretariat and reviewed by the MET SG members. ATM concerns could be addressed by the MID ATM/SAR/AIS Sub-Group. Lastly, the meeting was encouraged to participate in SIGMET tests on volcanic ash in order to be better prepared for a real volcanic ash event.

3.8 The meeting was apprised of the outcome of the METWSG/4 (15 to 18 May 2012, Montréal) and agreed that it is of interest to the Region (<http://www.icao.int/safety/meteorology/METWSG/Lists/Meetings/AllItems.aspx>); in particular, the developments of a proposal related to regional advisory centres for the issuance of SIGMET advisories that would be considered at the proposed MET Divisional Meeting in July 2014, were highlighted.

3.9 The meeting was apprised of the outcome of the AMOFSG/9 (26 to 30 September 2012, Montreal) and agreed that it is of interest to the Region (<http://www.icao.int/safety/meteorology/amofsg/Lists/Meetings/AllItems.aspx>); in particular, the numerous proposals to modify Annex 3 as part of draft Amendment 76 as well as the developments of guidance material for many items such as siting and operations of meteorological instruments at aerodromes and reporting marked discontinuities of RVR, were highlighted.

3.10 The meeting was apprised of the outcome of the MARIE-PT and agreed that it is of interest to the Region (<http://www.icao.int/safety/meteorology/MARIE-PT/Pages/default.aspx>). In particular, a roadmap for ATM requirements for MET were available on the referenced website as well as an initial set of functional requirements (what is required) and associated performance metrics (how is it required – resolution, accuracy) for meteorological elements related to ATM. A roadmap or work plan related to Extensible Markup Language/Geography Markup Language (XML/GML) developments was also provided at the referenced website noting the publication of WMO Logical Data Model (LDM) and Schema was expected in July 2013 (comments section of referenced website – Manual on the Digital Exchange of Aeronautical Meteorological Information). In addition, the EUR Data Management Group (DMG) will take the lead in developing a Concept of Operations for ICAO Meteorological Exchange Model (IWXXM) in coordination with WMO and Eurocontrol through the proper channel (MARIE-PT). This was expected to be available in 2014.

3.11 The meeting noted that State(s) designated (to be determined by MIDANPIRG/14) as Regional OPMET Centres (ROC)s or Regional OPMET Data Banks (RODB)s should develop the capability of exchanging METAR/SPECI, TAF and SIGMET in XML.

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Report on Agenda Item 3

3.12 The meeting also noted that ICAO was considering the development of a PANS-MET, similar to other PANS in existence such as PANS-ATM, which would describe 'how' MET service for international air navigation is to be provided. The development of a PANS-MET, which would coincide with changes to the extent of Annex 3, is expected to be considered at a proposed MET Divisional Meeting in 2014.

3.13 The meeting was apprised of the MET capability demonstration (current and foreseen capabilities) being developed by WMO as provided at the referenced website. This information was used to assist the Air Traffic Management Requirements and Performance Panel (ATMRPP) in October 2012 when considering MET requirements for ATM.

3.14 To support possible new MET requirements for ATM (e.g. such as high resolution winds in the terminal area), the meeting noted efforts related to obtaining more observations from aircraft. In particular, Qatar would hold a meeting with stakeholders including airlines to obtain more observations from aircraft (AMDAR programme) to improve forecasts in the MID Region. This event is planned in early 2014.

3.15 The meeting was apprised also of the developments related to Aviation System Block Upgrades (ASBU) that includes a baseline implementation (implementation of current provisions) and future upgrades based on future requirements and future industry capabilities. This methodology would include potential implementation upgrades every five years and numbered in blocks: block 0 – 2013, current provisions. block 1 – 2018, block 2 – 2023 and block 3 – 2028. Current meteorological provisions that entail SIGMET information, aerodrome warnings, wind shear warnings and alerts, enroute forecasts provided by WAFC, volcanic ash advisory centres and tropical cyclone advisory centres were included in block 0. It was noted that the Technical Team that developed the ASBU modules, including those relating to MET determined that other types of MET information – e.g. OPMET information such as METAR/SPECI and TAF - did not need to be referenced in the block 0 MET modules, but was included in the 12th Air Navigation Conference. MET requirements for ATM to support performance based air navigation methods would be expected in future blocks in order to contribute in optimizing the benefits of performance based navigation. The later blocks would consider dynamic integration of MET information into the ground ATM systems' decision support logic and eventually avionics automated decision support systems which would enable the future 4D trajectory based operations. A workshop on preparations for ICAO's 12th Air Navigation Conference (AN-Conf/12, 19 to 30 November 2012, Montreal) – ASBU methodology was held in Cairo from 30 September to 4 October 2012. More information may be obtained at the following link: <http://www.icao.int/MID/Pages/2012-asbu.aspx>.

3.16 The meeting also noted that details of modules within the block (such as meteorology) included pre-requisites and a global readiness checklist: status (ready now or estimated date), standards readiness, avionics availability, ground system availability, procedures available and operations approvals. The modules were also mapped to key performance areas (e.g. Capacity: optimized usage of airspace capacity that would allow achieving arrival and departure rates). This new implementation methodology, ASBU, was endorsed at the 12th Air Navigation Conference in November 2012.



AIR TRAFFIC MANAGEMENT VOLCANIC ASH CONTINGENCY PLAN TEMPLATE

**First Edition
(August 2012)**

FOREWORD

This document is an Air Traffic Management (ATM) Volcanic Ash Contingency Plan template which sets out standardised guidelines and procedures for the provision of information to airlines and en-route aircraft before and during a volcanic eruption. Volcanic contamination, of which volcanic ash is the most serious, is a hazard for safe flight operations. Mitigating the hazards posed by volcanic ash in the atmosphere and/or at the aerodrome cannot be resolved in isolation but through collaborative decision making (CDM) involving all stakeholders concerned. During an eruption, volcanic contamination can reach and exceed the cruising altitudes of turbine-powered aircraft within minutes and spread over vast geographical areas within a few days. Encounters with volcanic ash may result in a variety of hazards including one or more of the following:

- a) the malfunction, or failure, of one or more engines leading not only to reduction, or complete loss of thrust but also to failures of electrical, pneumatic and hydraulic systems;
- b) the blockage of pitot and static sensors resulting in unreliable airspeed indications and erroneous warnings;
- c) windscreens rendered partially or completely opaque;
- d) smoke, dust and/or toxic chemical contamination of cabin air requiring crew to don oxygen masks, thus impacting verbal communication; electronic systems may also be affected;
- e) the erosion of external and internal aircraft components;
- f) reduced electronic cooling efficiency leading to a wide range of aircraft system failures;
- g) the aircraft may have to be manoeuvred in a manner that conflicts with other aircraft; and
- h) volcanic ash deposition on a runway may degrade aircraft braking performance, most significantly if the volcanic ash is wet; and in extreme cases, this can lead to runway closure.

Operators are required by ICAO Annex 6 – *Operation of Aircraft* to implement appropriate mitigation measures for volcanic ash in accordance with their safety management system (SMS), as approved by the State of the Operator/Registry. The guidelines provided in this document assume that the ICAO requirements regarding safety management systems have been implemented by the operators. Detailed guidance on Safety Risk Assessments (SRAs) for flight operations with regard to volcanic ash contamination can be found in the manual on *Flight Safety and Volcanic Ash – Risk Management of Flight Operations with Known or Forecast Volcanic Ash Contamination* (ICAO Doc 9974).

This document is an ATM¹ contingency plan including its interfaces with supporting services such as aeronautical information service (AIS) and meteorological (MET) services and that the plan therefore primarily addresses the provider States. Distribution of applicable AIS and MET messages related to volcanic ash are set out in relevant ICAO Annexes– namely Annex 15–

¹ ATM is defined “the dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management – safely, economically and efficiently – through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.” (*Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444))

Aeronautical Information Services and Annex 3 – Meteorological Service for International Air Navigation.

Volcanic ash can also affect the operation of aircraft at aerodromes. Volcanic ash deposition at an aerodrome, even in very small amounts, can result in the closure of the aerodrome until all the deposited ash has been removed. In extreme cases, the aerodrome may no longer be available for operation at all, resulting in repercussions on the ATM system, e.g. diversions, revised traffic flows, etc.

Some aircraft types or engine technologies are more vulnerable to volcanic ash contaminants than others; therefore, any specific mitigation measures to be applied would have to take into account any such variance. Considering that a commercial aircraft travels about 150 km (80 NM) in 10 minutes and that volcanic ash can rise to flight levels commonly used by turbine-engine aircraft in half that time, a timely response to volcanic eruptions and volcanic ash in the atmosphere is essential.

It is imperative that information on the volcanic activity is disseminated as soon as possible. In order to assist staff in expediting the process of originating and issuing relevant AIS and MET messages, a series of templates should be available for different stages of the volcanic activity. A list of ICAO registered volcanoes — see the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (ICAO Doc 9691) Appendix F — should be available at the State's International NOTAM office with volcano name, number and nominal position. In order to ensure the smooth implementation and effectiveness of the contingency plan in case of an actual volcanic eruption, volcanic ash exercises (VOLCEX) should be conducted at a frequency determined by the ICAO Region concerned.

This document has been prepared, and is in line with a proposal for amendment to the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) paragraph 15.8 *Procedures for an ATC unit when a volcanic ash cloud is reported or forecast* — which is expected to become applicable in November 2014.

General considerations during the development of an ATM contingency plan for volcanic ash and anticipated flight crew issues when encountering volcanic ash are provided in Appendices A and B respectively.

AIR TRAFFIC MANAGEMENT VOLCANIC ASH CONTINGENCY PLAN TEMPLATE

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APPENDIX A General guidance for the development of an ATM volcanic ash contingency plan

APPENDIX B Anticipated flight crew issues when encountering volcanic ash

APPENDIX C Communication and dissemination of pilots' reports of volcanic activity

The eventual inclusion of any or all of the optional appendices listed below is to be determined by the appropriate ICAO Planning and Implementation Regional Group.

APPENDIX D Actions to be taken by the meteorological watch offices (MWO) in the event of a volcanic eruption

APPENDIX E Actions to be taken by the volcanic ash advisory centres (VAACs) in the event of a volcanic eruption

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1. TERMINOLOGY

1.1. AREAS OF CONTAMINATION

1.1.1. Information on areas of observed and/or forecast volcanic ash in the atmosphere is provided by means of appropriate MET messages in accordance with Annex 3 – *Meteorological Service for International Air Navigation*.²

1.2. DANGER AREAS

1.2.1. If it is considered that the volcanic event could pose a hazard to aviation, a danger area³ may be declared by NOTAM; however, this option should only be applied over and in the proximity of the volcanic source. Normally, clearances will not be issued through the danger area unless explicitly requested by the flight crew. In this context it should be noted that the final responsibility for aircraft safety rests with the flight crew. Therefore, the final decision regarding route, whether it will be to avoid or proceed through an area of volcanic activity, is the flight crew's responsibility. Wherever this document discusses the possible establishment of danger areas, States are not prevented from establishing restricted or prohibited areas over the sovereign territory of the State if considered necessary by the State concerned.

1.2.2. Although it is the prerogative of the provider State to promulgate a danger area in airspace over the high seas, it should be recognized that restrictions to the freedom of flight over the high seas cannot be imposed in accordance with the United Nations Convention on the Law of the Sea (Montego Bay 1982).

1.3. PHASES OF AN EVENT

1.3.1. The response to a volcanic event that affects air traffic has been divided into four distinct phases in this document — a Pre-Eruption Phase, a Start of Eruption Phase, an On-going Eruption Phase, and a Recovery Phase— as follows:

- a) **PRE-ERUPTION PHASE** (when applicable): The initial response, “raising the alert”, commences when a volcanic eruption is expected.
 - 1) Appropriate AIS and MET messages may be issued in accordance with Annex 15 and Annex 3 respectively, and disseminated to affected aircraft in flight by the most expeditious means. It should be noted that, sometimes volcanoes erupt unexpectedly without any alert being raised, hence the pre-eruption phase may be omitted.
- b) **START OF ERUPTION PHASE** (when applicable): The start of eruption phase commences at the outbreak of the volcanic eruption and entrance of volcanic ash into the atmosphere and mainly pertains to aircraft in flight.

² Principally this will include volcanic ash advisory messages (issued by volcanic ash advisory centres) and SIGMET information on volcanic ash (issued by meteorological watch offices).

³ Depending on the State's regulation, the area may be established as a “danger area”, “restricted area” or “prohibited area”. Over the high seas only “danger area” may be established.

Appropriate AIS and MET messages may be issued as appropriate in accordance with Annex 15 and Annex 3 respectively, and a danger area may be declared by NOTAM. Normally, clearances will not be issued through the danger area unless explicitly requested by the flight crew.

- c) **ON-GOING ERUPTION PHASE:** The on-going eruption phase commences with the issuance of the first volcanic ash advisory (VAA) containing information on the extent and movement of the volcanic ash cloud following completion of the previous reactive responses. Appropriate AIS and MET messages may be issued as appropriate in accordance with Annex 15 and Annex 3 respectively.
- d) **RECOVERY PHASE:** The recovery phase commences with the issuance of the first VAA containing a statement that “NO VA EXP” (i.e. “no volcanic ash expected”) which normally occurs when it is determined that no volcanic ash is expected in the atmosphere and the volcanic activity has reverted to its pre-eruption state.

Note: These descriptions are amplified in Chapter 3 of this document.

1.3.2. Although the four distinct phases herein describe actions to be undertaken during an actual volcanic event, they are based on a theoretical scenario. Actual eruptions may not always be distinct with respect to ATM actions to be undertaken. Similarly, an eruption may occur without any pre-eruptive activity, or may cease and restart more than once. Hence, the first observation may be the presence of an ash cloud which is already some distance away from the volcano. It is essential that the contingency planning prepares the ATM system for an appropriate response depending on the actual conditions. Therefore, the “Pre-Eruption Phase” and “Start of Eruption Phase” described in this document are annotated “when applicable” in order to provide for flexibility in the application of the contingency plan in those parts of the world with insufficient volcano monitoring and alerting.

1.3.3. Flight crews are required to report observations of volcanic activity by means of a special air-report (Special AIREP). Arrangements should be put in place to ensure that such information is transferred without delay to the appropriate aeronautical institutions responsible for subsequent action. The communication and dissemination of pilot reports on volcanic activity is described in Appendix C.

2. **PRE-ERUPTION PHASE**

2.1. GENERAL

2.1.1. Where flight operations are planned in areas that are susceptible to volcanic eruptions, ATS units may expect to receive from flight crews the ICAO Volcanic Activity Report (VAR) form (published in the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) Appendix 1).

2.1.2. The focus of this phase is to gain early recognition of volcanic events. This phase is frequently characterised by a very limited availability of information on the potential extent and severity of the impending eruption. The priority is to ensure the continued safety of aircraft in flight, and there is therefore a requirement to promulgate information as a matter of

ATM Volcanic Ash Contingency Plan Template

urgency. Notwithstanding the potentially limited extent of information available, the pre-eruption phase actions described below should be carried out for every expected eruption.

2.1.3. The initial response, “raising the alert”, commences when a volcanic eruption is expected. Initial awareness of the event may be by means of a Special AIREP/VAR and/or from information provided by meteorological or volcanological agencies. Arrangements in each State between designated volcano observatories, meteorological and air traffic management agencies should ensure that alerting information is provided expeditiously by the most appropriate means to provide continued safety of flight.

2.1.4. Emphasis is placed on raising awareness of the hazard and to protect aircraft in flight. The actions are based on well-prepared, well-exercised contingency plans and standard operating procedures. Aircraft are expected to clear or avoid the volcanic ash affected area based on standard operating procedures.

2.2. ORIGINATING ACC ACTIONS (*eruption expected in its own flight information region*)

2.2.1. In the event of significant pre-eruption volcanic activity, which could pose a hazard to aviation, an area control centre (ACC)⁴, on receiving information of such an occurrence, should carry out the following:

- a) ensure that appropriate AIS messages are originated in accordance with Annex 15. These must provide as precise information as is available regarding the activity of the volcano. It is imperative that this information is issued by the international NOTAM office and disseminated as soon as possible in accordance with the provisions of Annex 15;
- b) when so required by the State, define an initial, precautionary danger area in accordance with established procedures. The size of the danger area should encompass a volume of airspace in accordance with the information available, aiming to avoid undue disruption of flight operations;
 - 1) if no such procedures have been established, the danger area should be defined as a circle with a radius of xxx km (xx NM)⁵. The circle should be centred on the estimated or known location of the volcanic activity;
 - 2) although ATC would not normally initiate a clearance through a danger area, it will inform aircraft about the potential hazard and continue to provide normal services. It is the responsibility of the pilot-in-command to determine the safest course of action.
- c) advise the associated MET service provider(s) in accordance with national/regional arrangements (unless the initial notification originated from such provider(s)), who will then inform the appropriate air traffic flow management (ATFM) units;

⁴ Where the term “ACC” is used throughout this document, it is intended to also include all ATS facilities.

⁵ The size of the area is to be agreed in the region concerned and should be based on local knowledge as regards the volcano concerned.

- d) alert flights already within the area concerned and offer assistance to enable aircraft to exit the area in the most expeditious and appropriate manner. Flight crews should be provided with all necessary information required to make safe and efficient decisions in dealing with the hazards in the defined area. Aircraft that are close to the area should be offered assistance to remain clear of the area. Flights which would be expected to penetrate the area should be re-cleared onto routes that will keep them clear; and
- e) immediately notify other affected ACCs of the event and the location and dimensions of the area concerned. The ACC should also negotiate any re-routings necessary for flights already coordinated but still within adjacent flight information regions (FIRs) and provide any information on potential implications on traffic flow and its capability to handle the expected traffic. It is also expected that adjacent ACCs will be asked to reroute flights not yet coordinated to keep them clear of the area. It should be noted that flight crews may make the decision not to completely avoid the area based on, for example, visual observations; and
- f) implement flow management measures if necessary to maintain the required level of safety.

Note 1. — In order to assist staff in expediting the process of composing the AIS messages, a series of templates should be available for this stage of the volcanic activity.

2.2.2. In addition to sending the relevant AIS messages to the normal distribution list, it will be sent to the relevant meteorological facilities.

2.3. ADJACENT ACC ACTIONS

2.3.1. During the pre-eruption phase, ATC will not normally initiate clearances through a danger area; however, it will inform aircraft about the potential hazard and continue to provide normal services. Adjacent ACCs should take the following action to assist:

- a) when advised, re-clear flights to which services are being provided and which will be affected by the area; and
- b) unless otherwise instructed, continue normal operations and:
 - 1) if one or more routes are affected by the area, suggest re-routings to the affected aircraft onto routes clear of the area; and
 - 2) maintain awareness of the affected area.

2.4. ATFM UNIT ACTIONS

2.4.1. The ATFM unit and the associated volcanic ash advisory centre (VAAC) will determine how their initial communications will take place on the basis of bilateral agreements. Upon reception of preliminary information on volcanic activity from the lead VAAC, the ATFM unit should initiate actions in accordance with its procedures to ensure exchange of information in

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order to support CDM between air navigation service providers (ANSPs), meteorological watch offices (MWOs), VAACs and aircraft operators concerned.

3. START OF ERUPTION PHASE

3.1. GENERAL

3.1.1. This phase commences at the outbreak of a volcanic eruption, with volcanic ash being ejected into the atmosphere. The focus of the processes in this phase is to protect aircraft in flight and at aerodromes from the hazards of the eruption through the collection and use of relevant information.

3.1.2. In addition to relevant actions described under the pre-eruption phase, major activities of the start of eruption phase are: Issuance of relevant AIS and MET messages in accordance with Annex 15 and Annex 3 respectively; as well as provision of information and assistance to airborne traffic. As appropriate, danger areas will be declared via NOTAM. This phase will last until such time as the on-going eruption phase can be activated.

3.2. ORIGINATING ACC ACTIONS (eruption in its own FIR)

3.2.1. The ACC providing services in the FIR within which the volcanic eruption takes place should inform flights about the existence, extent and forecast movement of volcanic ash and provide information useful for the safe and efficient conduct of flights.

3.2.2. If necessary, rerouting of traffic should commence immediately or may be in progress if the alerting time has been sufficient to facilitate activation of the pre-eruption phase. The ACC should assist in rerouting aircraft around the danger area as expeditiously as possible. Adjacent ACCs should also take the danger area into account and give similar assistance to aircraft as early as possible.

3.2.3. During the start of eruption phase, although ATC will not normally initiate a clearance through a danger area, it will inform aircraft about the hazard and will continue to provide normal services. It is expected that aircraft will attempt to remain clear of the danger area; however, it is the responsibility of the pilot-in-command to determine the safest course of action.

3.2.4. During the start of eruption phase the ACC should:

- a) ensure that a NOTAM is originated to define a danger area delineated cautiously so as to encompass a volume of airspace in accordance with the limited information available. In determining the area, information on upper winds should be taken into account, if available. The purpose is to ensure safety of flight in the absence of any prediction from a competent authority of the extent of contamination;
- b) maintain close liaison with MET facilities, who should issue appropriate MET messages in accordance with Annex 3;
- c) devise and update ATFM measures when necessary to ensure safety of flight operations, based on these forecasts and in cooperation with aircraft operators and the adjacent ACCs using the CDM process;

- d) ensure that reported differences between published information and observations (pilot reports, airborne measurements, etc.) are forwarded as soon as possible to the appropriate authorities to ensure its dissemination to all concerned;
- e) begin planning for the on-going eruption phase in conjunction with the aircraft operators, the appropriate ATFM unit and ACCs concerned; and
- f) issue appropriate AIS messages in accordance with Annex 15, should significant reductions in intensity of volcanic activity take place during this phase and the airspace no longer is contaminated by volcanic ash. Otherwise, begin CDM planning for the on-going eruption phase in conjunction with aircraft operators, the appropriate ATFM unit and the affected ACCs.

3.3. ADJACENT ACC ACTIONS

3.3.1. During the start of eruption phase, adjacent ACCs should take the following actions:

- a) maintain a close liaison with the appropriate ATFM unit and the originating ACC to design, implement and keep up to date ATFM measures which will enable aircraft to ensure safety of flight operations;
- b) the adjacent ACC, in cooperation with the originating ACC and aircraft operators, should impose as required additional tactical measures to those issued by the appropriate ATFM unit;
- c) maintain awareness of the affected area; and
- e) begin planning for the on-going eruption phase in conjunction with the aircraft operators, the appropriate ATFM unit and ACCs concerned.

3.4. ATFM UNIT ACTIONS

3.4.1. During the start of eruption phase, depending on the impact and/or extent of the volcanic ash, the appropriate ATFM unit should organise the exchange of latest information on the developments with the associated VAACs, ANSPs, MWOs and operators concerned in order to support CDM.

4. ON-GOING ERUPTION PHASE

4.1. The on-going eruption phase commences with the issuance of the first volcanic ash advisory (VAA) by the lead VAAC which contains information on the extent and movement of the volcanic ash cloud in accordance with Annex 3 provisions.

Note. — Volcanic ash advisory information in graphical format (VAG) may also be issued by the VAAC, containing the same information as its text-based VAA equivalent.

4.2. The VAA/VAG should be used to:

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- a) prepare appropriate AIS and MET messages in accordance with Annex 15 and Annex 3 provisions respectively; and
- b) plan and apply appropriate ATFM measures.

4.3. The volcanic contamination may affect any combination of airspace; therefore, it is not possible to prescribe measures to be taken for all situations. Furthermore it is not possible to detail the actions to be taken by any particular ACC. The following guidance therefore may prove useful during the on-going eruption phase but should not be considered mandatory or exhaustive:

- a) ACCs affected by the movement of the volcanic ash should ensure that appropriate AIS messages are originated in accordance with Annex 15. ACCs concerned and the appropriate ATFM unit should continue to publish details on measures taken to ensure dissemination to all concerned;
- b) depending on the impact and/or extent of the volcanic ash, the appropriate ATFM unit may take the initiative to organize teleconferences to exchange the latest information on the developments, in order to support CDM, with the VAACs, ANSPs and MWOs and operators concerned;
- c) ACCs and ATFM units should be aware that for the purposes of flight planning, operators could treat the horizontal and vertical extent of the volcanic ash contaminated area to be over-flown as if it were mountainous terrain; and
- d) any reported differences between published information and observations (pilot reports, airborne measurements, etc.) should be forwarded as soon as possible to the appropriate authorities (see Appendix C).

5. RECOVERY PHASE

5.1. The recovery phase commences with the issuance of the first VAA/VAG containing a statement that “NO VA EXP” (i.e. “no volcanic ash expected”) — which normally occurs when it is determined that the volcanic activity has reverted to its pre-eruption state and the airspace is no longer affected by volcanic ash contamination. Consequently, appropriate AIS messages should be issued in accordance with Annex 15.

5.2. ACCs and ATFM units should revert to normal operations as soon as practical.

6. AIR TRAFFIC CONTROL PROCEDURES

6.1. If a volcanic ash cloud is reported or forecasted in the FIR for which the ATS unit is responsible, the following actions should be taken:

- a) relay all pertinent information immediately to flight crews whose aircraft could be affected to ensure that they are aware of the ash cloud’s position and levels affected;
- b) request the intention of the flight crew and endeavour to accommodate requests for re-routing or level changes;

- c) suggest appropriate re-routing to the flight crew to avoid an area of reported or forecast ash clouds; and
- d) request a special air-report when the route of flight takes the aircraft into or near the forecast ash cloud and provide such special air-report to the appropriate agencies.

Note 1.— The recommended escape manoeuvre for an aircraft which has encountered an ash cloud is to reverse its course and begin a descent if terrain permits.

Note 2. — The final authority as to the disposition of the aircraft, whether it be to avoid or proceed through a reported or forecast volcanic ash cloud, rests with the flight crew.

6.2. When advised by the flight crew that the aircraft has inadvertently entered a volcanic ash cloud, the ATS unit should:

- a) take such action applicable to an aircraft in an emergency situation; and
- b) not initiate modifications of route or level assigned unless requested by the flight crew or necessitated by airspace requirements or traffic conditions.

Note 1.— General procedures to be applied when a pilot reports an emergency situation are contained in Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444) Chapter 15, 15.1.1 and 15.1.2.

Note 2.— Guidance material concerning the effect of volcanic ash and the impact of volcanic ash on aviation operational and support services is provided in Chapters 4 and 5 of the Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (Doc 9691).

7. **ATFM PROCEDURES**

7.1. Depending on the impact and/or extent of the volcanic ash and in order to support CDM, the appropriate ATFM unit should organize the exchange of the latest information on the developments with the associated VAACs, ANSPs, MWOs and operators concerned.

7.2. The ATFM unit will apply ATFM measures on request of the ANSPs concerned. The measures should be reviewed and updated in accordance with updated information. Operators should also be advised to maintain watch for relevant AIS and MET messages for the area.

APPENDIX A

GENERAL CONSIDERATIONS DURING THE DEVELOPMENT OF AN ATM CONTINGENCY PLAN FOR VOLCANIC ASH

1. In a contingency plan relating to volcanic ash contamination, certain steps need to be taken to provide a coordinated and controlled response for dealing with an event of this nature. Responsibilities should be clearly defined to ATS personnel. The plan should also identify the officials who need to be contacted, the type of messages that are to be created, the proper distribution of the messages and how to conduct business.

2. ATS personnel need to be trained and be made aware of the potentially hazardous effects if an aircraft encounters a volcanic ash cloud. Some particular aspects include:

- a) volcanic ash contamination may extend for hundreds, or even thousands of miles horizontally and reach the stratosphere vertically;
- b) volcanic ash may block the pitot-static system of an aircraft, resulting in unreliable airspeed indications;
- c) braking conditions at aerodromes where volcanic ash has recently been deposited on the runway will affect the braking ability of the aircraft. This is more pronounced on runways contaminated with wet ash. Flight crews and ATS personnel should be aware of the consequences of volcanic ash being ingested into the engines during landing and taxiing. For departure, it is recommended that pilots avoid operating in visible airborne ash; instead they should allow sufficient time for the particles to settle before initiating a take-off roll, in order to avoid ingestion of ash particles into the engine. In addition, the movement area to be used should be carefully swept before any engine is started;
- d) volcanic ash may result in the failure or power loss of one or all engines of an aircraft; and
- e) aerodromes with volcanic ash deposition may be declared unsafe for flight operations. This may have consequences for the ATM system.

4. The area control centre (ACC) in conjunction with ATFM units serves as the critical communication link between affected aircraft in flight and the information providers during a volcanic eruption. During episodes of volcanic ash contamination within the flight information region (FIR), the ACC has two major communication roles. First and most important is its ability to communicate directly with aircraft en-route which may encounter the volcanic ash. Based on the information provided in SIGMET information for volcanic ash and volcanic ash advisories (VAAs), and working with MWOs, ATS personnel should be able to advise the flight crew of which flight levels are affected by the volcanic ash and the forecast movement of the contamination. Through the use of various communication means, ATS units have the capability to coordinate with the flight crew alternative routes which would keep the aircraft away from the volcanic ash cloud.

5. Similarly, through the origination of a NOTAM/ASHTAM for volcanic activity the ACC can disseminate information on the status and activity of a volcano even for pre-eruption increases in volcanic activity. NOTAM/ASHTAM and SIGMET, together with AIREPs, are critical to dispatchers for flight planning purposes. Operators need as much advance notification as possible on the status of a volcano for strategic planning of flights and the safety of the flying public. Dispatchers need to be in communication with flight crews en-route so that a coordinated decision can be made between the flight crew, the dispatcher and ATS regarding alternative routes that are available. The ACC should advise the ATFM unit concerning the availability of alternative routes. It cannot be presumed, however, that an aircraft which is projected to encounter ash will be provided with the most desirable route to avoid the contamination. Other considerations have to be taken into account such as existing traffic levels on other routes and the amount of fuel reserve available for flights which may have to be diverted to other routes to allow for the affected aircraft to divert.

6. The NOTAM/ASHTAM for volcanic activity provides information on the status of activity of a volcano when a change in its activity is, or is expected to be, of operational significance. They are originated by the ACC and issued through the respective international NOTAM office based on the information received from any one of the observing sources and/or advisory information provided by the associated Volcanic Ash Advisory Centre (VAAC). In addition to providing the status of activity of a volcano, the NOTAM/ASHTAM also provides information on the location, extent and movement of the ash contamination and the air routes and flight levels affected. NOTAM can also be used to limit access to the airspace affected by the volcanic ash. Complete guidance on the issuance of NOTAM and ASHTAM is provided in Annex 15 — *Aeronautical Information Services*. Included in Annex 15 is a volcano level of activity colour code chart. The colour code chart alert may be used to provide information on the status of the volcano, with “red” being the most severe, i.e. volcanic eruption in progress with an ash column/cloud reported above flight level 250, and “green” at the other extreme being volcanic activity considered to have ceased and volcano reverted to its normal pre-eruption state. It is very important that NOTAM for volcanic ash be cancelled and ASHTAM be updated as soon as the volcano has reverted to its normal pre-eruption status, no further eruptions are expected by volcanologists and no volcanic ash is detectable or reported within the FIR concerned.

7. It is essential that the procedures to be followed by ATS personnel during a volcanic eruption, as well as supporting services such as MET, AIS and ATFM, should be translated into local staff instructions (adjusted as necessary to take account of local circumstances). It is also essential that such local staff instructions form part of the basic training for all ATS, AIS, ATFM and MET personnel whose jobs would require them to take action in accordance with the procedures. Background information to assist the ACC or flight information centre (FIC) in maintaining an awareness of the status of activity of volcanoes in their FIR(s) is provided in the monthly Scientific Event Alert Network Bulletin published by the United States Smithsonian Institution and sent free of charge to ACCs/FICs requesting it.

APPENDIX B

ANTICIPATED FLIGHT CREW ISSUES WHEN ENCOUNTERING VOLCANIC ASH

1. ATS personnel should be aware that flight crews will be immediately dealing with some or all of the following issues when they encounter volcanic ash:
 - a) smoke or dust appearing in the cockpit which may prompt the flight crew to don oxygen masks (could interfere with the clarity of voice communications);
 - b) acrid odour similar to electrical smoke;
 - c) multiple engine malfunctions, such as stalls, increasing exhaust gas temperature (EGT), torching, flameout, and thrust loss causing an immediate departure from assigned altitude;
 - d) on engine restart attempts, engines may accelerate to idle very slowly, especially at high altitudes (could result in inability to maintain altitude or Mach number);
 - e) at night, St. Elmo's fire/static discharges may be observed around the windshield, accompanied by a bright orange glow in the engine inlet(s);
 - f) possible loss of visibility due to cockpit windows becoming cracked or discoloured, due to the sandblast effect of the ash;
 - g) because of the abrasive effects of volcanic ash on windshields and landing lights, visibility for approach and landing may be markedly reduced. Forward visibility may be limited to that which is available through the side windows; and/or
 - h) sharp distinct shadows cast by landing lights as compared to the diffused shadows observed in clouds (this affects visual perception of objects outside the aircraft).
2. Simultaneously, ATS personnel can expect flight crews to be executing contingency procedures such as the following:
 - a) if possible, the flight crew may immediately reduce thrust to idle;
 - b) exit volcanic ash cloud as quickly as possible. The shortest distance/time out of the ash may require an immediate, descending 180-degree turn (terrain permitting);
 - c) don flight crew oxygen masks at 100 per cent (if required);

- d) monitor airspeed and pitch attitude. If unreliable airspeed is suspected, or a complete loss of airspeed indication occurs (volcanic ash may block the pitot system), the flight crew will establish the appropriate pitch attitude;
- e) land at the nearest suitable aerodrome; and
- f) upon landing, thrust reversers may be used as lightly as feasible.

APPENDIX C

COMMUNICATION AND DISSEMINATION OF PILOT REPORTS OF VOLCANIC ACTIVITY

1. INTRODUCTION

1.1 ICAO Annex 3 — *Meteorological Service for International Air Navigation* (paragraph 5.5, g) and h)) prescribes that volcanic ash clouds, volcanic eruptions and pre-eruption volcanic activity, when observed, shall be reported by all aircraft. The ICAO *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) contain detailed provisions on this special air report requirement in paragraphs 4.12.3 and 4.12.5, and the Volcanic Activity Report form in Appendix 1.

1.2 Experience has shown that reporting and sharing of information on volcanic ash encounters in accordance with the above mentioned provisions (in-flight and post-flight) varies across the world. The efficiency and quality of reporting currently depends heavily on regional characteristics and the level of regional integration. A high level of global harmonization is essential to achieve the desired level of implementation and consistency of the information.

2. PURPOSES OF VOLCANIC ASH REPORTING AND DATA COLLECTION

2.1 The main purposes for volcanic ash reporting and data collection are to:

- a) locate the volcanic hazards;
- b) notify immediately other aircraft (in-flight) about the hazard;
- c) notify other interested parties: ANSPs (ATC, AIS, ATFM), VAACs, MWO, etc to ensure the consistent production of appropriate information and warning products in accordance with existing provisions;
- d) analyse collected reports from the post-flight phase in order to:
 - 1) identify areas of concern;
 - 2) validate and improve volcanic ash forecasts;
 - 3) improve existing procedures;
 - 4) assist in defining better airworthiness requirements; and
 - 5) share lessons learned, etc.

3. PHASE OF OPERATIONS

3.1 The roles and responsibilities of the participants in the collection, exchange and dissemination of the volcanic information are distinctly different in two distinct phases:

- a) in-flight; and
- b) post-flight.

3.2 The following section analyses these separately.

4. PARTICIPANTS IN THE REPORTING PROCESS, THEIR ROLES AND RESPONSIBILITIES

4.1 Identification of the participants as well as their roles and responsibilities in general, but specifically during the two different phases of operations, is an important element in improving collection, exchange and dissemination of volcanic information. The number of participants and their roles and responsibilities depends on the phase of operations (in-flight, post-flight), their position in the information chain within one of these two phases and national/regional arrangements. One of the main issues regarding participants' roles and responsibilities is that each of them is, at one time or another, both a data/information provider and user of the information.

4.2 *In-Flight Phase*

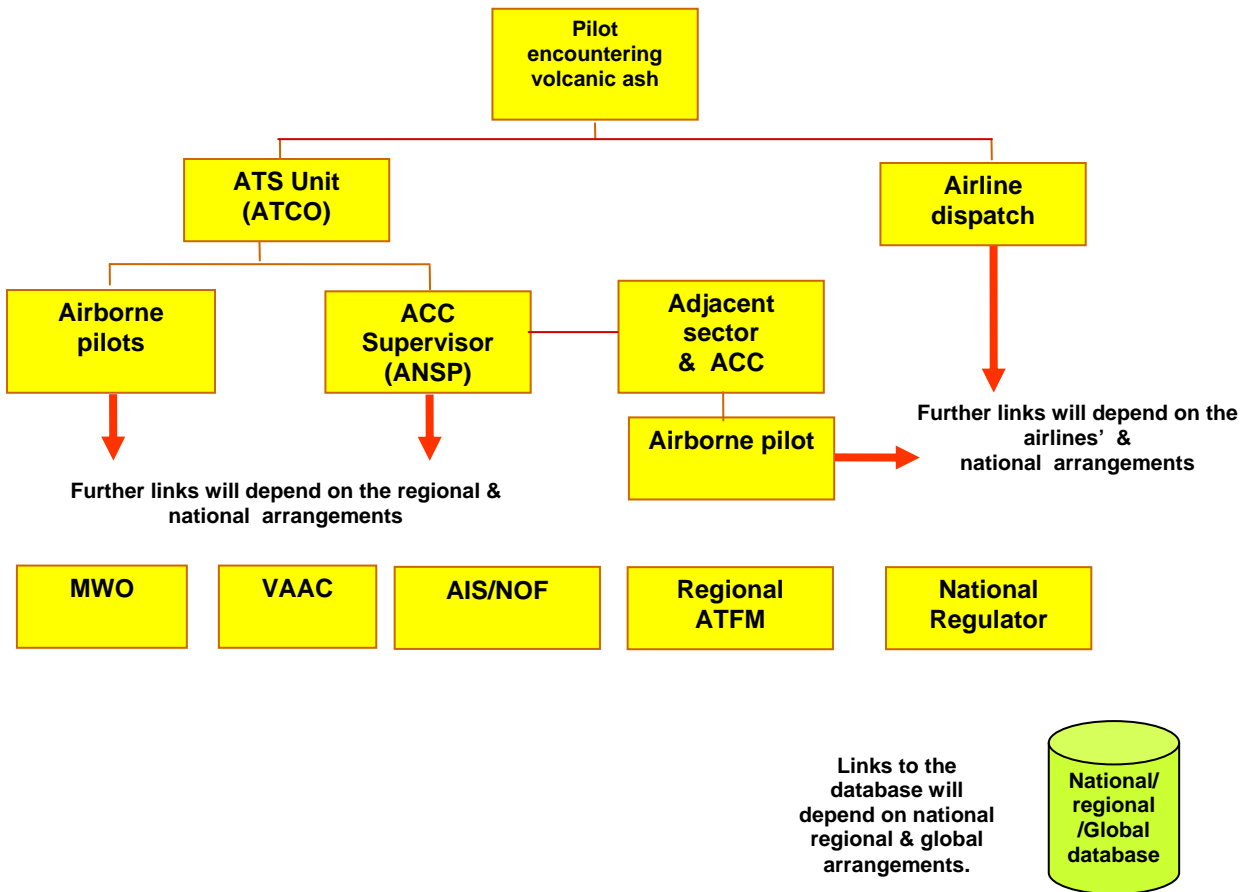
4.2.1 Participants, Roles & Responsibilities

	Participants	Roles & Responsibilities
	Pilots, civil and/or military, observing and/or encountering volcanic activity	To provide as much detailed information as possible about the type, position, colour, smell, dimensions of the volcanic contamination, level and time of the observation and forward VAR Part I immediately to the ATS unit with which the pilot is in radiotelephony (R/T) communication. Record the information required for VAR Part II on the appropriate form as soon as possible after the observation or encounter, and file the report via data link, if available.
	ATS unit receiving the information from the pilot encountering volcanic event	To ensure that information received by an air traffic controller from the pilot has been copied, clarified (if necessary) and disseminated to other pilots as well as to the ACC Supervisor. In addition, air traffic controllers could ask other pilots flying within the same area if they have observed any volcanic activity.
	ATS unit/ACC Supervisor (if applicable) or other responsible person within the Air Navigation Service Provider	To use all means of communication and available forms to ensure that the information received from the air traffic controller has been: <ul style="list-style-type: none"> passed on to the associated Meteorological organizations in accordance with national/regional arrangements; fully and immediately disseminated across the organization, in particular to adjacent sectors and the associated NOTAM Office (NOF); passed on to the neighbouring sectors and ACCs (if necessary); passed on to the regional ATFM

		centre if existing (e.g. CFMU in Europe); passed on to the national/regional authority responsible for the handling of contingency situations.
	Neighbouring ANSPs (ACCs etc.)	To ensure that information is provided to flight crews flying towards the area affected by the volcanic contamination; disseminated across the organization and the system prepared to cope with the possible changes of the traffic flows; and that the information is provided to the national authority responsible for the handling of contingency situations and passed on to the NOF and MWO as required.
	MET Watch Office	To use the information originated by flight crews and forwarded by the ATS unit which received the information in accordance with Annex 3.
	VAAC	To use the information originated by flight crews, MWOs and other competent sources in accordance with Annex 3
	AIS / NOF	To publish appropriate AIS messages in accordance with Annex 15
	ATFM unit or centre (if existing)	To ensure that information received is stored and made available for information to all partners in its area of responsibility (ANSPs, airlines, VAAC, MET etc.). As part of the daily activity, coordinate ATFM measures with ACCs concerned.

4.2.2 *In-flight reporting – Sample Flow Chart of the volcanic ash information*

4.2.2.1 The chart below is a graphical representation of a possible path of the in-flight volcanic ash information and may differ between regions depending on regional arrangements. It also gives the position of the volcanic ash participants in the reporting chain. The flow chart is not exhaustive and the path of the information can be extended and new participants could be added depending of the national and regional requirements.



4.3 Post-Flight Operations Roles & Responsibilities and order of reporting

	Participants	Roles & Responsibilities
1.	Civil and/or military pilots/airlines having observed or encountered an eruption or volcanic contamination	To file the volcanic ash report with as much detailed information as possible about the volcanic activity and/or encounter (position, colour, smell, dimensions, FL, time of observation, impact on the flight, etc.). Ensure that the VAR is filed and transmitted to the relevant recipients as soon as possible after landing (if not filed via datalink already during the flight). Make an entry into the Aircraft Maintenance Log (AML) in case of an actual or suspected encounter with volcanic contamination.
2.	ANSP	To provide a summary report of effects of the volcanic activity that affected its operations at least once per day to the national authority with as much detailed information as possible about the number of encounters, impact on air traffic management, etc.).

3.	AOC Maintenance - Post flight Inspection	To report about the observation of the aircraft surfaces, engine, etc, and to provide the information to the national (or regional or global, where applicable) central data repository.
4.	Investigation authority	All aeronautical service providers (including operators, ANSPs, airports, etc) shall investigate the effects of a volcanic activity, analyze the information and search for conclusions; and report the investigation results and relevant information to the national supervisory authority and any central data repository.
5.	National Authority	To handle the national central data repository and report to the regional/global central data repository if any. To analyze reports from its aeronautical service providers and take action as appropriate.
6.	Regional Central Data Repository	To collect the national data and make them available to interested stakeholders under agreed conditions.
7.	MWO	To use the national and regional information coming from national and regional central data repositories.
8.	VAAC	To use the information originated by flight crews, and other competent sources to: a) validate its products accordingly and; b) improve the forecast.
9.	Global Data Repository (and research institutes - where appropriate)	To analyse the information stored in the regional central data repository and provide the research outcomes for lessons learnt process.
10.	Knowledge management (e.g. SKYbrary)	To use the post-flight lessons learnt and disseminate them to interested stakeholders.
11.	ICAO	To review/revise ATM volcanic ash contingency plans.

4.4 *Tools for presenting and sharing the volcanic ash information*

4.4.1 To report, transmit and disseminate the volcanic ash encounter information, different types of tools can be used. The list below is provided to give ideas as to what tools can be used. It could also be split into regulatory and general information tools. At any case, it is not an exhaustive list and can be updated with new elements depending on regional experiences.

- a) Radiotelephony and Data link Communications
- b) VAR
- c) NOTAM/ASHTAM
- d) SIGMET
- e) VAA/VAG

- f) Central data repository e.g. CFMU Network Operations Portal (NOP)
- g) Centralized web based sites with the regularly updated information and maps
– e.g. EVITA - <http://www.eurocontrol.int/services/evita-european-crisis-visualisation-interactive-tool-atfcm>
- h) Teleconferences
- i) Periodic Bulletins with the set of information defined by the data providers and data users; e.g. Smithsonian Institution Weekly Bulletin.
- j) Centralized internet-based sites for the sharing of lessons learnt (Knowledge management – e.g. SKYbrary http://www.skybrary.aero/index.php/Main_Page)

MET SG/4
Report on Agenda Item 4

REPORT ON AGENDA ITEM 4: STATUS OF IMPLEMENTATION OF THE METEOROLOGICAL SERVICES IN THE MID REGION

4.1: REVIEW IMPLEMENTATION OF THE WAFS AND SADIS

4.1.1 The meeting recalled MIDANPIRG Conclusion 12/68 that called for training of new World Area Forecast System (WAFS) forecasts in 2011 or 2012 for the MID Region on the use of the new gridded WAFS forecasts for convective clouds, icing and turbulence. The World Area Forecast Centre (WAFS) Provider States proceeded with the development of computer-based (including voice over) initial training material for WAFS gridded global forecasts for CB clouds, icing and turbulence and, in coordination with the Secretary, would be available on the World Area Forecast System Operations Group (WAFSOPSG) website in the near term in order to support implementation under Amendment 76 to Annex 3 (WAFSOPSG/7 Conclusion 7/13 refers). The meeting was unsure how States would be notified, but this would be investigated by WAFS London in coordination with the WAFSOPSG Secretariat. The SADIS Provider will issue a SADIS administrative message (NOUK11 EGRR). In addition, the meeting noted that the training material was expected to be made available in five languages (WAFSOPSG 7/13 (b) refers).

4.1.2 The meeting also noted that WAFS Provider States updated guidance material on the harmonized WAFS grids for cumulonimbus clouds, icing and turbulence forecasts that was available on the WAFSOPSG website since 14 September 2012.

4.1.3 The meeting reviewed a summary of WAFS developments that included outcomes of the seventeenth meeting of the SADIS Operations Group (SADISOPSG/17, Cairo from 29 to 31 May 2012) and the eighteenth meeting of the SADIS Operations Group (SADISOPSG/18, Dakar from 28 to 30 May 2013) as well as the seventh meeting of the World Area Forecast System Operations Group (WAFSOPSG/7, Lima from 17 to 21 September 2012). The full reports of each meeting can be viewed at the following websites: <http://www2.icao.int/en/anb/met/sadisopsg/Lists/Meetings1/AllItems.aspx> and <http://www2.icao.int/en/anb/met/wafsopsg/Lists/Meetings/AllItems.aspx>.

4.1.4 With reference to transmission and delivery requirements in Annex 3 and 10 related to WAFS, the meeting noted such information was provided in the SADIS Management Report.

4.1.5 The meeting noted that with reference to providing WAFS forecasts for flight briefings, the authorized source is SADIS in the MID Region as per the MID Regional Air Navigation Plan.

MET SG/4
Report on Agenda Item 4

REPORT ON AGENDA ITEM 4: STATUS OF IMPLEMENTATION OF THE METEOROLOGICAL SERVICES IN THE MID REGION

4.2: REVIEW IMPLEMENTATION OF THE METEOROLOGICAL ADVISORIES AND WARNINGS

4.2.1 The meeting recalled MIDANPIRG/13 Conclusion 13/52 that invited States' MID SIGMET Test focal points to participate in the bi-annual SIGMET tests conducted by the EUR Region and report any deficiencies at each MET SG meeting. ROC Vienna provided the meeting with a list of participants from the EUR SIGMET test in September 2012, the Asia/Pacific SIGMET test on tropical cyclone in November 2012 and the EUR SIGMET test in February 2013. The EUR DMG did not register WC SIGMET tests from the MID Region. However, they reported that 8 States (Bahrain, Egypt, Iraq, Iran, Jordan, Kuwait, Saudi Arabia, and Oman) participated in the WS SIGMET test in February 2013, which is a significant improvement in participation. The EUR DMG will update their databases to accept the SIGMET from the MID Region. The meeting noted that only one State (Egypt) participated in the volcanic ash SIGMET test in February 2013. States are commended for participation in the WS SIGMET test and encouraged to participate in the WV and WC SIGMET tests each year as these test may be used as a measurement of implementation in the future regional air navigation plan.

4.2.2 The meeting noted that WS SIGMET test occurs on the first Wednesday of February and September and WV SIGMET test occurs on the first Thursday of February and September and that WC SIGMET test occurs in November of each year and the date was determined in the APAC Region which would be conveyed to MID States at least two months in advance.

4.2.3 The meeting recalled MIDANPIRG/13 Conclusion 13/53 that invited States with meteorological watch office responsibilities, and that have not already done so, to provide by 1 July 2012, the World Meteorological Organization Abbreviated Header Lines used for the issuance of SIGMET for flight information regions (FIRs) under their area of responsibility for inclusion in the MID Regional SIGMET Guide. The meeting noted that entries for Iraq, Lebanon, and Syria still needed to be verified (Bahrain verified their addresses in the meeting). Furthermore, the meeting agreed that more SIGMET examples for phenomenon such as heavy dust storm (HVY DS) and heavy sand storm (HVY SS) should be included in the MID Regional SIGMET Guide and that proposals be available by States by the BMG/4 meeting. The meeting also noted that SIGMET applied to all flight levels (the surface being the lowest boundary). Lastly, the meeting noted that the DRAFT watermark should be removed from the MID Regional SIGMET Guide posted on the ICAO MID website.

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Report on Agenda Item 4

REPORT ON AGENDA ITEM 4: STATUS OF IMPLEMENTATION OF THE METEOROLOGICAL SERVICES IN THE MID REGION

4.3: REVIEW OF REQUIREMENTS FOR OPMET DATA AND STATUS OF OPMET DATA EXCHANGE

4.3.1 The meeting recalled MIDANPIRG/13 Conclusion 13/55 to correct the addressing to Regional OPMET Centre (ROC) Vienna, eliminate multiple bulletins received at ROC Vienna and non-receipt of OPMET (SA, FC, FT) requests during monitoring. The meeting noted that the ICAO MID Regional Office issued State letter reference AN 10/11 – 10/183 dated 18 June 2012 that requested States to remedy these shortcomings. As noted in part b) of this Conclusion, States that were non-compliant with TAF requirements would be included in the ICAO MID Deficiency list. However, as the OPMET list of shortcomings has shortened significantly as noted by the third meeting of the Bulletin Management Group (23 June 2013, Cairo), the meeting agreed that the shortcomings in OPMET availability, format and exchange summarized in **Appendix 4.3A** to the Report on Agenda Item 4 be provided to the relevant States for action before the MIDANPIRG/14 meeting and persistent shortcomings identified in future monitoring be considered for inclusion in the MID Air Navigation Deficiencies Database (MANDD).

DRAFT CONCLUSION 4/1: OPMET SHORTCOMINGS IN THE MID REGION

That,

- a) States be urged to remedy the OPMET shortcomings as described in **Appendix 4.3A** to the Report on Agenda Item 4 and;*
- b) persistent shortcomings be considered by MIDANPIRG/14 for possible inclusion in the list of air navigation deficiencies.*

4.3.2 The meeting recalled MIDANPIRG/13 Conclusion 13/54 that called for the MID BMG to 1) determine requirements associated with the establishment of Regional OPMET Centres (ROC) in the MID Region and 2) to carry out a survey based on requirements developed in 1) to determine States' capabilities for establishing ROCs. To that end, there were three replies to the survey (SL AN 10/11 – 12/205 dated 3 July 2012): Iran, Saudi Arabia, and the United Arab Emirates. The survey results as provided at **Appendix 4.3B** to the Report on Agenda Item 4 were reviewed by the meeting, which concluded that Saudi Arabia was capable of meeting ROC requirements as detailed at **Appendix 4.3C** to the Report on Agenda Item 4. The meeting made this recommendation based on current capabilities, communications and regular attendance to ICAO MET meetings. The meeting also noted that another State could be selected for a backup ROC and would be considered at the BMG/4 meeting that will be held on 16 December 2013 in Jeddah. The meeting emphasized the importance for all States in the MID Region to cooperate with the selected ROC (pending endorsement of MIDANPIRG/14). Given the above, the meeting agreed to the following draft Conclusion:

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Report on Agenda Item 4

***DRAFT CONCLUSION 4/2: ESTABLISHMENT OF MID REGIONAL
OPMET CENTRE***

That,

- a) Saudi Arabia in coordination with ICAO establish a MID Regional OPMET Centre (ROC) by the first half of 2015 to improve the regional and inter-regional OPMET efficiency;*
- b) MID States interested in serving as a backup ROC in the MID Region provide their capabilities to the BMG/4 meeting for consideration; and*
- c) MID States be encouraged to continue cooperation in the exchange of OPMET data in the MID Region.*

4.3.3 Cost recovery questions related to services provided by a ROC would be addressed. ICAO would ask ROCs in other Regions how they support their services through cost recovery.

4.3.4 The meeting reviewed the terms of reference of the MID OPMET Bulletin Management Group (BMG) and agreed to add efforts associated with developing the capability of exchanging OPMET in digital form as well as creating and keeping under review an OPMET key performance indicator as provided in **Appendix 4.3D** to the Report on Agenda Item 4.3. Given the above, the meeting agreed to the following draft Decision:

***DRAFT DECISION 4/3: UPDATE TO BULLETIN MANAGEMENT
GROUP TERMS OF REFERENCE***

*That, the terms of reference and future work programme of the Bulletin Management Group of the MET Sub-Group updated as at **Appendix 4.3D** to the Report on Agenda Item 4.*

MET SG/4
 Appendix 4.3A to the Report on Agenda Item 4.3

Table – OPMET issues by State – and corrective action in blue via State Letter

Issue\State	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi	Syria	UAE	Yemen
Incorrect addressing MID-EUR Use : LOZZMMID				SL – FTIQ01ORBI FTIQ01 ORSU SAIQ01 ORBI SPIQ01 ORBI be sent to LOZZMMID (not LOWWYMYX)						SL – FTAR20 OEJD and SASD31 OEJD be sent to LOZZMMID (not LOWWYBYX)	SL – FTSY31 OSDI SASY31 OSDI be sent to LOZZMMID (not LOWMYBYX) SISY20 OSDI SMSY01 OSDI Discontinue AFTN transmission to LOWMYBYX	SL – WSAE10 OMAA be sent to LOZZMMID (not LOWWYMYX) USER10 OMAA UKER10 OMAA ULER10 OMAA UEER10 OMAA Discontinue AFTN transmission to LOWWYMYX	
OPMET sent to Denmark should cease											SL – discontinue sending OPMET data to Denmark (EKCHYMYX or EKZZMOMO)		
Double bulletins	SL- send OBBIYPYX only				SL- SMJD01 discontinue AFTN transmission		SL- OLLL (Beirut – Main Communication Centre) discontinue all duplications in App B			SL- OEJD discontinue sending FTSY31 FTYE21 SAME31			

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APPENDIX 4.3A

4.3A-2

Issue\State	Bahrain	Egypt	Iran	Iraq	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi	Syria	UAE	Yemen
Double reports	e.g. METAR for one location in more than one bulletin or TAF for one location in more than one bulletin – should be addressed by ROC when selected (can work with ICAO and ROC Vienna)												
Incorrect bulletin format	SL – WMO AHL for TAF RTD - time to be corrected												
Requirements – FASID Table MET 2A		Egypt to inform ICAO to discontinue OPMET requirements for HEOW (HEAZ is already proposed to be removed from FASID Table MET 1A)		SL – ORSU OPMET data required						Saudi Arabia to inform ICAO to discontinue OPMET requirements for OEJB	SL – OSAP OPMET data required		

MET SG/4
 Appendix 4.3B to the Report on Agenda Item 4.3

MID ROC Survey Summary

Received from Iran, Saudi Arabia, United Arab Emirates

Question	Answer		
	Iran	Saudi Arabia	United Arab Emirates
Can a facility in your State be capable of collecting, validating and disseminating OPMET data from NOCs in the Area of Responsibility (AoR) as well as from the national NOC?	Yes, I.R. of Iran Meteorology Organization (IRIMO) has the Capacity to do so	Yes	The answer is currently No
Can a facility in your State be capable of collecting OPMET data from other ROCs in the Region?	Yes	Yes	Currently no, could be done as long as the data is being distributed via AFTN or GTS this would be easily achievable, but if there was to be some other data source the complexity and costs would be currently unknown.
Can a facility in your State be capable of disseminating bulletins received from: 1) ICAO Regions; 2) Other ROCs; and 3) NOCs in their AoR in -other ROCs according to predefined distribution lists; -MID Regional OPMET Data Banks (RODBs); and -other NOCs in their AoR?	Yes	Yes to all	Currently no, could be done as long as the data is being distributed via AFTN or GTS this would be easily achievable, but if there was to be some other data source the complexity and costs would be currently unknown.

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APPENDIX 4.3B

4.3B-2

Can a facility in your State be capable of minimizing the duplication of OPMET data from within their AoR?	Yes	Yes	Quality control would be as per specifications in the document and included in IBL Comms. A manual backup would be put in place with the technicians.
Does your State use AFTN in the exchange of OPMET data?	Yes	Yes	Yes (reference first response attachment 1)
Would your State be capable of hosting a facility that has AFS relay capable of handling efficiently the volume of traffic anticipated (<i>Note that the EUR Data Management Group attempted to provide more details with reference to manpower and equipment, however, this group determined that it depended on how a State managed their communications and human resources and therefore could not prescribe a general requirement of manpower and equipment necessary to host a ROC</i>)?	The subject will be considered with more detail with regard to its technical specifications, but for the time being I would like to add that it will be available in the future.	Yes	Most of the workload would be on the software – but a human backup technician would be required to fully man the operation 24/7.
Is a facility in your State capable of handling all OPMET data types as described in the Appendix A ?	Yes	Yes	Currently no, could be done with the addition of an enhanced IBI. Comms.
Would a facility in your State be capable of developing and maintaining detailed OPMET distribution arrangements based on FASID Table MET 2A (SADIS User Guide Annex 1) and notified addressing by other regions?	Yes	Yes	Currently no, with the addition of an enhanced IBI. Comms the answer could be yes. Also a manager would be required to manage the agreements put in place.

4.3B-3

Does your State have a facility that would be capable of splitting OPMET bulletins received by GTS that is longer than 1800 characters for further distribution via AFTN links <i>(Note that the CCCC of the header is changed into the indicator of the recompiling ROC)?</i>	Yes	Yes	Currently no, could be yes with the addition of an enhanced IBL Comms only.
Does your State have a facility to distribute SIGMET messages, tropical cyclone and volcanic ash advisories to other ICAO Regions, VAACs and TCACs as appropriate, and SADIS and ISCS Gateways <i>(Note that by providing the data to IROG Vienna the further distribution to ROC/SADIS Gateway London is guaranteed. In this case, no extra routing is necessary as this would only lead to double transmission)?</i>	Yes	Yes	Currently no, could be yes with the addition of an enhanced IBL Comms.
Does your State accept the responsibility of exchanging OPMET data intra- and inter-regionally at no cost?	Yes	No (comment CFK: need to explain that the work necessary to provide services of a ROC is cost recoverable)	Yes
Would a facility in your State be capable of:			
-collecting the required OPMET data from another ICAO region or Regions?	Yes, IRIMO	Yes	Currently no, could be yes with new IBL Comms, probable AFTN and support staff

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APPENDIX 4.3B

4.3B-4

-disseminating the collected data to other ROCs and NOCs in the AoR with transit times that satisfy Annex 3, Appendix 10, 1.1?	Yes	Yes	Currently no, could be yes with new IBL Comms, probable AFTN and support staff
-sending required OPMET data from the ICAO MID-Region to other ICAO Region(s)?	Yes	Yes	Currently no, could be yes with new IBL Comms, probable AFTN and support staff
Would your State have a facility capable of collecting OPMET data from the ROCs as required in the respective FASID tables and store in a database for use internally within the Region?	Yes	Yes	Currently no, could be yes with new IBL Comms, probable AFTN and support staff
And maximize amount of available OPMET data?	Please elaborate more on the maximization of OPMET data.	Yes	Currently no, could be yes with new IBL Comms, probable AFTN and support staff
And provide request/response facilities for authorized users to obtain non-regular or occasional information?	Yes	Yes	Currently no, could be yes with new IBL Comms, probable AFTN and support staff
And provide regular monitoring to check the availability and timeliness of OPMET data and the possible misuse or abuse of the OPMET databanks (for reporting to the ICAO Office the results, where necessary)?	Yes	Yes	Currently no, could be yes with new IBL Comms, probable AFTN and support staff
And make tropical cyclone and volcanic ash advisory messages available on request?	Not answered	Yes	Currently no, could be yes with IBL Comms, probable AFTN and support staff
Not required, but desirable: would your State incur travel costs of an expert from another ROC in another	I have no clear response on this issue, but it will be considered by top management of IRIMO and Civil	No	Not answered

4.3B-5

<p>Region in the development of a ROC (estimate of 2 trips from Vienna on week at a time)?</p>	<p>Aviation Organization and for the time being, most probably the cost can be shared.</p>		
<p>Other comments</p>	<p>In email...dated 18 Aug 2012 IR of IRIMO is in the process of being accepted as a Global Information System Center – GISC in the WMO Information System – WIS in the region and it is a programme of IRIMO with priority to develop its capacities in order to be endorsed as a GISC in the next auditing by WMO</p> <p>GISC’s primary role is to collect and disseminate data and information used in the use of the provision of weather, climate and water services and research regionally and globally as quickly and efficiently as possible. GISC centers collect data and information from WIS contributing centres in their area of responsibility and pass information to centres in their area and to send information meant for global distribution to other GISCs. GISCs also ensure information from other regions is distributed or at least, available to, centres within the GISCs area of responsibility.</p>		<p>With reference to a facility in State capable of providing quality control of bulletins in the AoR 24 hours / 7 days a week – (maybe from a legacy question in the BMG/2 meeting) – UAE response: Currently no, could be done with the purchase of an enhanced IBL Comms, addition of 5 technicians and probable new AFTN servers then this could be accomplished.</p> <p>In email dated 26 aug 2012: We apologize for not being able to host the OPMET ROC.</p>

	Considering similarity of responsibilities and works for the anticipated OPMET Office and a GISC, and IRIMO's steps in this regard, IRIMO will have the required capacities in implementing and developing of an OPMET Centre in the region.		
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ROC Requirements (30 May 2013)

*ROC; **IROG; ***RODB

(note that acronym list is provided on third page)

*Collect, validate and disseminate OPMET data from NOCs in the Area of Responsibility (AoR) as well as from the national NOC. The national NOC and the ROC will usually be the same centre.

*Collect OPMET data from other ROCs in the region.

*Disseminate bulletins received from NOCs in the AoR to

- other ROCs according to predefined distribution lists;
- MID RODBs; and
- other NOCs in their AoR as agreed between the ROC and NOC and the States' authorities concerned

*Disseminate bulletins received from the other ROCs to

- NOCs in their AoR as agreed between the ROC and NOC and the States' authorities concerned

*Quality control of the bulletins in their AoR 24 hours / 7 days a week.

*Minimize the duplication of OPMET data from within their AoR.

*Handle efficiently the volume of traffic anticipated (*Note that the EUR Data Management Group attempted to provide more details with reference to manpower and equipment, however, this group determined that it depended on how a State managed their communications and human resources and therefore could not prescribe a general requirement of manpower and equipment necessary to host a ROC*) (AFS relay centres).

*Handle efficiently all OPMET data types as described in the **Attachment 1**.

*Develop and maintain detailed OPMET distribution arrangements based on FASID Table MET 2A (SADIS User Guide Annex 1) and the notified addressing by the other regions.

*Split OPMET bulletin received by GTS if longer than 1800 characters for further distribution via AFTN links (*Note that the CCCC of the header is changed into the indicator of the recompiling ROC*).

*Distribute SIGMET messages, tropical cyclone and volcanic ash advisories to other ICAO Regions, VAACs and TCACs as appropriate, and SADIS and ISCS Gateways. *Note that by providing the data to IROG Vienna the further distribution to ROC/SADIS Gateway London is guaranteed. In this case, no extra routing is necessary as this would only lead to double transmission.*

*Disseminate OPMET information at no cost (desired)

**Collect the required OPMET data from the ICAO Region(s) it is responsible for

**Utilize ground segment of the AFS (AFTN) for Inter-Regional OPMET exchange.

**As the IROG will usually host the ROC functionality it should disseminate the collected data to the other ROCs in the region (to be determined) and to the NOCs in the AoR with transit times that satisfy Annex 3, Appendix 10, 1.1.

**Send required OPMET data from the ICAO MID-Region to the ICAO Regions it is responsible for.

***Collect OPMET data from the ROCs as required in the respective FASID tables and store in database for use internally within the Region.

***Maximize amount of available OPMET data.

***Provide request/response facilities for authorized users to obtain non-regular or occasional information.

***Regularly monitor OPMET data in accordance to **Attachment 2** to check availability and timeliness of OPMET data and the possible misuse or abuse of the OPMET databanks; and report to the ICAO Office the results, where necessary.

***Make tropical cyclone and volcanic ash advisory messages available on request.

Any designation of ROCs/RODBs in the MID Region will also be expected to develop the ability to exchange METAR and SPECI, TAF and SIGMET (and eventually all MET data) in digital form (XML/GML) to support the ICAO Meteorological Exchange Model (IWXXM). The EUR DMG is developing a concept of operations on IWXXM with the support from WMO and Eurocontrol under the auspices of ICAO Meteorological Aeronautical Requirements and Information Exchange Project Team (MARIE-PT). This document was expected to address issues such as the source of data and storage, traceability including whether a transformation (XML to TAC or TAC to XML) took place and where it was transformed, who should make the transformations, how to treat non-standard data and conversions, compression, inter-regional exchange and many other issues identified by WMO, Eurocontrol and ICAO.

AFS – Aeronautical Fixed Service
AFTN – Aeronautical Fixed Telecommunication Network
AoR – Area of Responsibility
GTS – Global Telecommunication Network
IROG – Inter-regional OPMET Gateway
NOC – National OPMET Centre
ROC – Regional OPMET Centre
RODB – Regional OPMET Data Bank
TCAC – Tropical Cyclone Advisory Centre
VAAC – Volcanic Ash Advisory Centre

Attachment 1

Data type	Abbreviated name	WMO data type designator
Routine, also Scheduled OPMET data		
Aerodrome reports	METAR SPECI	SA SP
Aerodrome forecasts	TAF: up to 30-hours less than 12-hours	FT FC
Non-Routine, also Non-Scheduled OPMET data		
SIGMET information	SIGMET SIGMET for TC SIGMET for VA	WS WC WV
AIRMET information	AIRMET	WA
GAMET information	GAMET	FA
Volcanic ash and tropical cyclone advisories	VAA TCA	FV FK
Air-reports	AIREP	UA
Administrative	ADMIN	NO

OPMET Data Monitoring Tool Specification

22 March 2012

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1 Introduction

This specification is organised into three sections. Each section builds upon the previous section in terms of what data is to be monitored from WMO format bulletins. The sections correspond to the monitoring of only the WMO bulletin, the monitoring of the transmission network envelope and real-time monitoring.

A monitoring application shall, as a minimum, fully implement the requirements in section 1 – WMO Monitoring. Optionally, applications may fully implement the requirements in sections 2 and/or 3. For existing, unmodified, applications it will be acceptable to fully implement the requirements in section 1 and partially implement the requirements in sections 2 and/or 3.

Tables 1 and 2 show the WMO message types that shall be monitored.

Type	Bulletin
FC	9 Hour TAF Short Term Forecast report
FT	24/30 TAF Hour Long Term Forecast report
SA	METAR observation
SP	SPECI, special METAR observation

Table 1: Routine Data Types

Type	Bulletin
FA	GAMET
FK	Tropical Cyclone Advisory
FV	Volcanic Ash SIGMET
NO	System administration message
WA	AIRMET
WC	Tropical Cyclone SIGMET
WS	SIGMET
WT	Tropical Cyclone (Typhoon/Hurricane)
WV	Volcanic Ash SIGMET
UA	Special AIREP

Table 2: Non-Routine Data Types

2 WMO Monitoring

2.1 General Requirements

The application shall operate in an offline mode using ASCII text files as the data source.

The application shall be able to read AFTN, GTS and SADIS media. The definitions of these media are found in references 1, 2 and 3. Any message decomposition shall be undertaken in accordance with these documents.

All times shall be in UTC.

Bulletin boundaries shall be determined using one of the following criteria. The ability to select the criteria used at runtime may also be implemented.

For AFTN formats:

SOH -> *ETX* control characters.

For SADIS/GTS formats:

NNN -> (*NNN* -2 chars) character sequences; or

STX -> *ETX* control characters

2.2 Data Monitoring Requirements

Generally, data fields that can be retrieved but are not defined in references (0 or (0 shall be ignored (e.g. AFTN envelope fields).

Only routine and non-routine data types (specified in tables 1 and 2) shall be monitored.

For both types the WMO AHL shall be decomposed into the following fields. Each field shall be recorded in the corresponding field of the output file(s).

TT: Type of record;

AAii: Bulletin identifier;

CCCC: Compiling station;

YYGGgg: AHL date/time group;

BBB: Optional remark group.

A NIL bulletin (i.e. a bulletin that contains the single word 'NIL') shall be recorded with one entry with the word 'NIL' in the NIL output field and the characters ' ' (four blanks) recorded in the station/FIR field.

2.3 AFTN Data Requirements

The WMO AHL shall be defined as the line containing the STX control character.

The word 'AFTN' followed by 4 spaces ('AFTN ') shall be recorded in the NetworkType field.

2.4 GTS/SADIS Data Requirements

The WMO AHL shall be defined as the first non-blank line following the sequence number (NNN).

The word of 8 characters 'SADIS ' or 'GTS ' shall be recorded in the NetworkType output field.

2.5 Routine Data Requirements

Routine OPMET bulletins (TT as defined in Table 1) shall be broken down into their constituent reports and registered at the station level.

Individual reports shall be separated by '=' or '==' followed by zero (or more) spaces, one (or more) CR and LF.

Each report shall be decomposed into the following fields. Each field shall be recorded in the corresponding field of the output file(s).

ReportBBB: If present any three letter BBB type identifier, e.g. COR or AMD. (*OPTIONAL*).

CCCC: The ICAO location identifier;
The report date/time group.

For TAF reports only (TT = 'FC' or 'FT') the report validity period shall also be recorded.

A NIL report (i.e. where the word 'NIL' appears after the station identifier) shall have the word 'NIL' recorded in the NIL field in addition to the other fields.

2.6 Non-routine Data Requirements

The FIR/UIR shall be obtained from non-routine OPMET bulletins (TT as defined in Table 2) where applicable. The FIR/UIR shall be recorded in the station field of the output file. If the FIR/UIR cannot be determined ' ' (four blanks) shall be recorded.

If the word 'TEST' is found within the body of the bulletin then the word 'TST' shall be recorded in the NIL field of the output file.

2.7 Validation Requirements

Limited validation shall be performed upon the AHL:

- TT shall be two alphabetical characters;
- AAii shall be two alphabetical characters, excluding 'ZC', followed by 0, 1 or 2 digits and filled out with a blank character for every omitted digit;
- CCCC shall be four alphabetical characters excluding 'ZCZC' or 'NNNN';
- YYGGgg shall be six digits;
- BBB if present shall be three alphabetical characters. The first character shall be either 'A', 'C', 'P' or 'R'.

Individual routine reports shall be validated against the following:

- Station identifiers shall be four alphabetical characters excluding 'ZCZC' or 'NNNN';
- Report time shall be six digits optionally followed by 'Z';
- TAF Validity period shall be four, or six, or eight digits.

Bulletins that fail AHL validation shall be ignored.

Individual reports that fail validation shall be recorded with the erroneous fields filled with 'X' characters.

2.8 Output Format

The output from the application shall be a single ASCII file with an extension appropriate to the field delimitation.

Each field shall be delimited with one of the following characters.

- ',': comma for use with a '.csv' extension; or
- ';': semicolon for use with a '.txt' extension.

The first line of the output file shall contain the field identifiers correctly delimited.

The output file shall contain one line per routine report, or one line per non-routine bulletin.

Every field shall have a fixed length and be named as indicated below.

Reports for which information fields cannot be determined, or not gathered, shall not be recorded. The missing field shall be padded with the correct number of spaces to preserve the correct field lengths. In the case of the ReportTime and ValidityPeriod fields it shall be assumed that four-digit groups are missing date information and shall be prefixed with two space characters.

The output file shall contain the following fields in the following order (but recorded left to right). The <reserved> fields are placeholders for information that is gathered by applications implementing the additional data gathering requirements of section 2. They shall be included, but left blank, to ensure a common output file format for all applications.

The NIL field shall contain either three space characters, 'NIL', or 'TST' as appropriate.

Field	Name	Length	Comment
TT	TT	2	
AAii	AAii	4	
CCCC	CCCC	4	
YYGGgg	YYGGgg	6	
BBB	BBB	3	
Report "BBB"	ReportBBB	3	OPTIONAL. Pad with 3 spaces if not implemented
Report Station /FIR	Locind	4	Pad with spaces for bulletins that do not contain this information
Report Time	ReportTime	6	Only for routine types
TAF Validity Period	ValidityPeriod	8	Only required for FT and FC bulletins
NIL or TEST	NIL	3	Either ' ', 'NIL' or 'TST'
Transmission Network	NetworkType	8	Either 'AFTN', 'SADIS' or 'GTS'
<reserved>		6	
<reserved>		3	
<reserved>		4	
<reserved>		2	
<reserved>		6	
<reserved>		8	
<reserved>		6	

Table 3: WMO Output Fields

3 Transmission network monitoring

3.1 General Requirements

All requirements for this level are in addition to those specified for WMO Monitoring unless stated otherwise.

3.2 Data Monitoring Requirements

If available the received time of the bulletin may be recorded.

3.2.1 AFTN Data Requirements

The following fields shall be obtained and recorded from the AFTN envelope:

- Channel ID;
- Sequence number;
- Priority;
- Destination addresses;
- Filing time.

In addition to the above, the originator address shall be obtained and recorded in the Network Type field in place of the word 'AFTN'.

The sequence number shall be padded with leading zeros to create a five digit number.

3.2.2 GTS/SADIS Data Requirements

The GTS/SADIS sequence number shall be retrieved and recorded. The number shall be padded with leading zeros to expand to 5 digits.

The Network Type field shall be completed as described in requirement 2.4.

3.2.3 Validation Requirements

AHL and report validation shall be as for WMO Monitoring.

Fields obtained from the AFTN envelope shall be validated against the following:

- Channel ID shall be three characters;
- Priority shall be two characters;
- Each Destination Addresses shall be eight characters. There shall be a maximum of twenty one addresses.
- Filing time shall be six digits.

The sequence number for both AFTN and SADIS/GTS shall be either three, four or five digits.

3.3 Output Format

Every field shall have a fixed length and be named as indicated below. The Destination Address field is the last field does not have a fixed length.

Fields where the information cannot be determined, or not gathered, shall be left blank and delimited as per the file type.

The output file shall contain the following fields in the following order (but recorded left to right).

Data where the length is less than the field length shall be padded with ' ' (blank spaces) to the correct length. The Destination Address field may optionally be padded to the maximum length (188 characters).

If implemented, the RxTime field shall be six characters in length. The field shall be in the format HHMMSS

Field	Name	Length	Comment
TT	TT	2	
AAii	AAii	4	
CCCC	CCCC	4	
YYGGgg	YYGGgg	6	
BBB	BBB	3	
Report "BBB"	ReportBBB	3	OPTIONAL. Pad with 3 spaces if not implemented
Report Station /FIR	Locind	4	Pad with spaces for bulletins that do not contain this information
Report Time	ReportTime	6	Only for routine types
TAF Validity Period	ValidityPeriod	8	Only required for FT and FC bulletins
NIL or TEST	NIL	3	Either ' ', 'NIL' or 'TST'
Transmission Network	NetworkType	8	Either AFTN origin address, 'SADIS' or 'GTS'
Channel ID	ChannelId	3	AFTN only
Sequence Number	SeqNo	5	Pad with leading zeros to 5 digits
Priority	Priority	2	AFTN only
Filing Time	FileTime	6	AFTN only
<i>Received Time</i>	<i>RxTime</i>	<i>6</i>	<i>Only if logging software produces time as messages are logged. Use HHMMSS format</i>

Destination Addresses	DestAddr	(188)	AFTN only. No fixed length
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Table 4: WMO and Channel Output Fields

4 Real Time Monitoring

4.1 General Requirements

All requirements for this level are in addition to those specified for WMO monitoring (and Transmission monitoring if implemented) unless stated otherwise.

The application shall monitor and analyse OPMET data in real-time. Offline analysis facilities may be provided. This requirement is in place of requirement 0.

4.2 Data Monitoring Requirements

4.2.1 AFTN Data Requirements

There are no additional requirements to gather extra AFTN information.

4.2.2 GTS/SADIS Data Requirements

There are no additional requirements to gather extra GTS/SADIS information.

4.2.3 Routine Data Requirements

The following statistical information shall be gathered and recorded for each bulletin in a separate statistical result file:

- Bulletin length: The bulletin length, in bytes, including the start and end of message characters.
- Format error counts: The number of fatal errors (defined below) and the number of non-fatal errors (defined below).
- Bulletin type counters: The total number of received bulletins by type (TT).
- Timeliness: For a specific set of stations the timeliness of each received observation can be calculated and recorded. The definitions of timeliness can be found in ref 0.

4.2.4 Non-routine Data Requirements

The following statistical information may be gathered and recorded for each bulletin in a separate statistical result file:

- Bulletin length.
- Bulletin type counters.

4.3 Validation Requirements

The AHL shall be validated in the same manner as for levels one and two.

Fatal errors shall be defined as validation errors or missing data within the following fields in the AHL:

- AAii.
- CCCC.
- YYGgg

Non-fatal errors shall be defined as validation errors, or missing data within the BBB field of the AHL and the following report fields:

- Station location indicator.
- Report date/time.
- TAF validity period.

4.4 Output Format

The result files shall be generated in periods of twelve or twenty four hours.

The result files shall contain only validated data. Separate files may be used to log data that fails validation.

Statistical data shall be logged in a separate results file. The file will be delimited in same manner as for the results files.

A separate results file per data type may be used. In this case the TT field may be omitted.

Fields where the information cannot be determined, or not gathered, shall be left blank and delimited as per the file type.

The results output file shall contain the same fields as for WMO and network monitoring. The statistical output file shall contain the fields from the following table.

Field	Name	Comment
TTAAii CCCC	Header	
Bulletin Length	BullLen	The length in bytes
Type Counter	TypeCnt	The cumulative bulletin count for the current bulletin type.
Format Error	FormErr	The cumulative number of format errors when this bulletin was received.
Timeliness	Timeliness	Yes or no field whether this bulletin is timely.

Table 5: Real Time Monitoring Output Fields

4.5 Real Time Display

The application shall display, in real time, at least the following:

- A count of the number of bulletins received by type since midnight;
- The last received header for each type.

5 References

International Standards, Recommended Practices and Procedures for Air Navigation Services; Annex 10, Volume II, Chapter 4.

Manual of the Global Telecommunication System; WMO – No. 386.

Manual on Codes, Volume I.1 – Part A; WMO – No. 306.

OPMET Data Monitoring (OPMET.doc); Belgocontrol.

MET SG/4
Appendix 4.3D to the Report on Agenda Item 4.3

**Terms of Reference of the MID OPMET Bulletin Management Group
(OPMET BMG)**

1. Terms of Reference

- a. 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;
- b. Develop monitoring and management procedures related to the ROBEX exchange and other exchanges of OPMET information;
- c. Keep up-to-date the regional guidance material related to OPMET exchange;
- d. Develop capabilities to support the ICAO Meteorological Exchange Model (IWXXM)
- e. Develop key performance index for OPMET and keep under review
- f. Liaise with similar groups in the adjacent ICAO Regions in order to ensure harmonized and seamless OPMET exchange; and
- g. 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. 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;
- b. Review the ROBEX scheme and other OPMET exchange schemes and prepare proposal for updating and optimizing of the schemes;
- c. Review and update the procedures for interregional exchange and for transmission of the regional OPMET data to SADIS;
- d. 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;

- e. Develop procedures for monitoring and management of the OPMET information, based on similar procedures used in the EUR and APAC Regions; and
- f. Support MARIE-PT or any subsequent governance group appointed by ICAO 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.
- g. Use results from monitoring to measure OPMET (METAR and TAF) availability in MID Region against the required data listed in FASID Table MET 1A to support key performance index for OPMET component of BO-MET of the new implementation methodology called Aviation System Block Upgrade (ASBU) and keep under review;
- h. Provide regular progress reports to MET SG meetings.

3. Composition

- a. The OPMET/BMG is composed by experts from Egypt, Kuwait and Oman (Rapporteur). Bahrain, Saudi Arabia and UAE are also expected to participate in the activity of the Group; and
- b. Experts from the EUR BMG, 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.

MET SG/4
Report on Agenda Item 5

REPORT ON AGENDA ITEM 5: REVIEW OF THE MET PROVISIONS IN THE MID BASIC ANP AND FASID

5.1 The meeting recalled MET SG/3 draft Conclusion 3/7 that proposed an amendment to Part VI (MET) of the MID Air Navigation Plan Volume I and Volume II (Doc 9708), which was acted on with amendment proposals to the MID Basic ANP and FASID in May 2011 (SL AN 10/5A-12/130 dated 15 May 2012).

5.2 The meeting also recalled MID Basic ANP 12/04 – AOP (approved 18 October 2012) which called for the removal of HEAZ (Cairo/Almaza Intl) in Egypt and the addition of HEAL (Alamain/Alamain Intl) and HESG (SOHAG/Sohag Intl) in Egypt and ORBM (Mosul/Mosul Intl) in Iraq and OTHH (Doha/Hamad Intl – future 2013) and OMAD (Abu Dhabi/Al Bateen) and OMDW (Dubai/Dubai World Central – Al Maktoum Intl). The meeting noted that FASID Table MET 1A entries were provided for OTHH (Doha/Hamad Intl) which will become operational by the end of 2013. In addition, proposed changes were made by the Secretariat in order to align the Basic ANP and FASID Table MET 5 in accordance to the World Area Forecast System Operations Group (WAFSOPSG/7) Conclusion 7/2 regarding WAFS-related procedures that were updated to clarify WAFS services and update the respective Internet address. These changes were reflected in **Appendix 5A** to the Report on Agenda Item 5. In addition, the meeting noted that references to ISCS should be removed before an amendment proposal was processed.

5.3 The meeting was also asked whether the FASID Table MET 2C, “Exchange of Operational Meteorological Information during the Pilgrimage Season”, was still necessary in light of the fact that the development of the electronic Air Navigation Plan attempts to harmonize the regional plans as much as possible. Saudi Arabia would investigate whether FASID Table MET 2C was still applicable to the MID Region.

5.4 Given the aforementioned, the meeting agreed to the following draft Conclusion:

DRAFT CONCLUSION 4/4: PROPOSAL FOR AMENDMENT TO PART VI (MET) OF THE MID AIR NAVIGATION PLAN VOLUME I AND VOLUME II (DOC 9708)

*That, taking into consideration comments provided by States included in **Appendix 5A** to the Report on Agenda Item 5, a proposal for amendments to Part VI (MET) of the MID Air Navigation Plan Volume I and II be processed in accordance with established procedures.*

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MID ANP VOLUME I (BASIC ANP) PART VI (MET)

Part VI

METEOROLOGY (MET)

INTRODUCTION

1. This part of the Middle East (MID) Basic Air Navigation Plan contains elements of the existing planning system and introduces the basic planning principles, operational requirements and planning criteria related to aeronautical meteorology (MET) as developed for the MID Region.
2. As a complement to the Statement of Basic Operational Requirements and Planning Criteria (BORPC) set out in Part I, Part VI constitutes the stable guidance material considered to be the minimum necessary for effective planning of MET facilities and services in the MID Region. A detailed description/list of the facilities and/or services to be provided by States in order to fulfill the requirements of the Basic ANP is contained in the MID Facilities and Services Implementation Document (FASID).
3. The Standards, Recommended Practices and Procedures to be applied are contained in the following ICAO documents:
 - a) Annex 3 — Meteorological Service for International Air Navigation;
 - b) Regional Supplementary Procedures (Doc 7030), Part 3 - Meteorology.
4. Background information of importance in the understanding and effective application of the Plan is contained in the Reports of the Limited Middle East (COM/MET/RAC) Regional Air Navigation Meeting (Doc 9672, LIM MID (COM/MET/RAC)(1996)) and of the Third Middle East Regional Air Navigation Meeting (Doc 9434, MID/3 (1984)), supplemented by information appropriate to the MID Region which is contained in the Reports of the other Regional Air Navigation Meetings.
5. RAN Meeting recommendations or conclusions, Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG) conclusions and ICAO operations groups conclusions shown in brackets below a heading indicate the origin of all paragraphs following that heading; where these conclusions are shown in brackets below a paragraph they indicate the origin of that particular paragraph.

**METEOROLOGICAL SERVICE AT AERODROMES AND REQUIREMENTS FOR
METEOROLOGICAL WATCH OFFICES**
(FASID Tables MET 1A and MET 1B)

6. The service to be provided at the international aerodromes listed in MID Basic ANP Table AOP1 is set out in FASID Table MET 1A.
[LIM MID (COM/MET/RAC), Rec.4/10]
7. The service to be provided for flight information regions (FIR), upper flight information regions (UIR), control areas (CTA) and search and rescue regions (SRR) is set out in FASID Table MET 1B.
[LIM MID (COM/MET/RAC), Rec. 4/10]
8. Routine observations should be made at all aeronautical stations at hourly intervals and

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reports issued as local routine reports and METAR, complemented by special observations issued as local special reports and SPECI.

[MID/3, Rec. 3.1/12]

9. TAF should be issued at intervals of six hours, with the period of validity beginning at one of the main synoptic hours (00, 06, 12, 18 UTC). The period of validity should be 24 or 30 hours, to meet the requirements indicated in FASID Table MET 1A. The filing time of the forecasts should be one hour before the start of the period of validity.

[MIDANPIRG/11 Report]

10. The forecast maximum temperatures should be included in aerodrome forecasts for certain stations as agreed between the meteorological authorities and the operators concerned.

[LIM MID (COM/MET/RAC) Rec. 4/10]

11. Trend forecasts should be provided at the aerodromes as indicated in FASID Table MET 1A.

[LIM MID (COM/MET/RAC), Rec. 4/10]

12. Meteorological service should be provided on a 24 hour basis, except as otherwise agreed between the meteorological authority, the air traffic services authority and the operators concerned.

[MID/3, Rec.3.1/12]

13. At aerodromes with limited hours of operation, the issuance of METAR should be issued at least one hour prior to the aerodrome resuming operations to meet pre-flight and in-flight planning requirements for flights due to arrive at the aerodrome concerned as soon as it is opened for use. Furthermore, TAF should be issued with adequate periods of validity so that they cover the entire period during which the aerodrome is open for use.

[MID/3, Rec. 3.1/12]

14. When an MWO is temporarily not functioning or is not able to meet all its obligations, its responsibilities should be transferred to another MWO and a NOTAM should be issued to indicate such a transfer and the period during which the office is unable to fulfil all its obligations.

[MID/3, Rec. 3.1/12]

15. Details of the service provided should be indicated in Aeronautical Information Publications, in accordance with the provisions of Annex 15.

[MID/3, Rec. 3.1/12]

16. As far as possible, English should be among the languages used in meteorological briefing and consultation.

[MID/3, Rec. 3.1/12]

17. FASID Tables MET 1A and 1B should be implemented as soon as possible.

AIRCRAFT OBSERVATIONS AND REPORTS

18. The meteorological authority should adopt the approved list of ATS/MET reporting points, as it relates to points located within and on the boundaries of the FIR for which the State is responsible. Those ATS/MET reporting points should be published in the AIP of the State concerned.

[LIM MID (COM/MET/RAC), Rec.4/19]

Note.— The approved list of ATS/MET reporting points is published and kept up to date by the ICAO Regional Office concerned, on the basis of consultations with ATS and MET authorities in each State and the provisions of Annex 3 in this respect.

19. The meteorological watch offices (MWO) designated as the collecting centres for air-reports

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received by voice communications within the FIR/UIR for which they are responsible, are shown in FASID Table MET 1B.

AIRMET INFORMATION

20. AIRMET messages are not required to be issued by MWOs.
[LIM MID (COM/MET/RAC), Rec. 4/10]

TROPICAL CYCLONE ADVISORIES AND VOLCANIC ASH ADVISORIES (FASID Tables MET 3A, 3B and 3C; FASID Charts MET1 and MET2)

21. Tropical cyclone advisory centre (TCAC) New Delhi has been designated to prepare advisory information. FASID Table MET 3A sets out the area of responsibility, the period of operation of the TCAC and the MWOs to which the advisory information should be sent.
[IAVWOPSG Conclusion 3/2]

22. Volcanic ash advisory centre (VAAC) Toulouse has been designated to prepare advisory information. FASID Table MET 3B sets out the area of responsibility of the VAACs, and the MWOs and ACCs/FICs to which the advisory information should be sent.
[IAVWOPSG Conclusion 3/2]

23. In order for the VAAC to initiate the monitoring of volcanic ash from satellite data and the forecast of volcanic ash trajectories, MWOs should notify the VAAC immediately on receipt of information that a volcanic eruption has occurred or volcanic ash has been observed in the FIR for which they are responsible. In particular, any special air-reports of pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud, received by MWOs should be transmitted without delay to the VAAC Toulouse. Selected State volcano observatories have been designated for direct notification of significant pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash in the atmosphere to their corresponding ACC/FIC, MWO and VAAC. FASID Table MET 3C sets out the selected State volcano observatories and the VAACs, MWOs and ACCs/FICs to which the notification should be sent by the observatories.
[IAVWOPSG Conclusion 3/2]

EXCHANGE OF OPERATIONAL METEOROLOGICAL INFORMATION (FASID Tables MET 2A, 2B, 2C, 4A and 4B)

24. FASID Table MET 2A sets out the requirements for operational meteorological (OPMET) information, which should be made available to States and users through the AFS satellite broadcasts (SADIS and ISCS). FASID Table MET 2B contains the exchange requirements to the EUR Region for SIGMET- and AIRMET-messages, volcanic ash and tropical cyclone advisories and special air reports, originated by States in the MID Region, to satisfy international flight operations for uplink to SADIS.

Note: Volcanic ash advisories and tropical cyclone advisories are not originated by States in the MID Region.

25. FASID Table MET 2C sets out the operational meteorological information which should be available in Saudi Arabia for the pilgrimage flights. For its implementation, ICAO should notify, in accordance with AFI/6, Recommendation 6/24, as approved by Council, meteorological offices concerned well in advance of the exact dates of the beginning and the end of the Pilgrimage Season (cf also Doc 7474, Table MET 2C).
[LIM MID (COM/MET/RAC), Rec. 5/3]

26. FASID Tables MET 4A and MET 4B set out the Regional OPMET Bulletin Exchange (ROBEX) Scheme for the collection of METAR and air reports (AIREP), and TAF, respectively. When the designated ROBEX centres are not operational for any reason, the exchanges required

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under the ROBEX Scheme should be carried out by direct address messages.
[LIM MID (COM/MET/RAC), Rec. 5/5]

Note.— Details of the ROBEX procedures including the exchange of OPMET information required under the scheme are given in the ROBEX Handbook prepared by the ICAO Asia and Pacific Office, Bangkok, Thailand.

27. Each MWO should arrange for the transmission to all aerodrome meteorological offices within its associated FIR of its own SIGMET messages and relevant SIGMET messages for other FIR, as required for briefing and, where appropriate, for flight documentation.
[MID/3, Rec. 3.1/12]

28. Each MWO should arrange for the transmission to its associated ACC/FIC of SIGMET messages and special air-reports received from other MWOs.

29. Each MWO should arrange for the transmission of routine air-reports received by voice communications to all meteorological offices within its associated FIR.

30. Operational meteorological information required in MID States from the EUR Region should be requested from the inter-regional OPMET Gateway (IROG), Vienna. OPMET information from the AFI Region should be requested from Jeddah (OEJNYM). OPMET information from ASIA/PAC Region should be requested from IROG Bangkok.

WORLD AREA FORECAST SYSTEM (WAFS)

(FASID Table MET 5)

31. FASID Table MET 5 sets out the MID Region requirements for WAFS forecasts to be provided by WAFC London.
[WAFSOPSG Conclusion 1/2]

32. For back-up purposes, each WAFC should have the capability to produce WAFS forecasts for all required areas of coverage.
[WAFSOPSG Conclusion 5/2]

33. WAFS forecasts should be made available by WAFC London using the satellite distribution system for information relating to air navigation (SADIS), including the Secure SADIS FTP Service or using the satellite and Internet service.
[WAFSOPSG Conclusion ~~6/2~~ 7/2]

Editorial note. – Insert “or using the SADIS service” in the corresponding CNS procedure contained in Part IV of the ANP

34. Each State should make the necessary arrangements to receive and make full use of operational WAFS forecasts made available by WAFC London. The lists of the authorized users of the SADIS services in the MID Region and the locations of the operational VSATs and/or Internet-based services are available from the following website:

www.icao.int/safety/meteorology/sadisopsg (click: “Operational Information” and then “Status of implementation of SADIS”) for SADIS.

[WAFSOPSG Conclusion ~~6/2~~ 7/2]

– END –

MID ANP VOLUME II (FASID) PART VI (MET)

METEOROLOGY (MET)

1. Introduction

1.1 The Standards, Recommended Practices and Procedures to be applied are as listed in paragraph 1.2, Part VI - MET of the MID Basic ANP. The material in this part complements that contained in Part I – Statement of Basic Operational Requirements and Planning Criteria (BORPC) of the MID Basic ANP and should be taken into consideration in the overall planning processes for the MID Region.

1.2 This Part contains a detailed description/list of the facilities and/or services to be provided to fulfil the basic requirements of the Plan and are as agreed between the provider and user States concerned. Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified. This element of the FASID, in conjunction with the MID Basic ANP, is kept under constant review by the MIDANPIRG in accordance with its schedule of management, in consultation with user and provider States and with the assistance of the ICAO Middle East Office, Cairo.

2. Meteorological Service Required at Aerodromes and Requirements for Meteorological Watch Offices
(FASID Tables MET 1A and 1B)

2.1 The meteorological service to be provided at aerodromes to satisfy international flight operations is outlined in FASID Table MET 1A.

2.2 The requirements for meteorological watch offices (MWO) together with the service to be provided to flight information regions (FIR), upper flight information regions (UIR) and search and rescue regions (SRR) are listed in FASID Table MET 1B.

3. Exchange of Operational Meteorological Information
(FASID Tables MET 2A, 2B, 2C, 4A and 4B)

3.1 The requirements for availability of OPMET information (METAR, SPECI and TAF) on a global basis through the AFS satellite distribution system (the SADIS and ISCS) are provided in FASID Table MET 2A. This table contains the aerodromes included in the AOP Table of the Basic ANP and those non-AOP aerodromes for which the States concerned have agreed to make available the OPMET information via the satellite distribution system on a regular basis. FASID Table MET 2B contains the exchange requirements to the EUR Region for SIGMET- and AIRMET-messages, volcanic ash and tropical cyclone advisories and special air reports, originated by States in the MID Region, to satisfy international flight operations for uplink to SADIS.

Note: Volcanic ash advisories and tropical cyclone advisories are not originated by States in the MID Region.

3.2 FASID Table MET 2BC contains the operational meteorological information which should be available in Saudi Arabia for the pilgrimage flights.

3.3 FASID Tables MET 4A and 4B set out the Regional OPMET Bulletin Exchange (ROBEX) Scheme for the exchange of METAR, SPECI, air reports (AIREP) and TAF.

Attachment A

Note. - Details of the ROBEX procedures including the exchange of OPMET information required under the Scheme are given in the ROBEX Handbook published by the ICAO Asia and Pacific Office, Bangkok in co-ordination with the ICAO MID Office, Cairo. The ROBEX handbook is available via the 'MET' section of: <http://www.bangkok.icao.int/edocs/index.html>.

Attachment A

4. Tropical Cyclone Warning System and International Airways Volcano Watch (FASID Tables MET 3A, MET 3B, and MET 3C and FASID Charts MET 3-1 and 2)

4.1 The area of responsibility and the periods of operation of the designated Tropical Cyclone Advisory Centre (TCAC) New Delhi and the MWOs to which the advisory information should be sent by the TCAC are contained in FASID Table MET 3A. The areas of responsibility of the designated TCACs in all regions are shown on FASID Chart MET 1.

4.2 The area of responsibility of the designated Volcanic Ash Advisory Centre (VAAC) Toulouse, and the MWOs and ACCs/FICs to which the advisory information should be sent by the VAAC are contained in FASID Table MET 3B. The areas of responsibility of the designated VAACs in all regions are shown on FASID Chart MET 3-2.

4.3 FASID Table MET 3C sets out the selected State volcano observatories in the MID Region designated for direct notification of significant pre-eruption volcanic activity and/or volcanic ash in the atmosphere and the VAACs, MWOs and ACCs/FICs to which the notification should be sent by the observatories.

Note 1. - Operational procedures to be used for the dissemination of information on volcanic eruptions and associated ash clouds in areas which could affect routes used by international flights, and necessary pre-eruption arrangements as well as the list of operational contact points are provided in the document titled Handbook on the International Airways Volcano Watch (IAVW) - Operational Procedures and Contact List (Doc 9766). ~~Note 2. - Additional guidance material regarding the IAVW is contained in the Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (Doc 9691).~~

5. World Area Forecast System (WAFS) (FASID Table MET 5)

5.1 FASID Table MET 5 sets out the MID Region requirements for WAFS forecasts to be provided by WAFC London.

– END –

MID ANP VOLUME II (FASID) PART VI (MET)

TABLE MET 1A - METEOROLOGICAL SERVICE AT AERODROMES

EXPLANATION OF THE TABLE

Column

1. Name of the aerodrome.
2. ICAO location indicator of the aerodrome.
3. Designation of aerodrome:
RG - international general aviation, regular use
RS - international scheduled air transport, regular use
RNS - international non-scheduled air transport, regular use
AS - international scheduled air transport, alternate use
ANS - international non-scheduled air transport, alternate use
4. Name of the meteorological office responsible for the provision of meteorological service at the aerodrome indicated in column 1.
5. ICAO location indicator of the responsible meteorological office.
6. Requirement for trend forecasts.
7. Requirement for aerodrome forecasts in TAF code
T – Requirement for 24-hour validity aerodrome forecasts in TAF code (24H)
X - Requirement for 30-hour validity aerodrome forecasts in TAF code (30H)
8. Availability of OPMET information
F - Full : OPMET data as listed issued for the aerodrome all through the 24-hour period
P - Partial : OPMET data as listed not issued for the aerodrome for the entire 24-hour period
N - None : No OPMET data issued for the time being

Attachment B

Aerodrome where service is to be provided			Responsible MET office		Forecasts to be provided		Availability of OPMET
Name 1	ICAO Location Indicator 2	Use 3	Name 4	ICAO Location Indicator 5	TR 6	TAF 7	
BAHRAIN							
BAHRAIN INTERNATIONAL	OBBI	RS	BAHRAIN INTERNATIONAL	OBBI	Y	X	F
EGYPT							
AL ALAMAIN/ INTL	HEAL	AS	CAIRO/INTL	HECA		*	P
ALEXANDRIA / INTL	HEAX	RS	CAIRO/INTL	HECA	Y	X	F
ALMAZA AFB / MILITARY	HEAZ	RNS	CAIRO/INTL	HECA		X	F
ASWAN / INTL	HESN	RS	CAIRO/INTL	HECA	Y	X	F
ASYUT / INTL	HEAT	AS	CAIRO/INTL	HECA		X	F
CAIRO/INTL	HECA	RS	CAIRO/INTL	HECA	Y	X	F
HURGHADA / INTL	HEGN	RS	CAIRO/INTL	HECA	Y	X	F
LUXOR / INTL	HELX	RS	CAIRO/INTL	HECA	Y	X	F
MARSA ALAM / INTL	HEMA	RS	CAIRO/INTL	HECA		X	F
SHARK EL OWEINAT / INTL	HEOW	AS	CAIRO/INTL	HECA		X	F
SHARM EL SHEIKH / INTL	HESH	RS	CAIRO/INTL	HECA		X	F
SOHAG INTERNATIONAL AIRPORT	HESG	AS	CAIRO/INTL	HECA		*	P
ST.CATHERINE / INTL	HESC	AS	CAIRO/INTL	HECA		X	F
TABA / INTL	HETB	RS	CAIRO/INTL	HECA		X	F
IRAN (ISLAMIC REPUBLIC OF)							
BANDAR ABBASS/INTL	OIKB	RS	TEHRAN/MEHRABAD INTL	OIII		T	F
ESFAHAN / SHAHID BEHESHTI INTL	OIFM	RS	TEHRAN/MEHRABAD INTL	OIII		X	F
MASHHAD/SHAHID HASHEMI NEJAD INTL	OIMM	RS	TEHRAN/MEHRABAD INTL	OIII		T	F
SHIRAZ/SHAHID DASTGHAIB INTL	OISS	RS	SHIRAZ/SHAHID DASTGHAIB INTL	OISS	Y	X	F
TABRIZ/INTL	OITT	RNS	TABRIZ/INTL	OITT		X	F
TEHRAN/IMAM KHOMAINI INTL	OIIE	RS	TEHRAN/MEHRABAD INTL	OIII	Y	X	F
TEHRAN/MEHRABAD INTL	OIII	RS	TEHRAN/MEHRABAD INTL	OIII	Y	T	F
ZAHEDAN/INTL	OIZH	RS	TEHRAN/MEHRABAD INTL	OIII		T	F
IRAQ							
AL NAJAF	ORNI	RNS				T	F
BAGHDAD INTERNATIONAL AIRPORT	ORBI	RS	BAGHDAD INTERNATIONAL AIRPORT	ORBI	Y	T	F
BASRAH INTL AIRPORT	ORMM	RS	BAGHDAD INTERNATIONAL AIRPORT	ORBI	Y	T	F
ERBIL INTL AIRPORT	ORER	RS				T	F
MOSUL INTERNATIONAL AIRPORT	ORBM	RS	BAGHDAD INTERNATIONAL AIRPORT	ORBI	Y	T	F
SULAYMANIYAH INTERNATIONAL AIRPORT	ORSU	RS				T	F
JORDAN							
AMMAN/MARKA	OJAM	AS	AMMAN/MARKA	OJAM	Y	T	F
AMMAN/QUEEN ALIA	OJAI	RS	AMMAN/MARKA	OJAM	Y	X	F
AQABA/KING HUSSEIN	OJAQ	RNS	AMMAN/MARKA	OJAM			F
JERUSALEM/JERUSALEM	OJJR	RS	AMMAN/MARKA	OJAM			N
KUWAIT							
KUWAIT/INTL AIRPORT	OKBK	RS	KUWAIT/INTL AIRPORT	OKBK	Y	X	F
LEBANON							
BEIRUT/BEIRUT INTL	OLBA	RS	BEIRUT/BEIRUT INTL	OLBA	Y	X	F

Attachment B

Aerodrome where service is to be provided			Responsible MET office		Forecasts to be provided		Availability of OPMET	
Name 1	ICAO Location Indicator 2	Use 3	Name 4	ICAO Location Indicator 5	TR 6	TAF 7		8
OMAN								
MUSCAT/MUSCAT INTL	OOMS	RS	MUSCAT/MUSCAT INTL	OOMS	Y	X	F	
SALALAH	OOSA	AS	SALALAH	OOSA		X	F	
QATAR								
DOHA INTERNATIONAL	OTBD	RS	DOHA INTERNATIONAL	OTBD	Y	X	F	
NEW DOHA INTERNATIONAL AIRPORT (NDIA)	OTHH	RS	DOHA INTERNATIONAL	OTBD	Y	X	F	
SAUDI ARABIA								
DAMMAM/KING FAHD INTERNATIONAL	OEDF	RS				X	F	
JEDDAH/KING ABDULAZIZ INTERNATIONAL	OEJN	RS	JEDDAH/KING ABDULAZIZ INTERNATIONAL	OEJN	Y	X	F	
MADINAH/PRINCE MOHAMMAD BIN ABDULAZIZ INTERNATIONAL	OEMA	RS	JEDDAH/KING ABDULAZIZ INTERNATIONAL	OEJN	Y	T	F	
RIYADH/KING KHALED INTERNATIONAL	OERK	RS	JEDDAH/KING ABDULAZIZ INTERNATIONAL	OEJN	Y	X	F	
SYRIAN ARAB REPUBLIC								
ALEPPO/INTL	OSAP	RS	DAMASCUS/INTL	OSDI		T	F	
BASSEL AL-ASSAD/INTL. LATTAKIA	OSLK	RS	DAMASCUS/INTL	OSDI		T	F	
DAMASCUS/INTL	OSDI	RS	DAMASCUS/INTL	OSDI	Y	X	F	
UNITED ARAB EMIRATES								
ABU DHABI INTERNATIONAL	OMAA	RS	ABU DHABI INTERNATIONAL	OMAA	Y	X	F	
ABU DHABI / AL BATEEN EXECUTIVE AIRPORT	OMAD	RG RNS	ABU DHABI INTERNATIONAL	OMAA		X	F	
AL AIN INTERNATIONAL	OMAL	RS	ABU DHABI INTERNATIONAL	OMAA		X	F	
DUBAI INTERNATIONAL	OMDB	RS	DUBAI INTERNATIONAL	OMDB	Y	X	F	
DUBAI/AL MAKTOUM INTERNATIONAL	OMDW	RS	DUBAI INTERNATIONAL	OMDB	Y	X	F	
FUJAIRAH INTERNATIONAL	OMFJ	RS	DUBAI INTERNATIONAL	OMDB		X	F	
RAS AL KHAIMAH INTERNATIONAL	OMRK	RS	DUBAI INTERNATIONAL	OMDB		X	F	
SHARJAH INTERNATIONAL	OMSJ	RS	DUBAI INTERNATIONAL	OMDB		X	F	
YEMEN								
ADEN/INTL	OYAA	RS	SANAA/INTL	OYSN	Y	X	F	
HODEIDAH/INTL	OYHD	RS	SANAA/INTL	OYSN		T	F	
MUKALLA/INTL	OYRN	RS	SANAA/INTL	OYSN		T	F	
SANAA/INTL	OYSN	RS	SANAA/INTL	OYSN		T	F	
TAIZ/INTL	OYZZ	RS	SANAA/INTL	OYSN		T	F	

*TAF available upon request

Attachment C

FASID TABLE MET 1B - METEOROLOGICAL WATCH OFFICES

EXPLANATION OF THE TABLE

Column

- 1 Name of State with Meteorological Watch Office (MWO) responsibility.
- 2 Location name of the MWO
- 3 ICAO location indicator assigned to the MWO.
- 4 Name of FIR, the UIR and/or the search and rescue region (SRR) served by the MWO.
- 5 ICAO location indicator assigned to the ATS unit serving the FIR, UIR and/or SRR.
- 6 Requirement for issuance of SIGMET, *excluding* volcanic ash SIGMET and tropical cyclone SIGMET
- 7 Requirement for issuance of volcanic ash SIGMET
- 8 Requirement for issuance of tropical cyclone SIGMET
- 9 Remarks

Note.— Unless otherwise stated in column 9, the MWO listed in column 2 is the designated collecting centre for the air reports received within the corresponding FIR/UIR listed in column 4.

Attachment C

State	MWO location		Area served		SIGMET			Remarks
	Name	ICAO loc. ind.	Name	ICAO loc. ind.	WS	WV	WC	
1	2	3	4	5	6	7	8	9
BAHRAIN								
	BAHRAIN INTERNATIONAL	OBBI	BAHRAIN FIR and SRR	OBBB	Y	Y	Y	
EGYPT								
	CAIRO/INTL	HECA	CAIRO FIR and SRR ACC	HECC	Y	Y		Asian part thereof
IRAN (ISLAMIC REPUBLIC OF)								
	TEHRAN/MEHRABAD INTL	OIII	TEHRAN FIR and SRR (ACC/FIC/FIR)	OIIX	Y	Y	Y	
IRAQ								
	BAGHDAD INTERNATIONAL AIRPORT	ORBI	BAGHDAD FIR and SRR	ORBS	Y	Y		
ISRAEL								
	TEL AVIV/BEN GURION AIRPORT	LLBG	TEL AVIV FIR and SRR	LLAD	Y	Y		
JORDAN								
	AMMAN/QUEEN ALIA	OJAI	AMMAN FIR and SRR (ACC/FIC)	OJAC	Y	Y		
KUWAIT								
	KUWAIT/INTL AIRPORT	OKBK	KUWAIT FIR and SRR ACC/AERODROME CONTROL TOWER	OKAC	Y	Y	Y	
LEBANON								
	BEIRUT/BEIRUT INTL	OLBA	BEIRUT FIR and SRR BEIRUT/BEIRUT INTL	OLBA	Y	Y		
OMAN								
	MUSCAT/ SEEB MUSCAT INTL	OOMS	MUSCAT FIR and SRR	OOMM	Y	Y	Y	
SAUDI ARABIA								
	JEDDAH/KING ABDULAZIZ INTL INTERNATIONAL	OEJN	JEDDAH FIR and SRR	OEJD	Y	Y	Y	
SYRIAN ARAB REPUBLIC								
	DAMASCUS/INTL	OSDI	DAMASCUS/ INTL FIR and SRR	OSDI	Y	Y		
UNITED ARAB EMIRATES								
	ABU DHABI INTERNATIONAL	OMAA	EMIRATES FIR and SRR	OMAE	Y	Y	Y	
YEMEN								
	SANAA/INTL	OYSN	SANAA/ INTL FIR and SRR	OYSN	Y	Y	Y	

Attachment D

FASID TABLE MET 3A - TROPICAL CYCLONE ADVISORY CENTRE FOR THE MID REGION

EXPLANATION OF THE TABLE

Column

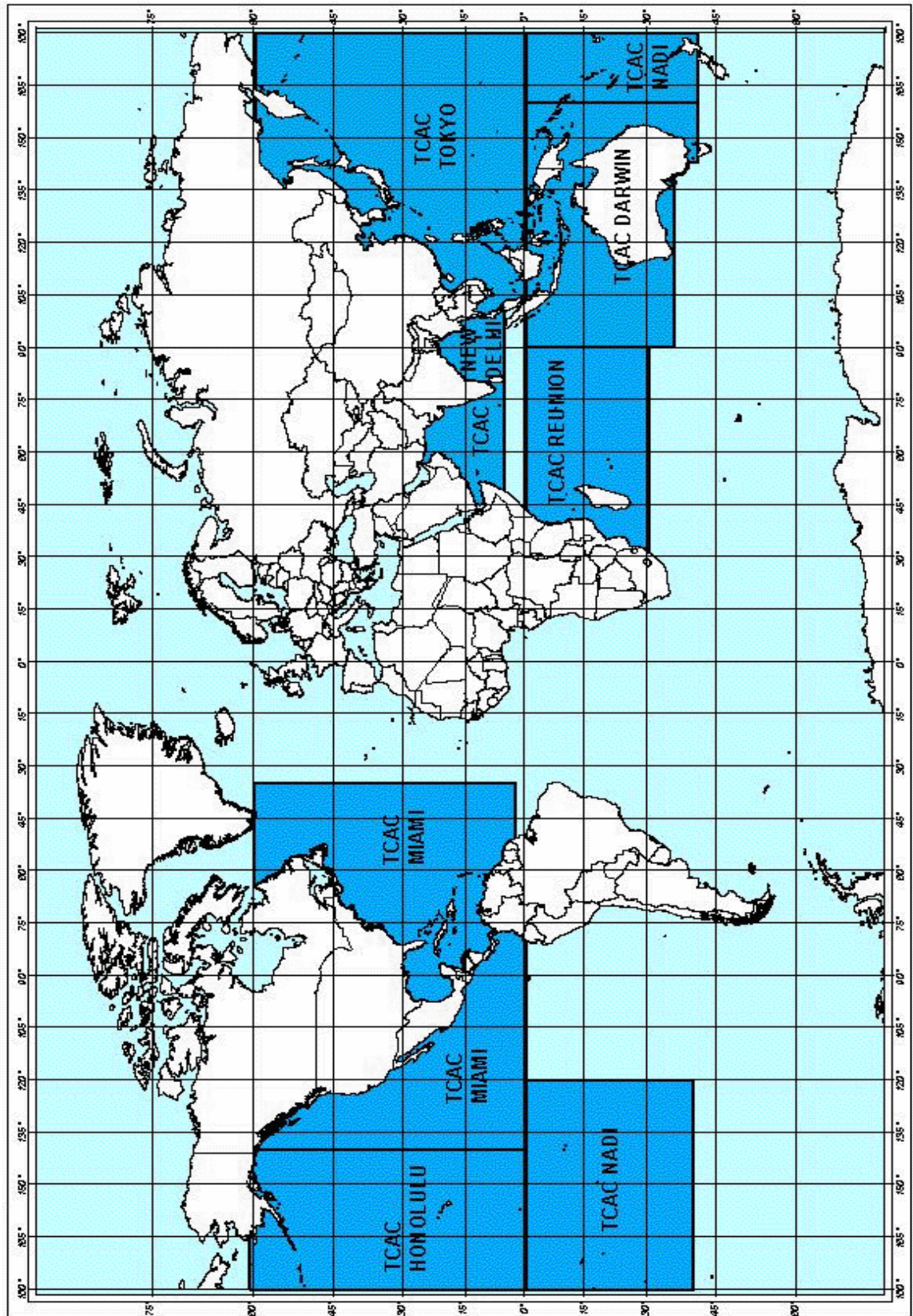
- 1 Location of the Tropical Cyclone Advisory Centre (TCAC)
- 2 ICAO location indicator of the TCAC (for use in the WMO heading of advisory bulletin)
- 3 Area of responsibility for the preparation of advisory information on tropical cyclones by the TCAC in Column 1
- 4 Period(s) of operation of the TCAC
- 5 Meteorological Watch Office (MWO) to which the advisory information on tropical cyclones should be sent
- 6 ICAO location indicator of the MWO in Column 5

Tropical Cyclone Advisory Centre		Area of Responsibility	Tropical cyclone season [‡] Period(s) of operation	MWO to which advisory information is to be sent	
Name	ICAO Loc. Ind.			Name	ICAO Loc. Ind.
1	2	3	4	5	6
New Delhi (India)	VIDP	Arabian Sea including Gulf of Oman and Gulf of Aden N: Coastline S: 5°N W: Coastline E: 65°E	April – June October – December	Abu Dhabi International Bahrain International Jeddah/King Abdulaziz International Kuwait/Intl Airport Muscat/Muscat Intl Sana ² -a/Intl Tehran/Mehrabad Intl	OMAA OBBI OEJN OKBK OOMS OYSN OIII

[‡] -Indicates approximately the main season for tropical cyclones.

FASID CHART MET 1 - AREAS OF RESPONSIBILITY OF THE TCACs

CURRENT STATUS OF ICAO TROPICAL CYCLONE ADVISORY CENTRES (TCACs) - AREAS OF RESPONSIBILITY
SITUATION ACTUELLE DES CENTRES D'AVIS DE CYCLONES TROPICAUX (TCAC) OACI - ZONES DE RESPONSABILITÉ
SITUACIÓN ACTUAL DE LOS CENTROS DE AVISOS DE CICLONES TROPICALES, OACI (TCAC) - ZONAS DE RESPONSABILIDAD



Attachment F

FASID TABLE MET 3B — VOLCANIC ASH ADVISORY CENTRES

EXPLANATION OF THE TABLE

Column

- 1 Name of the Volcanic Ash Advisory Centre (VAAC).
- 2 ICAO location indicator of VAAC (for use in the WMO heading header of advisory bulletin).
- 3 Area of responsibility for the preparation of advisory information on volcanic ash by the VAAC in Column 1.
- 4 ~~ICAO Contracting~~ State where the MWOs and ACCs/FICs are located.
- 5 ICAO Region where the MWOs and ACCs/FICs are located.
- 6 MWOs to which the advisory information on volcanic ash should be sent.
- 7 ICAO location indicator of the MWOs in Column 6.
- 8 ACCs/FICs to which the advisory information on volcanic ash should be sent.
- 9 ICAO location indicator of the ACCs/FICs in Column 8.

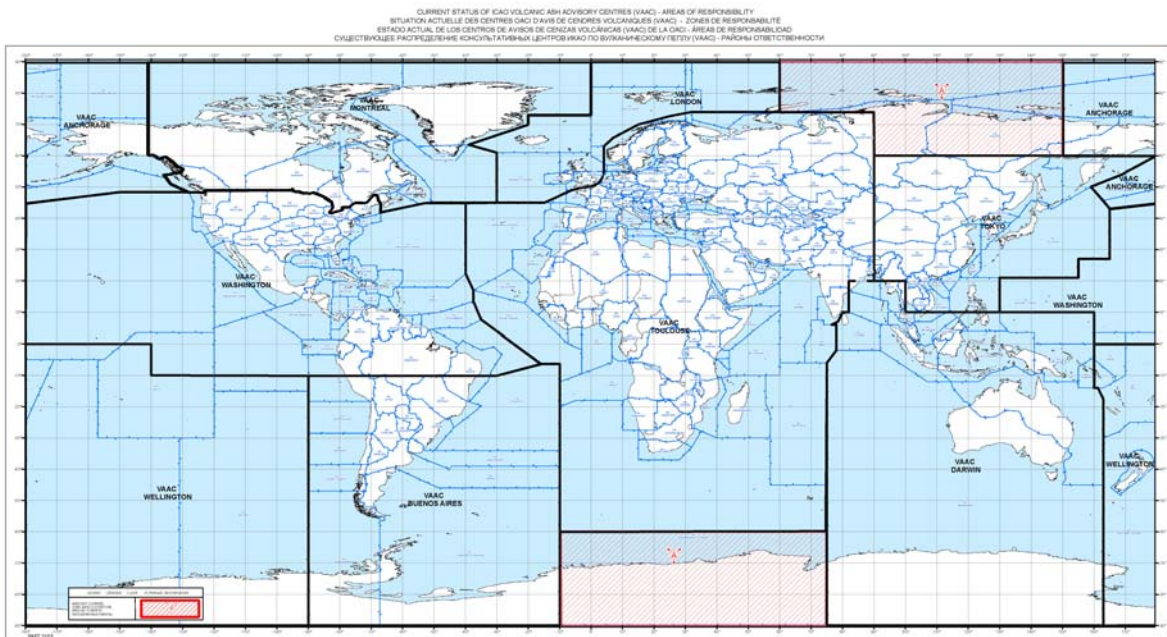
Volcanic Ash Advisory Centre			State	ICAO Region	MWO to which advisory information is to be sent		ACC/FIC to which advisory information is to be sent	
Name	ICAO Loc. Ind.	Area of responsibility			Name	ICAO Loc. Ind.	Name	ICAO Loc. Ind.
1	2	3	4	5	6	7	8	9
Toulouse (France)	LFPW	The whole ICAO-MID Region Santa Maria Oceanic FIR, AFI Region north of S60, EUR Region (except for London, Scottish and Shannon FIRs) west of E90 and south of N71, MID Region, and ASIA Region	Bahrain	MID	Bahrain International	OBBI	Bahrain FIR	OB BB
			Egypt	MID	Cairo/Intl	HECA	Cairo ACC	HECC
			Iran (Islamic Republic of)	MID	Tehran/Mehrabad	OIII	Tehran (ACC/FIC/FIR)	OIIX
			Iraq	MID	Baghdad International Airport	ORBI	Baghdad	ORBS*
			Israel	MID	Tel Aviv	LLBG	Tel Aviv	LLAD
			Jordan	MID	Amman/Queen Alia	OJAI	Amman (ACC/FIC)	OJAC
			Kuwait	MID	Kuwait/Intl Airport	OKBK	Kuwait ACC/Aerodrome Control Tower	OKAC
			Lebanon	MID	Beirut/Beirut	OLBA	Beirut/Beirut	OLBA

Attachment F

		west of E90 north of N20 (plus Mumbai, Chennai (west of 82E) and Male FIRs)			Intl		t Intl	
			Oman	MID	Muscat/Musc at Intl	OOMS	Muscat FIR	OOMM
			Saudi Arabia	MID	Jeddah/King Abdulaziz International	OEJN	Jeddah FIR	OEJD
			Syrian Arab Republic	MID	Damascus/Intl	OSDI	Damascus/I ntl	OSDI
			United Arab Emirates	MID	Abu Dhabi International	OMAA	Emirates FIR	OMAE
			Yemen	MID	Sanaa/Intl	OYSN	Sanaa/Intl	OYSN

*not listed in Doc 7910

VOLCANIC ASH ADVISORY CENTRES (VAAC) AREAS OF COVERAGE



Attachment H

FASID Table MET 3C

SELECTED STATE VOLCANO OBSERVATORIES

EXPLANATION OF THE TABLE

Column

- 1 ~~Name of the~~ Provider State of the volcano observatory designated for direct notification of volcanic activity.
- 2 Name of the volcano observatory.
- 3 VAAC to which the information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.
- 4 ACC/FIC to which the information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.
- 5 ICAO location indicator ~~assigned to~~ of the ACC/FIC listed in Column 4.
- 6 MWO to which information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.
- 7 ICAO location indicator of the MWO listed in Column 6

Provider State of volcano observatory	Volcano observatory	VAAC to which the information is to be sent	ACC/FIC to which the information is to be sent		MWO to which information is to be sent	
			Name	ICAO Loc Ind.	Name	ICAO Loc Ind.
1	2	3	4	5	6	7
...	...	VAAC Toulouse

Note:—AFTN is not available at all selected volcano observatories; ~~and~~ therefore, it is the responsibility of each State to make appropriate communication arrangements.

Note:—The FASID Table MET 3C to be completed when information is provided by the States concerned

FASID Table MET 4A

REGIONAL OPMET BULLETIN EXCHANGE (ROBEX) SCHEME –
COLLECTION AREAS FOR AERODROME FORECASTS

EXPLANATION OF THE TABLE

Column

- 1 Location of the TAF collection centre
- 2 Aerodromes for which aerodrome forecasts in the TAF code form are collected

TAF Collection Centre	Collection Area
BAHRAIN	ABU DHABI ABU DHABI / AL BATEEN EXECUTIVE AL AIN AL MAKTOUM BAHRAIN DAMMAM DOHA DUBAI FUJAIRAH KUWAIT MUSCAT RAS AL KHAIMAH SALALAH SHARJAH
BEIRUT	AMMAN BAGHDAD BASRAH BEIRUT DAMASCUS
JEDDAH	ADEN DHAHRAN/DAMMAM JEDDAH MADINAH RIYADH SANA'A
TEHRAN	AHWAZ BANDAR ABBASS ESFAHAN KERMAN MASHHAD SHIRAZ TABRIZ TEHRAN ZAHEDAN

FASID Table MET 4B

**REGIONAL OPMET BULLETIN EXCHANGE (ROBEX) SCHEME –
COLLECTION AREAS FOR **ROUTINE AERODROME METEOROLOGICAL** REPORTS
AND AIR-REPORTS**

EXPLANATION OF THE TABLE

Column

- 1 Location of the METAR/SPECI and AIREP collection centre
- 2 ~~Aerodromes~~ Meteorological offices for which aerodrome meteorological reports forecasts in the METAR/SPECI code form and AIREP ~~code form~~ are collected

METAR/SPECI and AIREP Collection Centre	Collection Area
BAGHDAD	BAGHDAD BASRAH
BAHRAIN	ABU DHABI ABU DHABI / AL BATEEN EXECUTIVE AL AIN AL MAKTOUM BAHRAIN DAMMAM DOHA DUBAI FUJAIRAH KUWAIT MUSCAT RAS AL KHAIMAH SHARJAH
BEIRUT	AMMAN BEIRUT DAMASCUS
JEDDAH	DHAHRAN JEDDAH MADINAH RIYADH SANA'A
TEHRAN	AHWAZ BANDAR ABBASS ESFAHAN KABUL KANDAHAR KERMAN MASHHAD SHIRAZ TABRIZ TEHRAN ZAHEDAN

Attachment K

FASID TABLE MET 5 - REQUIREMENTS FOR WAFS FORECASTS

EXPLANATION OF THE TABLE

Column

- 1 WAFS forecasts required by the MID States, to be provided by WAFc London.
- 2 Area of coverage required for the WAFS forecasts to be provided by WAFc London.

FORECASTS REQUIRED	AREAS REQUIRED
1	2
SWH forecasts (FL250-630) in the BUFR code form	GLOBAL
SWM forecasts (FL100-250) in the BUFR code form	EUR, MID
Forecasts of upper-air wind, temperature and humidity, cumulonimbus clouds, icing, and clear-air and in-cloud turbulence, and of geopotential altitude of flight levels in GRIB code form	GLOBAL

Note 1.— SWM forecasts are provided for limited geographical areas as determined by regional air navigation agreement. Areas “EUR” and “MID” provided by WAFc London.

Note 2. — WAFcs will continue to issue forecasts of SIGWX in PNG chart form for back-up purposes for fixed areas of coverage as specified in Annex 3.

Note 3. — Forecasts of cumulonimbus clouds, icing, and clear-air and in-cloud turbulence are labelled as “trial forecasts” and are currently distributed through the Internet-based services.

MET SG/4
Report on Agenda Item 6

REPORT ON AGENDA ITEM 6: IDENTIFICATION, ASSESSMENT AND REPORTING OF MET DEFICIENCIES

6.1 The meeting reviewed the MIDANPIRG Air Navigation Deficiency Database (MANDDD) on the ICAO MID website (<http://www.icao.int/MID/Pages/meetings.aspx>) and noted that there were no MET deficiencies reported after the removal of those listed for Iran, Iraq and Syria at the MIDANPIRG/13 meeting. Deficiencies in the MET field to be included in the MANDDD at MIDANPIRG/14 would depend on States' responses to OPMET shortcomings identified by the BMG/3 meeting.

MET SG/4
Report on Agenda Item 7

REPORT ON AGENDA ITEM 7: QUALITY MANAGEMENT SYSTEM

7.1 The meeting recalled that Annex 3, paragraph 2.2.3 requires States to ensure that the designated meteorological authority establish and implement a properly organized quality system comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users listed in Annex 3, paragraph 2.1.2.

7.2 The meeting agreed that implementation of Quality Management System (QMS) should be a key performance indicator expressed in percentage of States in the MID Region that meet QMS provisions in Annex 3. The associated key performance indicator is described in Agenda Item 9.

7.3 The meeting agreed that a progress report on the status of QMS implementation by MID States be presented to MIDANPIRG/14, for review and appropriate action.

MET SG/4
Report on Agenda Item 8

REPORT ON AGENDA ITEM 8: KEY PERFORMANCE INDICATORS

8.1 The meeting reviewed the Report on Agenda Items 3 and 4 of the third meeting of the MIDANPIRG Steering Group (MSG/3) that was held in Cairo, Egypt from 17-19 June 2013. In particular, progress on the new ANP template that partitions the ANP into three volumes. More specifically Volume I would be stable and contains information such as designation of service centres (e.g. WAFCs, VAACs, Tropical Cyclone Advisory Centres (TCAC)s) and Volume II would be more dynamic and regionally governed (e.g. OPMET requirements, meteorological watch offices) and Volume III would measure implementation of requirements. This global effort was ongoing and expected to be completed by May 2014.

8.2 The meeting noted that Volume III of the new ANP being developed was linked to developing Key Performance Indicators (KPIs) that measure implementation that may assist in focusing resources in implementation efforts. The new implementation methodology called Aviation System Block Upgrades includes MET: B0-AMET – Meteorology information supporting enhanced operational efficiency and safety. This module includes forecasts provided by WAFc, VAAC and TCAC as well as aerodrome warnings, SIGMETs, and OPMET information.

8.3 Given the above information, the meeting agreed to develop a draft set of regional key performance indicators in MET as provided in **Appendix 8A** to the Report on Agenda Item 8. In total, four KPIs were developed: States' implementation of SADIS, OPMET implementation, SIGMET implementation (noting one State is exempt – Qatar, for which SIGMET is issued by Bahrain as the Bahrain FIR overlays Qatar), and QMS implementation.

8.4 The meeting agreed that States' should have time to review the draft KPIs in MET and that the State letter requesting input on the draft regional KPIs in MET make reference to how the implementation statistics would be calculated (e.g. the SADIS Status of Implementation on the SADISOPSG website would be used to count the number of States that have access to SADIS 2G or Secure SADIS FTP). States' should reply to this request, by 15 August 2013.

8.5 Given the aforementioned, the meeting agreed to the following draft Conclusion.

**DRAFT CONCLUSION 4/5: MID REGION KEY PERFORMANCE
INDICATORS - MET**

*That, States provide input to the proposed Key Performance Indicators related to MET at **Appendix 8A** to the Report on Agenda Item 8 by **15 August 2013** for consideration by MIDANPIRG/14.*

MET SG/4
 Appendix 8A to the Report on Agenda Item 8

Key Performance Indicators supporting B0-MET – Meteorological information supporting enhanced operational efficiency and safety

Applicability: States

Metrics	Key Performance	Targets	Action	Remarks
1- WAFS	Number of States providing forecasts from WAFC London to users as per Annex 3	xx% implementation	Inform States of deficiency and assist in acquiring access to SADIS	
2 – OPMET at aerodromes	Number of aerodromes providing OPMET as per requirements in MID FASID Table MET 1A	METAR and TAF as per requirements in MID FASID Table MET 1A available from xx% of aerodromes in Region	ROC monitor -> corrective action by States -> monitor and report	Consider global requirement against FASID Table MET 2A from SADIS monitoring
3 – Meteorological Watch Office	Number of MWOs providing SIGMET as per requirements in MID FASID Table MET 1B	SIGMET from MWOs listed in MID FASID Table MET 1B provided by xx% of MWOs SIGMET test participation by MWOs listed in MID FASID Table MET 1B provided by xx% of MWOs	ROC monitor -> corrective action by States -> monitor and report	
4- QMS	Number of States that have implemented QMS	QMS (MET) is implemented in xx% of States in Region	Reported by States -> implementation plan -> solicit update by States and report	

MET SG/4
Report on Agenda Item 9

REPORT ON AGENDA ITEM 9: FUTURE WORK PROGRAMME

9.1 The meeting reviewed the terms of reference (TOR)s of the MET Sub-Group of the MIDANPIRG as provided in **Appendix 9A** to the Report on Agenda Item 9. The meeting agreed to include implementation of exchange of weather data for aeronautical meteorology in digital form to support the ICAO Meteorological Exchange Model (IWXXM), noting the initial implementation emphasis would be placed on States hosting Regional OPMET Centres. Given the above, the meeting agreed to the following Draft Decision:

DRAFT DECISION 4/6: UPDATE TO THE MET SG TERMS OF REFERENCE

That, the terms of reference of the MET Sub-Group be updated as at Appendix 9A to the Report on Agenda Item 9.

9.2 The meeting noted that additional changes to the TORs of the MET SG may occur subsequent to the restructuring of the MIDANPIRG and its supporting bodies. To support this initiative of the MID MSG/3, MET SG members would be requested to provide input to the TORs that would support the ASBU implementation methodology by 31 August 2013.

9.3 The meeting agreed that the MET SG/5 meeting would be held in the 4th quarter of 2014. The venue will be in Cairo, unless a State would be willing to host the meeting.

METEOROLOGY SUB-GROUP (MET SG)

1. Terms of Reference

1.1 The terms of reference of the MET Sub-Group are:

- a) Ensure the continuous and coherent development of the MET Part of the MID Air Navigation Plan (Basic ANP and FASID, Doc 9708) taking into account the evolving operational requirements in the MID Region and the need for harmonization with the adjacent regions in compliance with the Global Air Navigation Plan.
- b) Monitor and coordinate implementation of the relevant ICAO SARPs and regional procedures, facilities and services on aeronautical meteorology by the MID States and pursue harmonization.
- c) Identify any deficiencies in the provision of meteorological service for air navigation in the MID Region and ensure the development and implementation of relevant action plans by the States to resolve them.
- d) Foster implementation by facilitating the exchange of know-how and transfer of knowledge and experience between the MID States.
- e) Provide input to the work of appropriate ICAO bodies in the field of aeronautical meteorology, according to the established procedures.

1.2 In order to meet the Terms of Reference, the MET SG shall:

- a) Monitor implementation of WAFS and SADIS by the MID States and provide guidance for timely implementation of changes to the systems that affect end users
- b) Foster implementation of IAVW:
 - Liaise with VAAC Toulouse
 - Organise VA SIGMET tests
 - Work towards enhancing the awareness of all IAVW stakeholders
 - Support regional volcanic ash contingency plan activities (e.g. adapting plan, volcanic ash exercises, workshops)
- c) Foster implementation of TC advisories and warnings:
 - Liaise with TCAC New Delhi
 - Organize TC SIGMET Tests
- d) Enhance the availability and quality of SIGMET.
 - ~~Organize WS SIGMET Tests~~
- e) Monitor the OPMET exchange and improve the availability and reliability of OPMET information from the MID Region:
 - Ensure establishment of proper Regional OPMET Data Bank
 - Conduct regular monitoring of OPMET data

- Provide feed-back to States on observed deficiencies
 - Conduct feasibility study on the establishment of Regional OPMET Centres
 - Foster implementation of ICAO Meteorological Exchange Model (IWXXM) within MID. The initial implementation emphasis will be placed on States hosting ROCs/RODBs.
- f) Maintain the MET Parts of the MID ANP.
- ~~Ensure that FASID Tables are up to date~~
- g) Develop regional guidance on the provision of SIGWX forecasts for Low-level flights
- h) Facilitate the implementation of QMS for MET in the MID States.
- ~~Organize a QMS Seminar/Workshop~~

2. Composition

2.1 The Sub-Group is composed of:

- a) MIDANPIRG Member States;
- b) concerned International/Regional Organizations as observers. (IATA, IFALPA, WMO); and
- c) Provider States of specific MET services to the MID Region, WAFC London, VAAC Toulouse, TCAC New Delhi, Vienna OPMET Databank, should be invited to attend meetings on a regular basis.

MET SG/4
Report on Agenda Item 10

REPORT ON AGENDA ITEM 10: ANY OTHER BUSINESS

10.1 Nothing has been discussed under this Agenda Item.

MET SG/4
Attachment A to the Report

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