



International Civil Aviation Organization

WORKING PAPER

**TWENTIETH MEETING OF THE METEOROLOGY SUB-GROUP
(MET SG/20) OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP (APANPIRG)**

Bangkok, Thailand, 6 – 9 June 2016

**Agenda Item 6.2: Research, development and implementation issues in the MET field
Data exchange (including MET/IE WG Report)**

REVIEW OUTCOMES FROM MET/IE WG/14

(Prepared by Chair MET/IE WG and Presented by Secretariat)

SUMMARY

This paper presents a summary of the 14th meeting of the Meteorological Information Exchange Working Group (MET/IE WG) of the Meteorology Sub Group (MET SG) of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG), held in Bangkok, Thailand from 7 to 9 March 2016. It includes the agreed actions and work plan of the group. Actions for the meeting are contained in paragraph 12.1.

1. Introduction

1.1 The Fourteenth Meeting of the Asia/Pacific (APAC) Meteorological Information Exchange Working Group (MET/IE WG/14) of the APAC Air Navigation Planning and Implementation Regional Group (APANPIRG) was held at the ICAO Asia and Pacific Regional Office, Bangkok, Thailand from 7 – 9 March 2016.

1.2 The MET/IE WG was established at the Nineteenth Meeting of the Meteorology Sub-group of APANPIRG (MET SG/19) and replaces the former expert group known as the Regional OPMET Bulletin Exchange Working Group (ROBEX WG).

1.3 The meeting included a conjoint session on 9 March 2016 with the Sixth Meeting of the APAC Meteorological Services Working Group (MET/S WG/6) to discuss items of interest to both groups.

1.4 The meeting was attended by 55 participants from 16 States and two International Organizations, including Australia, Bangladesh, Bhutan, Cambodia, China, Hong Kong China, Japan, Lao People's Democratic Republic (Lao PDR), Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United States, Viet Nam, the International Air Transport Association (IATA) and ICAO.

1.3 Mr. Tim Hailes presided over the meeting in the role as chairperson and was assisted by Mr Peter Dunda, ICAO RO Met, as secretariat. During the conjoint session Mr. Chan Pak Wai, chairperson of the MET/S WG and Mr Hailes were co-chairs.

1.4 A total of 19 Working Papers (WP) and 9 Information Papers (IP) were considered by the MET/IE WG meeting. An additional 7 WPs and 6 IPs were considered during the conjoint session. Copies of the papers and the full report of the MET/IE WG/14 can be accessed at the following website: <http://www.icao.int/APAC/Meetings/Pages/2016-MET-IE-WG14.aspx>. Agreed actions for MET/IE WG/14 and the conjoint session are contained in Appendix B of this paper.

2. Follow-up of previous actions:

2.1 The previous (13th) meeting of the ROBEX WG developed a task list of 7 action items. Following a review by the meeting, 3 action items were considered as completed, 3 were in progress and 1 was yet to commence. The meeting updated the task list showing the status of the action items, a copy of which is provided in Appendix A. The corresponding tasks in the MET/IE WG work programme were also updated by the meeting, as necessary (refer Appendix C).

3. Review and optimization of OPMET exchange schemes

3.1 **IROG Backup Tests:** The 11th annual real-time inter-regional OPMET Gateway (IROG) back-up exercise was conducted by IROGs Singapore and Bangkok on 11 February 2016 to test the procedure for dissemination of APAC OPMET data to the World Area Forecast Centre (WAFc) London by IROG Bangkok in the event that IROG Singapore experiences technical problems.

3.2 The success rate of transmission was marginally lower than the previous year's perfect score (i.e., 2016: 97.5% vs. 2015: 100%). This was attributed to network inefficiency in the Mumbai-Bangkok ATS message handling system (AMHS) circuit, which affected the transmission of OPMET bulletins containing METAR reports and internal system inefficiencies, which affected the transmission of the OPMET bulletins containing TAFs.

3.3 Based on the results of the back-up exercise, the meeting did not consider it necessary to propose changes to the existing back-up procedure between ROdB/IROG Singapore and ROdB/IROG Bangkok.

3.4 **Inter-regional OPMET exchange (APAC-MID):** Since 15 May 2015, IROG Bangkok has commenced the regular relay of APAC OPMET bulletins to the ICAO Middle East (MID) Region, via IROG Jeddah and (backup IROG) Bahrain, on behalf of the APAC Region to take advantage of enhancements to the MID Region OPMET Centres. Following a review of these new arrangements, IROG Bangkok and IROG Singapore have agreed to implement further improvements to ensure the continuity of OPMET exchange between the MID and APAC Regions and to eliminate duplicate data sent from other addresses in the APAC Region.

3.5 The meeting agreed that the description and schematics of the new arrangement should be considered for inclusion in future updates of the (APAC) Regional OPMET Bulletin Exchange (ROBEX) Handbook [Action 14/1].

3.6 **Re-alignment of OPMET bulletins:** In accordance with the recommendation from ROBEX WG/13, and the associated Activity 9 of the ROBEX WG work programme, ROBEX Centre Bangkok has re-aligned the (locations contained within) OPMET bulletins which it is responsible for compiling (under the ROBEX scheme). The changes implemented by ROBEX Centre Bangkok became effective on 30 October 2015. The meeting agreed that the corresponding data in the ROBEX Handbook (i.e., in Tables A, B and C) should be updated accordingly, and at the soonest opportunity [Action 14/2].

3.7 **Improvements to OPMET bulletins:** Australia advised that it has implemented a range of changes to improve the compliance of the format of international OPMET bulletins generated by RODB Brisbane with applicable ICAO provisions.

4. Planning and implementation of digital exchange of meteorological information

4.1 **Status and plans for IWXXM and AMHS within APAC:** In order to assess the status and plans for implementation of both the ICAO Meteorological Information Exchange Model (IWXXM) and AMHS within the APAC Region, a survey of States was conducted from 30 September to 30 October 2015. In total, 21 States have responded to the survey. The information provided by responding States is encouraging, insofar that at least half are aware of the anticipated requirement to exchange OPMET data in IWXXM format with applicability of Amendment 78 to Annex 3 in November 2018.

4.2 An updated version of the results is presented in a separate paper to MET SG/20, so the details won't be repeated in this report. The meeting did however agree to request ICAO to redistribute the survey on behalf of the group, possibly seeking World Meteorological Organization (WMO) assistance in reaching out to non-responding States, in order to obtain additional information about the status of planning and implementation of IWXXM and AMHS in the APAC Region [Action 14/3].

4.3 **Status and plans for IWXXM:** Details of the planning and implementation of digital exchange of OPMET information using IWXXM were provided by Republic of Korea, Australia, Thailand and Singapore.

4.4 Hong Kong, China also advised it was developing a test plan for exchanging digital meteorological information via AMHS infrastructure connecting to neighboring States; initially working with Singapore and Thailand.

4.5 The meeting agreed that such testing conducted between States was of interest to the wider group and the subsequent reporting back to the MET/IE WG was considered a very useful activity supporting a coordinated regional approach to planning and implementation of digital exchange of OPMET information using the IWXXM format.

4.6 The meeting also noted that issues raised in the discussion, such as those of a global nature including: (a) the possible provision of an official website for information such as the latest application tools, Extensible Markup Language/Geography Markup Language (XML/GML) models / schemas and IWXXM announcements and training materials; (b) the provision of a validator to test the compliance of IWXXM data; and (c) the roles of the ROBEX Bulletin Compiling Centres (BCCs), RODBs and IROGs with respect to the regional and inter-regional exchange of digital meteorological

information, should be forwarded to the ICAO Meteorology Panel (METP), Working Group on Meteorological Information Exchange (WG-MIE) as that is the body responsible for development of the ICAO provisions for IWXXM OPMET information and the guidance material required to support implementation of the ICAO provisions

4.5 **IWXXM development summary:** The WMO Task Team on Aviation XML (TT-AvXML), which is responsible for the development of an XML/GML representation of meteorological information for use by the international civil aviation community, is expected to publish the latest version IWXXM 2.x around May 2016. In addition to bug fixes and improvements on the previous release (version 1.1), XML/GML representations of AIRMET and volcanic ash and tropical cyclone advisory information will also be introduced in IWXXM 2.x to meet the proposed additional requirements that will become applicable with Amendment 77 to ICAO Annex 3.

4.7 Given the relatively short period between the expected availability of IWXXM 2.x and the applicability date of Amendment 77 to Annex 3, it is expected that the implementation of the necessary system changes to support the new IWXXM-related provisions will be difficult for many States to achieve by the applicability of the Amendment 77 to Annex 3.

4.7 **Update on the ICAO METP WG-MIE:** The meeting discussed the progress of METP WG-MIE. The METP WG-MIE is primarily responsible for the METP Job Card – Inclusion of aeronautical meteorological information in the SWIM-enabled environment and further development of the SWIM concept relating to meteorology. The meeting discussed its work plan which is organized into 6 work streams: 1) Extensions; 2) Annex 3; 3) SWIM plan; 4) IWXXM guidance; 5) Governance and IMP; and 6) Support and Coordination.

4.8 To promote coordination among States and Regions and facilitate assistance to States with respect to planning and implementation of digital exchange of meteorological information, it is important that the work programme of the (APAC) MET/IE WG takes into consideration the responsibilities and work plan of the METP WG-MIE.

4.9 **OPMET additional parameters:** The MET/P WG-MIE, in its work stream 1) Extensions, is consulting users on optional parameters provided in traditional alphanumeric code (TAC) OPMET messages with a view to documenting the management of these additional parameters and extensions in IWXXM. Benefits of doing this would include a globally consistent method of including such parameters in IWXXM exchanged data. To assist this work, feedback that is provided by States directly to the advisor to the Australian member of METP WG-MIE would be forwarded to the METP WG-MIE for further consideration.

4.10 The meeting noted that while there is currently no ICAO requirement for additional parameters to be included as a remark (e.g., in a RMK field) within TAC messages, the introduction of additional parameters might be necessary in future versions of IWXXM, e.g., if new ICAO requirements for additional parameters in OPMET were to be adopted to meet potential future user needs.

4.11 **Capacity building for implementation of digital exchange of OPMET:** The meeting discussed plans for an ICAO inter-regional Workshop on implementing IWXXM for exchange of OPMET data will be held at the ICAO European and North Atlantic (EUR/NAT) Regional Office in Paris, France, from 31 May to 2 June 2016. The workshop will be dedicated to the regional OPMET data exchange hubs in all ICAO Regions, the WMO, Eurocontrol and other appropriate organisations and experts deemed necessary, and is expected to be the first in a series of regional workshops addressing training and capacity building aspects related to the migration to IWXXM.

4.12 In addition to targeting experts from RODBs, the meeting considered that future capacity building initiatives may need to involve a more diverse audience, such as the high-level decision makers and project managers of the service providers concerned, airline operators and other users of aeronautical meteorological information in the APAC Region.

4.13 Advice from the organizing ICAO Office, i.e., the EUR/NAT Office, was that one or two experts representing the communications and meteorological information aspects of the RODBs would be ideal to support the initial workshop. The meeting noted that 4 APAC RODBs, i.e., Brisbane, Bangkok, Singapore and Tokyo, indicated the intention, or serious consideration, to participate in the workshop.

4.14 The meeting was not provided with information on Fiji's position with respect to participation at the workshop by RODB Nadi, or of the status of planning and implementation of IWXXM at RODB Nadi. Furthermore, the meeting noted that the chair (of MET/IE WG) did seek this information from RODB Nadi prior to the meeting, but received no response. The meeting agreed that the Secretariat should contact Fiji to ascertain the status of planning and implementation of IWXXM at RODB Nadi; and Fiji's intentions with respect to supporting and participating in the IWXXM workshop [Action 14/4].

4.15 The meeting felt that it would also be prudent to seek further advice from the MET SG with respect to any necessary follow-up action for the MET/IE WG related to capacity building for the planning and implementation of digital exchange of meteorological information [action 14/5].

5. Quality control, monitoring and management of meteorological information exchange

5.1 **OPMET monitoring by IATA:** Results of IATA monitoring of APAC OPMET data in 2016 indicated further improvement in overall availability of OPMET over previous years, though there were still some locations where potential problems were highlighted with respect to OPMET availability at the Satellite Distribution System [for meteorological information] (SADIS) and the World Area Forecast System Internet File Service (WIFS). The monitoring also identified locations where the timeliness and regularity of OPMET information may not conform to requirements.

5.2 The meeting agreed that the IATA OPMET monitoring data should be promulgated to States concerned to help improve the availability, timeliness and regularity of OPMET provided by APAC States [Action 14/6].

5.3 **Quality improvement of MET information:** Republic of Korea advised that they have plans to enhance accessibility to Korean aviation meteorological observations, forecasts, warnings and statistics.

5.4 **APAC OPMET performance indices:** For the first time RODB Bangkok has computed and analysed OPMET performance indices of incoming OPMET data derived from 4 RODBs: Bangkok, Brisbane, Singapore and Tokyo during the period 1-31 January 2016. The analysis indicated that the compliance index at a number of locations was lower than 0.5 (note: 1.0 represents perfect compliance). It was agreed that further investigation would be required to determine the cause(s) of the low compliance of OPMET at the locations identified and that coordinated assistance to the States concerned to facilitate resolution of OPMET performance was likely required [Action 14/8]

5.5 The meeting noted in contrast to the 4 APAC RODBs listed above, which have been very supportive of the OPMET monitoring activities, no data was provided by RODB Nadi to support the above analysis. Lack of participation and support from RODB Nadi in the OPMET monitoring activities, which are conducted under the auspices of APANPIRG, over a period of several years has not been helpful towards the MET/IE WG objectives to assist the APANPIRG work programme. The meeting requested the Secretariat raise the significant concerns with Fiji, with respect to the lack of participation by RODB Nadi in the meetings of MET/IE WG and the OPMET monitoring activities [Action 14/7].

5.6 **Web-based OPMET performance indices analyser:** Thailand has developed a new way to analyse OPMET monitoring data using a web-based performance indices analyser to calculate three OPMET performance indices: availability, compliance, and regularity. This system will be made available to facilitate RODBs in analysing OPMET monitoring data and producing reports for future use.

6. Guidance material related to meteorological information exchange

6.1 **Guidelines for the implementation of OPMET data exchange using IWXXM:** The meeting discussed the draft document “Guidelines for the Implementation of OPMET data exchange using IWXXM” is being developed by METP WG-MIE under the work stream 4) IWXXM guidance. To assist this work, feedback on the draft document should be provided by States directly to the advisor to the Australian member of METP WG-MIE (MET/IE WG Chair) who would forward to the METP WG-MIE for further consideration.

6.2 For various possible reasons, including lack of technical capability, resources and understanding, some States may experience difficulties in the development, planning and implementation of IWXXM. Given the relatively limited time frame to address such issues (before applicability of related ICAO Annex 3 provisions), a short-term or interim solution may involve arrangements between States with RODBs performing TAC-to-IWXXM translation on behalf of other States – however the meeting noted that no APAC RODB has currently committed to performing TAC-to-IWXXM translation. In the longer term, however, all States should consider the escalating need to support the generation of IWXXM-formatted meteorological information, as it is anticipated that there would be future capabilities developed in IWXXM that will not be developed in TAC – making the translation of TAC-to-IWXXM increasingly obsolete.

6.3 As the regional implementation of AMHS is a key enabler for the implementation of IWXXM exchange, the meeting noted that coordination among the ICAO APAC regional groups supporting AMHS implementation and IWXXM implementation will be of importance – especially to ensure that the requirements and timelines related to IWXXM implementation are made well known to the expert groups and the service providers concerned with the planning and implementation of the required AMHS systems [Action 14/9].

6.4 Furthermore, the meeting noted the likely need for States to implement AMHS connection between MET service and the national AMHS connection to support IWXXM transfer. It was felt that promulgation of this information would be highly beneficial.

6.5 **ROBEX Handbook updates:** The last ‘major’ amendment of the ROBEX Handbook was published in October 2015. A subsequent ‘minor’ amended was published in December 2015 incorporating updates to reflect current requirements for OPMET at some locations in India.

6.6 New draft amendments to the ROBEX Handbook were presented to the meeting for review, and in some cases were revised with additional input provided by the meeting. Some further development of the draft amendments to the ROBEX Handbook would be required to fully address the issues identified prior to submission of the draft amendments as a mature document for further review and possible approval by the MET SG for onward distribution to and use by States [Action 14/10].

6.7 **APAC ICD updates:** The APAC OPMET Data Banks Interface Control Document (ICD) was last amended in October 2015. There were no new requested changes to the ICD but the RODBs were reminded to notify the Regional Office of any changes in the procedures or content of the respective data banks, such that where required an annual draft amendment to the ICD could be presented to the MET SG for review and possible approval for further distribution to and use by States [Action 14/11].

6.8 **APAC ANP updates:** Subsequent to APANPIRG endorsement of a draft new format for the APAC Regional Air Navigation Plan (ANP), which is based on the common, new template approved by Council in 2014, proposals for amendment of the APAC ANP, Volumes I and II, were circulated by ICAO to States for comment in December 2015 and January 2016, respectively.

6.9 The necessary updates to the Regional ANP data, currently contained in the Facilities and Services Implementation Document (FASID) Tables MET 1A and 1B, which were already discussed at MET SG/19 and related to the responsible MET office for the provision of OPMET information for Honiara, Solomon Islands, and the now redundant reference to meteorological watch office (MWO) requirements at Cairns, Australia, were incorporated into the proposal for amendment of the APAC Regional ANP, Volume II (at Tables MET II-2 and MET II-1), which was circulated to States for comment in January 2016.

6.10 However, the other necessary updates to the Regional ANP data, currently contained in FASID Tables MET 3A and 3B, which were also discussed at MET SG/19 and related to the area of responsibility of tropical cyclone advisory centres and the recipients of information from volcanic ash advisory centres, were not able to be processed in an amendment proposal to the Regional ANP. This was because: (a) a moratorium on other amendments to data in the Regional ANPs was in place to facilitate a smooth transition from the 'old' format of the Regional ANPs to the 'new', common Regional ANP format; and (b) the information related to tropical cyclone advisory centres and volcanic ash advisory centres (previously contained in FASID Tables MET 3A and 3B) was not incorporated in the new Regional ANP format, at Volumes I and II.

6.11 Given the above, the Secretariat was requested to make available to States the required updates to information concerning tropical cyclone advisory centres and volcanic ash advisory centres (in FASID Tables MET 3A and 3B), which were discussed previously at MET SG. Furthermore the Secretariat was requested to confirm where the information contained in FASID Tables MET 3A, 3B, 3C, 5 and 6 and Charts MET 1 and 2 will be available longer term [Action 14/12].

7. Report on Conjoint Session

7.1 **Follow-upon previous actions:** The previous conjoint session, i.e., ROBEX WG/13 and the 5th meeting of the Meteorological Hazards Task Force (MET/H TF/5), developed a task list of 8 action items. The meeting considered that 5 action items were completed; 1 was on hold; 1 was in progress; and 1 was yet to commence. An updated task list showing the status of the action items is contained at the Appendix A.

7.2 Although the action item number 7 concerning guidance supporting clarity and consistency of information within tropical cyclone advisory and SIGMET messages in the region was completed, the follow-up on the resultant APANPIRG Conclusion 26/53, which was envisaged to be assigned by ICAO to the Meteorology Panel (METP) for further action, should be expedited to meet the timeframe for possible Annex 3 amendments to be considered [Action 1].

7.3 Advisers or members of the METP from Australia and Japan were encouraged to raise the issues discussed above at the earliest opportunity with the METP and/or appropriate working groups of the METP so that the proposals concerning clarity and consistency of information within tropical cyclone advisory and SIGMET messages may be considered for incorporation in the development of proposals for future Amendments to Annex 3.

8. Review and optimization of VAAC Backup Tests

8.1 **Back-up operations between VAACs Tokyo and Darwin:** Mutual back-up tests were conducted between the VAAC Darwin and VAAC Tokyo on 25 November 2015 and 27 January 2016. Recommendations arising from the back-up test included:

- a) VAACs (Darwin and Tokyo) continue to promote the implementation and understanding of the International Airways Volcano Watch (IAVW) through active engagement with regional MWOs;
- b) VAACs use test results to identify the necessity to update the list of aeronautical fixed telecommunication network (AFTN) addresses used for the provision of volcanic ash (VA) advisory information; and use airlines' feedback concerning the provision of VA advisory information in graphical format (VAG) to enhance the back-up operations performance; and
- c) VAACs continue to conduct annual back-up testing.

8.2 Future back-up test reports should include responses received to the volcanic ash test message; listed by State, and include the list of email addresses to which the notice of the back-up test was disseminated.

9. SIGMET and (volcanic ash and tropical cyclone) advisory information (including SIGMET tests)

9.1 **SIGMET tests:** Annual SIGMET tests were conducted in the APAC Region on 4 November 2015 (WC SIGMET test for tropical cyclone), 11 November 2015 (WV SIGMET test for volcanic ash) and 18 November 2015 (WS SIGMET test for phenomena other than tropical cyclone and volcanic ash).

9.2 The meeting noted that a relatively short lead time was provided by the ICAO State letter invitation to participate in the SIGMET tests and considered that this would have resulted in some MWOs having insufficient time to prepare for and hence participate in the tests (in particular the WC SIGMET test on 4 November), which would have contributed to the significantly lower level of participation (20%) recorded in the SIGMET test results as compared with the previous year.

9.3 In view of the above, the feasibility of re-conducting the WC SIGMET test was discussed, but it was not considered this would be useful or necessary as the next, scheduled annual SIGMET tests (WC, WV and WS) were due to be held in 2016. For future SIGMET tests, however,

the formal notification of the conduct of SIGMET tests should be distributed to States no later than 1 month prior to the scheduled test.

9.4 In addition to the discussion above, an unexpected delay in the issuance of the triggering test tropical cyclone advisory message from tropical cyclone advisory centre (TCAC) Tokyo, at the start of the WC SIGMET test, which was attributed to an internal TCAC system error, was considered to also have contributed to the lower level of participation of MWOs that was highlighted in the WC SIGMET test results.

9.5 In general, the errors recorded in the test SIGMET messages issued by some States included incorrect usage of codes, namely the message priority code, abbreviated header information, SIGMET message sequence number and the flight information region (FIR) identifier. Australia noted that it had implemented some internal system changes since the SIGMET tests were conducted and that this would have resolved the errors reported in test SIGMET messages issued from Australia.

9.6 Some MWOs issued multiple SIGMET bulletins (during the WC SIGMET test) containing the same test SIGMET messages, which was not desirable as it could result in confusion for the recipients, including Regional OPMET Databanks (RODBs) that analyse the SIGMET test data.

9.7 In accordance with expectations for the SIGMET test for volcanic ash, test WV SIGMET messages were issued by and received from the 9 designated MWOs in the Russian Federation – located in the neighbouring ICAO European (EUR) Region.

9.8 4 States (i.e., Democratic People's Republic of Korea, Maldives, Republic of Korea and Sri Lanka), including 11 MWOs, did not participate in the WS SIGMET test on 18 November 2015.

9.9 Notwithstanding the shorter lead time provided by the invitation letter for the SIGMET tests (as already discussed at 2.2), 2 States and 2 MWOs, namely Afghanistan (MWO Kabul) and Papua New Guinea (MWO Port Moresby), have not participated in any of the SIGMET tests conducted in the APAC Region since 2006.

9.10 The WS SIGMET test results showed that the rate of reception of SIGMET test messages at the APAC RODBs and the EUR Regional OPMET Centres (ROCs) and RODBs, varied, with fewer WS SIGMET test messages being received at the EUR ROC/RODBs than at the APAC RODBs.

9.11 Clarification of the responsibilities and the correct path for the relay of SIGMET messages (from the source) to SADIS and WIFS gateways may help to address the discrepancies in SIGMET message reception discussed above.

9.12 The overall reception rate of WS SIGMET test messages at the APAC RODBs was slightly higher than the previous year. The meeting requested the Secretariat to formally advise those States which did not participate or where rectification of errors is required [Action 2].

9.13. **Cooperation on SIGMET tests between Japan, Lao PDR and Myanmar:** The meteorological service provider for Japan (JMA) has been providing cooperative technical assistance to the meteorological service providers in Lao People's Democratic Republic (Lao PDR) and Myanmar since 2014 to support improvement in the issuance of SIGMET information in Lao PDR and Myanmar.

9.14 The cooperative assistance resulted in improved SIGMET test participation for both Lao PDR and Myanmar, which suggested that cooperative technical assistance (between States) can be an effective way to support improvement in the provision of aeronautical meteorological services, such as SIGMET information.

9.15 **SIGMET Guide:** Proposed amendments to the Regional SIGMET Guide drafted by the previous conjoint session were reviewed and expanded by MET SG/19 and finally endorsed by APANPIRG/26. Subsequently, the new (5th Edition) APAC Regional SIGMET Guide was published by ICAO.

9.16 The meeting noted that it was necessary to update the SIGMET Guide to reflect any changes necessary for alignment with Amendment 77 to Annex 3. Coordination with other ICAO Regions would be important to maintain consistency with other Regional SIGMET Guides and assistance should be sought from the ad-hoc group members that developed the common Regional SIGMET Guide template, which included a member from the SADIS Provider State [Action 3].

9.17 **SIGMET pamphlets:** A draft new SIGMET pamphlet was developed as a quick reference guide for States to use in the preparation of (WV) SIGMET messages. The ad-hoc group will present the final draft of the new WV SIGMET pamphlet for review by the MET SG and possible adoption and distribution for use by States.

9.18 In view of the above, the meeting formulated the following draft conclusion for the MET SG:

MET SG/20 Draft Conclusion 20/X – SIGMET Pamphlets

That, ICAO be invited to adopt the SIGMET Pamphlet, provided by the ad-hoc group, as Regional guidance material and distribute to States to facilitate improved format of SIGMET information for volcanic ash.

9.19 **Regional guidance on SIGMET for radioactive cloud:** The draft regional guidance material on the issuance of SIGMET for radioactive cloud, was presented to MET SG for further review and consideration and subsequently forwarded to the METP Meteorological Information and Service Development Working Group (WG-MISD) held in November 2015, which is the global group primarily responsible for developing the guidance material to support Annex 3 provisions. Further work by the ad-hoc group would not be necessary unless advised by MET SG.

9.20 **Automated guidance for SIGMET information on thunderstorms:** Australia has developed a thunderstorm decision support tool, referred to as the “Cloud Object Tracking and Classification” or COTAC software, which utilises a machine learning algorithm, coupled with meteorological satellite imagery and lightning detection technology to detect and track areas of thunderstorm activity, and is used to support the issuance of SIGMET information. Australia advised of the criteria used to determine whether the detected and tracked thunderstorm activity warrants issuance of SIGMET information.

9.21 **Issuance of tropical cyclone advisory information in graphical format by TCAC Tokyo:** The issuance of tropical cyclone advisory information in graphical format (TCG) by TCAC Tokyo commenced on August 2015. The TCG information is prepared in accordance with Annex 3 requirements and is made available at the TCAC Tokyo website and WAFC information services.

9.22 The system used to generate the TCG is not limited to the use of a circle-shaped area for the depiction of the geographical extent of (frequent) cumulonimbus (CB) clouds. Rather, it is enabled to more precisely reflect the true shape of the observed extent of CB clouds associated with a tropical cyclone.

9.23 **Darwin VAAC Management Report:** Darwin VAAC issued in total 2592 VAAs, and corresponding VAGs, in the 12 months (from 1 February 2015 to 31 January 2016) – representing a substantial increase in the provision of VAA/VAG compared with previous years.

9.24 Several factors were attributed to the increase in VAA/VAG issuance, including: introduction of a more frequent updating cycle for VAA/VAG (i.e., during significant events, routine issuance increased from 6-hourly to 3-hourly); increased availability and quality of observational data (such as Himawari-8 satellite imagery) resulted in more detections of VA; and an overall increase in the level volcanic activity that occurred in the VAAC's area of responsibility.

9.25 **Monthly VONA issuance drill between PHIVOLCS and VAAC Tokyo:** The national provider of volcano observatories in Philippines (PHIVOLCS) and the VAAC Tokyo have established and implemented a cooperative, monthly VONA issuance drill to facilitate improved issuance of VONA by all the volcano observatories of PHIVOLCS and, hence, to support the issuance and exchange of timely volcanic ash advisory information in the Region and safety of aviation in volcanic ash events.

9.26 **Report of VOLKAM15 and aim of VOLKAM16:** The third ICAO EUR (EAST) volcanic ash exercise (VOLKAM15) was conducted during 15-16 April 2015, and demonstrated the exchange of VONA, SIGMET information for VA, VAA and Notice to Airmen (NOTAM), issued via AFTN and/or via email, and the responses of aircraft operators, meteorological offices and Air Traffic Services (ATS) units. VAACs Tokyo and Anchorage demonstrated enhanced communication and coordination with the practice of VAAC handover procedures. More detailed discussion on highlights from VOLKAM15 is provided in IP/C2.

9.27 The fourth ICAO EUR (EAST) volcanic ash exercise (VOLKAM16) will be conducted during 21-22 April 2016, and then reviewed in May 2016 by the EUR (EAST) VOLCEX/SG.

10. Review of Work Programme

10.1 The TORs, detailed work programme and composition of the group were reviewed and updated as detailed in the Appendix C.

11. Next Meeting

11.1 The next meeting was tentatively scheduled for 20 to 22 March 2017 in Bangkok, Thailand, with the inclusion of a conjoint session with the MET/S WG on 22 March 2017

12 Action by the Meeting

12.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) provide advice on future requirement for IWXXM capacity building workshops;
- c) provide updates to the list of agreed actions; and
- d) formulate actions as appropriate.

**APPENDIX A FOLLOW-UP OF AGREED ACTIONS FROM
 ROBEX WG/13 AND THE CONJOINT SESSION WITH MET/H TF/5**

Updated: 11 May 2016

ROBEX WG/13 – (Highlighted text indicates updated information from MET/IE WG/14)

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/REMARKS
13/1	Post the list of WIFS accounts and approving officials in the APAC Region on the ICAO Regional Office web site (http://www.icao.int/apac/pages/default.aspx), e.g., with a link to APAC eDocuments.	June 2015	Secretariat	COMPLETED Related to ROBEX WG/13 Decision 13/1
13/2	Draft revisions to the guidance for OPMET monitoring (e.g., in the ROBEX Handbook and IATA OPMET monitoring practices) to address the specific requirements in ROBEX WG/13 Decision 13/2 and present to MET SG/20 .	June 2016	Secretariat and ROBEX WG	IN PROGRESS Related to ROBEX WG/13 Decision 13/2 To be discussed at MET SG/20
13/3	Consider the feasibility of realigning the locations in corresponding METAR (SA) and TAF (FT) bulletins and report to MET SG/20 .	June 2016	Secretariat and ROBEX WG	IN PROGRESS Related to ROBEX WG/13 Decision 13/3 To be discussed at MET SG/20
13/4	Forward the Draft Conclusion 13/4 – <i>Capacity building workshop to facilitate planning and implementation of digital exchange of aeronautical meteorological information</i> , to MET SG/19 for further consideration.	July 2015	Secretariat and Chair (ROBEX WG)	COMPLETED Related to ROBEX WG/13 Draft Conclusion 13/4

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/REMARKS
13/5	Present a WP to MET SG/19 on the current status of planning and implementation by States (including Fiji/RODB Nadi), and their needs and requirements to support planning and implementation of IWXXM.	July 2015	Secretariat and ROBEX WG	COMPLETED Related to ROBEX WG/13 Decision 13/5
13/6	Draft revisions to the ROBEX Handbook to address the specific requirements in ROBEX WG/13 Decision 13/6 and present to MET SG/20 .	June 2016	Secretariat and ROBEX WG	IN PROGRESS Related to ROBEX WG/13 Decision 13/6 To be discussed at MET SG/20
13/7	Investigate feasibility of including provisions in the regional guidance material related to the issuance of routine TAF at intervals of three (3) hours; present draft material to MET SG/20 .	June 2016	Secretariat and ROBEX WG	TO BEGIN Related to ROBEX WG/13 Decision 13/7 To be discussed at MET SG/20

CONJOINT SESSION OF ROBEX WG/13 AND MET/H TF/5: (Highlighted text indicates updated information from MET/IE WG/14 & MET/S WG/6)

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS/REMARKS
1	Review and update, as necessary, the distribution list for the VAAC back-up test State letter invitations and supporting documentation.	Jun 2015	Secretariat in consultation with VAACs and States	ON HOLD Related to Decision (ROBEX WG/13-MET/H TF/5)/1

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS/REMARKS
2	Review and update the lists of AFTN addresses used for MWOs and ACCs in VAAC back-up tests, including in VAAC Wellington's area of responsibility.	Jun 2016	Secretariat in consultation with VAACs and States	IN PROGRESS Related to Decision (ROBEX WG/13-MET/H TF/5)/2 To be discussed at MET SG/20
3	Promulgate the detailed data in Appendices 1 and 2 to WP/C2, Tables 1 and 2 in WP/C3 and Tables 1 and 2 in WP/C4 to highlight problems in test SIGMET issuance to the States/MWOs concerned.	Nov 2015	Secretariat	COMPLETED Related to Decision (ROBEX WG/13-MET/H TF/5)/3
4	Investigate and report (to MET SG/19) on the feasibility of collaboration between ICAO, Japan and WMO with respect to a proposed SIGMET workshop (hosted by Japan in 2016) to facilitate improved issuance of SIGMET in the Asia/Pacific.	Jul 2015	Secretariat in consultation with Japan	COMPLETED Related to Decision (ROBEX WG/13-MET/H TF/5)/4
5	Review the draft Regional SIGMET Guide provided in the revised Attachments 1 and 2 in WP/C5 then submit for final approval process and dissemination to States for use as Regional guidance.	Oct 2015	Secretariat and ad hoc group: Australia (Rapporteur), Hong Kong-China, Japan, New Zealand	COMPLETED Related to Decision (ROBEX WG/13-MET/H TF/5)/5
6	Further investigate the feasibility of the use of social media sites to make the VONA information accessible to users.	Mar 2016	Secretariat in consultation with VAACs	COMPLETED Related to Decision (ROBEX WG/13-MET/H TF/5)/6
7	Develop a working paper for MET SG/19 (highlighting the issues raised in WP/C8 and IP/C5) with proposal(s) for the improvement of guidance supporting clarity and consistency of information within tropical cyclone advisory and SIGMET messages in the Region.	Jul 2015	Ad hoc group: Australia (rapporteur), Hong Kong-China and Japan (note: Secretariat to invite India), IATA and/or IFALPA	COMPLETED Related to Decision (ROBEX WG/13-MET/H TF/5)/7
8	Consider the promotion of the issuance of special air-reports to support information sharing, especially with respect to hazardous phenomena, in a consistent manner as required throughout the Region.	Jun 2016	Secretariat in consultation with IFALPA	TO COMMENCE Related to Decision (ROBEX WG/13-MET/H TF/5)/8 To be discussed at MET SG/20

APPENDIX B
AGREED ACTIONS/TASKS FROM MET/IE WG/14 AND THE CONJOINT SESSION WITH MET/H TF/5

Updated: 11 May 2016

MET/IE WG/14 – Adapted from the Report of MET/IE WG/14:

TASK	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/REMARKS
14/1	Draft an updated IROG schematic for the ROBEX Handbook	Jun 2016	Secretary, Thailand	TO BEGIN To be discussed at MET SG/20
14/2	Process amendment to the ROBEX Handbook, Tables A, B and C, to reflect the updated OPMET bulletins compiled by RODB Bangkok	Jun 2016	Secretary, Thailand	TO BEGIN To be discussed at MET SG/20
14/3	Re-distribute the survey on the status of planning and implementation of IWXXM and AMHS	Jun 2016	Secretary	TO BEGIN To be discussed at MET SG/20
14/4	Obtain confirmation from Fiji on: a) The status of planning and implementation of IWXXM at RODB Nadi; and b) Fiji's intentions with respect to supporting and participating in the IWXXM workshop	Apr 2016	Secretary	TO BEGIN To be discussed at MET SG/20
14/5	Obtain instruction from MET SG on any necessary follow-up action related to capacity building for the planning and implementation of digital exchange of meteorological information	Jun 2016	Chair, Secretary	TO BEGIN To be discussed at MET SG/20
14/6	Forward OPMET monitoring information to States concerned and SADIS/WIFS providers	Jun 2016	Secretary	TO BEGIN To be discussed at MET SG/20
14/7	Notify Fiji of the MET/IE WG's significant concerns regarding RODB Nadi representation at the WG and participation in OPMET monitoring	Jun 2016	Secretary	TO BEGIN To be discussed at MET SG/20
14/8	Coordinate corrective action with States concerned to facilitate resolution of OPMET performance (low compliance) issues	Jun 2016	Secretary, RODBs	TO BEGIN To be discussed at MET SG/20

TASK	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/REMARKS
14/9	Recommend appropriate links to other regional (communications-related) expert groups to promote the requirements for AMHS with extended services and timelines to support IWXXM and to promote the requirement for connection between MET service and national AMHS connection to support IWXXM transfer	Jun 2016	Chair, Secretary	TO BEGIN To be discussed at MET SG/20
14/10	Complete the revised draft amendments to the ROBEX Handbook	Jun 2016	Secretary	TO BEGIN To be discussed at MET SG/20
14/11	Complete the draft amendments to the ICD	Jun 2016	Secretary, RODBs	TO BEGIN To be discussed at MET SG/20
14/12	Publish agreed updates to information in FASID Tables MET 3A and 3B and confirm the future location for the information contained in FASID Tables MET 3A, 3B, 3C, 5 and 6 and Charts MET 1 and 2	Jun 2016	Secretary	TO BEGIN To be discussed at MET SG/20

Conjoint Session of MET/IE WG/14 and MET/H TF/5: Adapted from the Report of MET/IE WG/14:

TASK	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/REMARKS
1	Report on follow-up related to APANPIRG Conclusion 26/53	Jun 2016	Secretary	TO BEGIN To be discussed at MET SG/20
2	Promulgate results of the 2015 SIGMET test to States concerned	Jun 2016	Secretary	TO BEGIN To be discussed at MET SG/20
3	Prepare draft amendment to the APAC Regional SIGMET Guide to align with Amendment 77 to Annex 3.	Jun 2016	Chairs, Secretary	TO BEGIN To be discussed at MET SG/20

APPENDIX C
ICAO ASIA/PACIFIC
METEOROLOGICAL INFORMATION EXCHANGE WORKING GROUP
(MET/IE WG)

TERMS OF REFERENCE AND WORK PROGRAMME

1. COMPOSITION

The **MET/IE WG** ~~ROBEX WG~~ is made up of members from States representing the five APAC Regional OPMET Data Banks (RODBs): *Australia/Brisbane, Fiji/Nadi, Japan/Tokyo, Singapore and Thailand/Bangkok*; the World Area Forecast System (WAFS), **Secure Aviation Data Information Service** ~~Satellite Distribution System~~ (SADIS) and WAFS Internet File System (WIFS) Provider States: *United Kingdom and United States*; the three APAC Volcanic Ash Advisory Centres (VAACs): *Australia/Darwin, Japan/Tokyo and New Zealand/Wellington*; the designated focal points for SIGMET tests and regional OPMET bulletin exchange (ROBEX); and the International Air Transport Association (IATA).

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2. DESCRIPTION

Objective	Increase OPMET availability and reliability needed for flight planning (efficiency) and in-flight re-planning (safety) in support of the Global Air Navigation Plan framework and the aviation system block upgrade (ASBUs) methodology.
Benefits	Increase in safety and efficiency (time and fuel savings).
Terms of	Under guidance from the ICAO Secretariat:

Reference	<ul style="list-style-type: none"> a) Review the OPMET exchange schemes in the APAC and other regions and develop proposals for their optimization, taking into account the requirements by the aviation users and global OPMET exchange; b) Monitor and participate in trials of digital aeronautical meteorological information exchange inter- and intra- regionally; c) Develop standardized quality control, monitoring and management procedures related to exchange of IWXXM and TAC OPMET information; d) Review the regional guidance material related to OPMET exchange; e) Liaise and consult with other appropriate bodies within ICAO and WMO dealing with communication and/or management aspects of the OPMET exchange; and f) Provide advice and report to the MET Sub-group on the above issues for further co-ordination through the ICAO Secretariat with other appropriate bodies.
Work Programme	<p>The work to be addressed by the MET/IE WG includes:</p> <ul style="list-style-type: none"> - Examine new and existing requirements for OPMET exchange in APAC, MID and other neighbouring regions along with the WAFS Provider States and assess the feasibility of satisfying these requirements, taking into account the availability of the data; - Keep the ROBEX scheme and other OPMET exchange schemes under review and prepare proposals for updating and optimizing the schemes; - Review and update of the procedures for inter-regional OPMET exchange and ensure the availability of the required APAC and MID OPMET data for Secure-SADIS FTP and WIFS; - Review the regional guidance material on OPMET exchange to ensure procedures are provided for the exchange of all required OPMET data types: SA, SP, FT, WA, WS, WC, WV, FK, FV and UA; - Conduct trials and develop procedures for quality control, monitoring and management of the OPMET exchange to foster implementation of quality management of OPMET data by the ROBEX centres and the RODBs; - Develop quality control guidance material and promote implementation of quality control for OPMET management - Report on deficiencies in the format and dissemination of OPMET messages; - Participate in the testing, implementation and promote awareness of the transition to digital exchange of OPMET using a code form based on IWXXM; - Conduct regular regional VAAC back-up and SIGMET tests; and - Provide support for the APAC Volcanic Ash Exercises - Develop quality control guidance material and promote implementation of quality control for OPMET management.

3. COMMUNICATION STRATEGIES				
Description	Target Audience	Delivery Method	Frequency / Date	Responsibility
Work Plan	MET/IE WG Members	Document via email & MET/IE WG Meeting	As required but reviewed at the MET/IE WG Meeting and the MET SG	Chair
General	MET/IE WG	Email	As required	MET/IE WG

correspondence	Members			Members
Working Group Meeting	MET/IE WG Members	Meeting	Annually	Chair
Status & Milestone Reports	ICAO Secretariat and MET/IE WG Members	Report via email & WP at MET/IE WG Meeting	Annually	Chair
Task Force Report	All APAC States	Working Paper at MET SG	Annually	Chair

4. PERFORMANCE FRAMEWORK FORM (PFF)

Tasks	Time Frame	Responsibility	Status	Milestone
Task 1: Improve the availability of OPMET data	Ongoing	MET/IE WG		1
Task 2: Improve timeliness, compliance and regularity of OPMET exchange	Ongoing	MET/IE WG		2
Task 3: Identify gaps and errors in processes, procedures and OPMET exchange	Ongoing	MET/IE WG		3, 4, 5
Task 4: Review regional guidance material related to OPMET data	Ongoing	MET/IE WG		3, 4, 5, 6
Task 5: Facilitate and monitor the migration to IWXXM in support of SWIM	2016-2018	MET/IE WG		7
Task 6: Review the RODB OPMET Exchange structure	2017	MET/IE WG		8

5. MILESTONES

Milestone	Accountability	Dates	Status
Milestone 1: Achieve 95% (90%) or greater OPMET availability for AOP (non-AOP) aerodromes where OPMET information is required at RODBs, Secure SADIS FTP and WIFS (i.e., aerodromes listed in former FASID Table MET 2A).	MET/IE WG	Annually Jun	
Milestone 2: Achieve OPMET timeliness, compliance and regularity index of 0.95 (0.90) for AOP (non-AOP) aerodromes where OPMET information is required at RODBs, Secure SADIS FTP and WIFS (i.e., aerodromes listed in former FASID Table MET 2A).	MET/IE WG	Annually Jun	
Milestone 3: SIGMETs tests conducted, analysed and report complete.	MET/IE WG	Annually Jun	
Milestone 4: VAAC Back-up tests conducted, analysed and report complete.	VAAC Back-up Focal Points	Annually Jun	
Milestone 5: IROG Back-up tests conducted, analysed and	Bangkok	Annually	

report complete.	RODB	Mar	
Milestone 6: RODB Monitoring procedures updated in ROBEX Handbook.	Secretariat	Jun 2014	
Milestone 7: Report to MET/IE WG & MET SG on IWXXM exchange & testing.	Secretariat & Chair	Annually Mar & May	
Milestone 8: RODB OPMET Exchange structure review complete.	MET/IE WG	2017	
Milestone 9: Improved efficiency and effectiveness of ROBEX scheme.	RODBs	Annually Jun	

6. WORK PLAN				
Activity / Milestone	Accountability	Predecessors	Date	Status
Activity 1: Increasing OPMET availability for aerodromes where OPMET information is required at RODBs, Secure SADIS FTP and WIFS (i.e., aerodromes listed in former FASID Table MET 2A)				
Activity 1.1: Tokyo RODB to investigate providing Bangkok RODB data in standard format	Tokyo RODB	-	TBA	
Activity 1.1: Perform real time monitoring if required	RODBs & IATA	-	If required	
Activity 1.2: Monitor RODB OPMET reception in Jan and use Dec as PI threshold.	RODBs	-	Annually Dec/Jan	
Activity 1.3: Monitor SADIS/WIFS OPMET reception.	IATA	-	Annually Jan	
Activity 1.4: Score against ANP Table MET II-2 (and former FASID Table MET 2A).	Singapore, Tokyo, RODB Bangkok RODBs & IATA	1.3 & 1.4	Annually Feb	
Activity 1.5: Prepare ROBEX paper and report results and deficiencies to MET/IE WG meeting.	RODB Bangkok & IATA	1.5	Annually Mar	
Activity 1.7: Report summary of OPMET availability results to MET SG	Secretariat & Chair	1.6	Annually May	
Activity 1.8: Advise States of OPMET deficiencies.	Secretariat	1.7	Annually Jun	
Activity 1.9: Provide support for States to rectify deficiencies if requested.	RODBs	1.8	As required	
Activity 1.10: Exchange a common dataset and assess the consistency between RODBs of the 'availability' calculation and standardise.	Singapore, Tokyo, Bangkok RODBs	-	TBA	

6. WORK PLAN				
Activity / Milestone	Accountability	Predecessors	Date	Status
Milestone 1: Achieve 95% (90%) or greater OPMET availability for AOP (non-AOP) aerodromes at RODBs & WAFS.	MET/IE WG	1.9	Annually Jun	
Activity 2: Improving OPMET timeliness, compliance and regularity at RODBs and WAFS Internet based Services				
Activity 2.1: Investigate the ingestion of AMHS data into analysis	Bangkok & Tokyo RODB	-	TBA	
Activity 2.1: Monitor & collate OPMET data timeliness, compliance and regularity in Jan and use Dec as PI threshold.	RODBs & IATA	-	Annually Dec/Jan	
Activity 2.2: Collate and Analyse data	Singapore, Tokyo, Bangkok RODB & IATA	2.1	Annually Feb	
Activity 2.3: Prepare paper and report State irregularities to MET/IE WG meeting	Bangkok RODB & IATA	2.2	Annually Mar	
Activity 2.4: Report summary of OPMET timeliness, compliance and regularity results to METSG	Chair	2.3	Annually May	
Activity 2.5: Inform States of compliance	Secretariat	2.4	Annually Jun	
Activity 2.6: Provide support for States to rectify deficiencies if requested.	RODBs	2.5	As required	
Activity 2.7: Exchange a common dataset and assess the consistency between RODBs of the timeliness, compliance and regularity calculation and standardise.	Singapore, Tokyo, Bangkok RODBs	-	TBA	
Activity 2.8: Correct identified issues relating to inconsistencies identified.	Singapore, Tokyo, Bangkok RODBs	2.7	TBA	
Milestone 2: Achieve 95% (90%) or greater OPMET timeliness, compliance and regularity for AOP (non-AOP) aerodromes at RODBs & WAFS.	MET/IE WG	2.6	Annually Jun	
Activity 3: SIGMET Tests				
Activity 3.1: Review SIGMET Test procedures	MET/IE WG	-	Annually Aug	

6. WORK PLAN				
Activity / Milestone	Accountability	Predecessors	Date	Status
Activity 3.2: State Letter regarding SIGMET Tests	Secretariat	3.1	Annually Sep	
Activity 3.3: Conduct WC SIGMET Tests	RODBs	3.2	Annually 1 st Wed in Nov	To be conducted on 2 Nov 2016
Activity 3.4: Conduct WV SIGMET Tests	RODBs	3.2	Annually 2 nd Wed in Nov	To be conducted on 9 Nov 2016
Activity 3.5: Conduct WS SIGMET Tests	RODBs	3.2	Annually 3 rd Wed in Nov	To be conducted on 16 Nov 2016
Activity 3.6: Collate and analyse test data against ANP Table MET II-2 (and former FASID Table MET 2A)	RODBs	3.3 - 3.5	Annually Jan	
Activity 3.7: Report to MET/IE WG	SIGMET Focal Points	3.6	Annually Mar	
Activity 3.8: Report on SIGMET Test Results to MET SG.	Chair	3.7	Annually May	
Activity 3.9: Advise States of SIGMET deficiencies	Secretariat	3.8	Annually Jun	
Milestone 3: Improved issuance and compliance of test SIGMETs	MET/IE WG	3.9	Annually Jun	
Activity 4: VAAC Back-up Tests				
Activity 4.1: Review VAAC Back-up Test procedures	MET/IE WG and VAACs		Annually Jan	
Activity 4.2: Update VAAC Back-up Procedures	Secretariat	4.1	Annually May	
Activity 4.3: Issue Notice of State Letter regarding VAAC Back-up Tests	Secretariat/ VAA Cs	4.1	Annually Aug	
Activity 4.4: Conduct VAAC Back-up Test between Darwin and Tokyo	VAACs	4.3	Annually Oct – TBC	
Activity 4.5: Conduct VAAC Back-up Test between Darwin and Wellington	VAACs	4.3	Annually Oct – TBC	
Activity 4.6: Collect test results and send to VAAC Provider State members	RODBs	4.4	Annually Oct – TBC	
Activity 4.7: Analyse Test results	VAAC Back-up Focal Points Members	4.5	Annually Nov	

6. WORK PLAN				
Activity / Milestone	Accountability	Predecessors	Date	Status
Activity 4.8: Report to MET/IE WG	VAAC Back-up Focal Points Members	4.6	Annually Feb	
Activity 4.9: Report to MET SG.	Chair	4.8	Annually May	
Activity 4.10: Advise relevant States, VAACs and RODBs of any deficiencies.	Secretariat	4.7	Annually Jun	
Milestone 4: VAAC Back-up Tests conducted, analysed and report complete.	VAAC Back-up Focal Points Members	4.8	Annually Jun	
Activity 5: IROG Back-up Tests				
Activity 5.1: Investigate back-up arrangements of IROG Tokyo & Brisbane	Secretariat	-	TBA	
Activity 5.2: Review IROG Back-up Test procedures to include all IROG.	All IROGs	-	Annually Feb	
Activity 5.3: Updated IROG Back-up Procedures in ROBEX Handbook.	Secretariat	5.2	Annually May	
Activity 5.4: Identify list of MET Bulletins to monitor.	All IROGs	-	Annually Jan/Feb	
Activity 5.5: Conduct IROG Back-up Tests	All IROGs	5.4	Annually Jan/Feb	
Activity 5.6: Collect & analyse test results	All IROGs	5.5	Annually Feb	
Activity 5.7: Report to MET/IE WG	Bangkok RODB	5.6	Annually Mar	
Milestone 5: IROG Back-up Tests conducted, analysed and report complete.	Bangkok RODB	5.7	Annually Mar	
Activity 6: APAC RODB Monitoring procedures				
Activity 6.1: Letter to ROBEX Centres requesting confirmation that ROBEX Handbook Appendix A, B & C has the correct information regarding the Bulletins. Also ask for Hours of Operation and Issue Times of METAR and TAF.	Secretariat	-	Annually May	

6. WORK PLAN				
Activity / Milestone	Accountability	Predecessors	Date	Status
Activity 6.2: Review ROBEX Handbook Appendix A & B table structure to include columns for Hours of Operation and Issue Times.	Chair	6.1	Annually Jul	
Activity 6.2: Review monitoring procedure in ROBEX Handbook and update as necessary.	All RODBs	-	Annually Aug	
Activity 6.3: RODBs to indicate differences in procedures and resolve these differences.	All RODBs	6.2	Annually Aug	
Activity 6.3: Any changes to RODB monitoring procedures and updates to Appendix A, B and C in ROBEX Handbook.	Secretariat	6.1 & 6.2	Annually Sep	
Milestone 6: RODB Monitoring procedures updated in ROBEX Handbook	Secretariat	6.4	Annually Sep	
Activity 7: New OPMET Exchange Formats				
Activity 7.1: Monitor migration to IWXXM.	Secretariat WG	-	As required	
Activity 7.2: Undertake IWXXM tests with other centres.	Singapore RODB WG		TBA 2018	
Activity 7.3: Report to MET SG on plans for implementation of XML schema at APAC RODBs.	Secretariat		Next meeting MET SG	
Activity 7.4: Conduct a trial of IWXXM.	Singapore RODB	7.2	Mar 2016	
Activity 7.4: Consider options and strategies for the exchange of OPMET data in IWXXM format within its area of responsibility.	WG		Feb 2016	
Activity 7.5: Increase awareness of the requirement for States to exchange of OPMET data in IWXXM format and the impact of inability to do so.	WG		As required	
Activity 7.6: Report to MET/IE WG on the status of the testing and implementation of digital OPMET exchange.	RODBs		Annually Mar	

6. WORK PLAN				
Activity / Milestone	Accountability	Predecessors	Date	Status
Activity 7.7: Report to MET/IE WG regarding testing and implementation of digital OPMET exchange internationally.	Secretariat		Annually Mar	
Activity 7.8: Prepare information (e.g. issues, CONOPS) for MET/P WG-MIE ICAO international IWXXM Working Group	WG		Feb 2016	
Activity 7.9: Participate in the ICAO international IWXXM Working Group.	WG		Mar 2016	
Milestone 7: Report to MET/IE WG & MET SG on IWXXM exchange & testing.	Secretariat & Chair	7.7	Annually May	
Activity 8: Review OPMET Exchange RODB Structure				
Activity 8.1: Review ROBEX Scheme diagram vs Table in 11.1 of ROBEX Handbook.	All RODBs		May Annually 2016	
Activity 8.2: Review AFTN network diagram and add an AMHS diagram in the ROBEX Handbook.	Secretariat	-	May Annually TBA	Note: a replacement CNS Chart is not available.
Activity 8.3: Review role and responsibilities of OPMET exchange RODB structure taking into account: <ul style="list-style-type: none"> ○ Capability; ○ IWXXM readiness; ○ Delivery methods (internet, AMHS); ○ New Products (i.e. ATM requirements); ○ International consistency. 	MET/IE WG	-	2017	
Activity 8.4: Investigate the necessity to include guidance related to IWXXM in the ROBEX Handbook.	WG		June 2016	
Milestone 8: RODB structure review complete.	MET/IE WG	-	2017	
Activity 9: Improve Efficiency and effectiveness of ROBEX Scheme				
Activity 9.1: Align content of SA bulletins with FT bulletins, where appropriate	All RODBs	-	May 2016	
Activity 9.2: Adjust FT bulletin filing time, where appropriate	All RODBs	-	TBA	

6. WORK PLAN				
Activity / Milestone	Accountability	Predecessors	Date	Status
Activity 9.3: Advise States who issue TAFs early of ICAO required lead times	Secretariat	-	June 2016	
Activity 9.4: Review ANP Table MET II-2 and ensure all necessary aerodromes are contained in OPMET bulletins	All RODBs	-	May Annually	
Activity 9.5: Review and update ROBEX HB and ICD to align with OPMET bulletin contents	All RODBs	-	Feb Annually	
Activity 9.6: Review and update ROBEX HB and ICD to eliminate duplication of OPMET bulletin information.	MET/IE WG	-	June 2016	
Milestone 9: Improved efficiency and effectiveness of ROBEX Scheme	MET/IE WG	-	2017	
