



INTERNATIONAL CIVIL AVIATION ORGANIZATION

TWENTY SIXTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION
PLANNING AND IMPLEMENTATION REGIONAL GROUP
(APANPIRG/26)

Bangkok, Thailand, 7 – 10 September 2015

Agenda Item 3: Performance Framework for Regional Air Navigation Planning and
Implementation

3.5 MET

METEOROLOGY SUB GROUP REPORT

(Presented by the MET SG Chair)

SUMMARY

This paper presents the outcomes from the Nineteenth Meeting of the APANPIRG Meteorology Sub Group (MET SG/19), held in the ICAO APAC Regional Office, Bangkok, Thailand, from 3-6 August 2015.

Strategic Objectives:

- A: **Safety** – Enhance global civil aviation safety
- B: **Air Navigation Capacity and Efficiency**—Increase the capacity and improve the efficiency of the global aviation system
- E: **Environmental Protection** — minimize the adverse environment effects of civil aviation activities.

1. INTRODUCTION

1.1 The MET SG/19 Meeting was attended by fifty (50) experts from Australia; Bangladesh; China; Hong Kong, China; Macao, China; Indonesia; Japan; Lao Peoples Democratic Republic; Malaysia; Maldives; New Zealand; Pakistan; Philippines; Republic of Korea; Thailand; United Kingdom; United States of America; International Air Transport Association (IATA); International Federation of Air Line Pilots' Association (IFALPA); World Meteorological Organization (WMO) and ICAO.

2. DISCUSSION

2.1 A total of twenty-four (24) Working Papers (WP), twenty-nine (29) Information Papers (IP), two (2) presentations (SP) and three (3) flimsies were considered by the meeting.

2.2 Based on the outcome of discussions, the MET SG/19 meeting adopted eleven (11) Decisions related solely to matters dealing with the internal working arrangements of the the MET SG and formulated nine (9) Draft Conclusions dealing with matters that, according to APANPIRG Terms of Reference, require the attention of States, or action by the ICAO in accordance with established procedures.

2.3 The list of Draft Conclusions formulated by MET SG/19 for further consideration and possible adoption by APANPIRG are as follows:

Draft Conclusion 19/3 — SIGMET Training

Draft Conclusion 19/5 — SADIS user States and SADIS users to prepare for cessation of SADIS 2G

Draft Conclusion 19/7 — Tropical Cyclone Advisory (TCA) and SIGMET messages

Draft Conclusion 19/13 — Improvement of OPMET data availability for aerodromes listed in AOP tables and aerodromes not listed in AOP tables

Draft Conclusion 19/14 — IWXXM and AMHS Survey

Draft Conclusion 19/15 — Capacity building workshop to facilitate planning and implementation of digital exchange of aeronautical meteorological information

Draft Conclusion 19/16 — Survey of State Meteorological Information Supporting Air Traffic Management

Draft Conclusion 19/17 — Competency of aeronautical meteorological personnel

Draft Conclusion 19/18 — SIGMET Pamphlets

2.4 A summary report of discussions on agenda items from the MET SG/19 meeting, including all Draft Conclusions for consideration by APANPIRG/26, is provided at the **Attachment** to this paper.

2.5 A copy of the full report from the MET SG/19 meeting, and all supporting documentation, is available at: <http://icao.int/APAC/Meetings/Pages/2015-METSG19.aspx>.

2.6 In accordance with its terms of reference, MET SG/19 reviewed and updated draft amendments to Regional guidance materials. Updates to the ROBEX Handbook and ICD, and the draft [new, 5th Edition] Asia/Pacific Regional SIGMET Guide, which is based on the *Regional SIGMET Guide template* developed by the global METWSG to resolve the regional inconsistencies on the generic content of the various regional SIGMET guides across the ICAO Regions, are provided in IP/07, IP/08 and IP/09 for further examination by APANPIRG before forwarding for use by States.

2.7 In view of the above, the following additional Draft Conclusion is provided for possible adoption by APANPIRG:

Draft Conclusion 26/x — Updates to Regional guidance material (ROBEX Handbook, ICD and SIGMET Guide)

That, the updated ROBEX Handbook and ICD and the new [5th Edition] Asia/Pacific Regional SIGMET Guide, as provided in IP/07, IP/08 and IP/09, be published in accordance with the established procedures and States be urged to review the operations of the designated meteorological offices to ensure that OPMET information is issued in accordance with the updated Regional guidance material.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) review the information in this paper;
- b) adopt the Draft Conclusions formulated by MET SG/19 listed at paragraph 2.3 above and detailed in the attached summary report; and
- c) adopt the Draft Conclusion proposed in paragraph 2.7 above.

MET SG/19 — SUMMARY REPORT

Note: A glossary of acronyms and abbreviations used in this summary report is provided in **section 8**.

1. Agenda Item 1: Opening of the meeting

1.1 Self explanatory

2. Agenda Item 2: Organizational matters

2.1 The meeting adopted the provisional agenda, which was distributed prior to the meeting.

3. Agenda Item 3: Review outcomes from ICAO groupsMET SG/18

3.1 The meeting reviewed progress on follow-up to the Decisions and Draft Conclusions formulated by MET SG/18, including initiatives undertaken by the Meteorological Hazards Task Force (MET/H TF) to address SIGMET deficiencies in the APAC Region, coordination with Bhutan with respect to the status of implementation of OPMET information in support of international civil aviation and coordination with States with respect to implementation of the required Internet-based services for access to WAFS forecasts and OPMET information.

APANPIRG/25

3.2 The meeting reviewed the status of MET-related APANPIRG/25 Conclusions and Decisions including:

- Conclusion 25/2** – APAC Regional Air Navigation Priorities and Targets;
- Conclusion 25/3** – Air Navigation Report Forms (ANRFs) and Responsibility Matrix;
- Conclusion 25/4** – Seamless ATM Implementation Guidance;
- Conclusion 25/14** – Access to ICAO Annexes and Documents;
- Conclusion 25/43** – Promote Understanding of SWIM in APAC Region;
- Conclusion 25/45** – Improvement of OPMET Data Format;
- Conclusion 25/46** – Improvement of OPMET Data Availability for Aerodromes Listed in ANP FASID Table MET 2A;
- Conclusion 25/48** – APAC MET/ATM Seminar;
- Conclusion 25/49** – Update of ATM/AIS/SAR, AOP, CNS and MET Deficiency List;

- Decision 25/1** – Development of the New APAC eANP;
- Decision 25/10** – ATFM/SG Terms of Reference;
- Decision 25/12** – Amend Regional ATM Contingency Plan Task Force (RACP/TF) Terms of Reference;
- Decision 25/47** – Establishment of a Volcanic Ash Exercises Steering Group in the APAC Region;
- Decision 25/50** – APANPIRG Contributory Bodies Structure Review Task Force (ABSRTF).

3.3 The status of follow-up on the items listed above is contained in the *APANPIRG/25 Conclusions/Decisions – Action Plan*, provided in WP/03 to APANPIRG/26.

ABSRTF/2

3.4 With regard to APANPIRG Decision 25/50, the MET SG reviewed the proposed MET SG Terms of Reference and project management principles developed by the ABSRTF/2 and agreed that the inclusion of the word "effective" in addition to "efficient", in Objective 3) of the Terms of Reference of each APANPIRG Sub Group, would better reflect the safety benefit and formulated the following Decision:

Decision 19/1 – MET SG Terms of Reference

That, to promote safety-related objectives of APANPIRG, the word “effective”, in addition to “efficient”, should be considered for inclusion in the terms of reference proposed by Draft Decision ABSRTF/2/3 – *Revised Terms of Reference of APANPIRG Sub Groups* (at the third dot point under the objectives) with respect to the objective of addressing deficiencies in the respective air navigation services related to each Sub-Group of APANPIRG.

Meteorology Panel

3.5 The ICAO Meteorology Panel (METP) conducted its first meeting in Montreal from 20-24 April 2015. The meeting agreed to a structure that included four (4) working groups and an ad hoc group as follows:

- Working Group on Meteorological Requirements and Integration (WG-MRI);
- Working Group on Meteorological Information and Service Development (WG-MISD):
 - Radioactive Material Sub-group;
 - World Area Forecast System Sub-group;
 - Volcanic Ash Sub-group;
 - Space Weather Sub-group; and
 - Regional Hazardous Weather Advisory Centres Sub-group;
- Working Group on Meteorological Information Exchange (WG-MIE);
- Meteorological Operations Group (MOG); and the
- Ad hoc group on Cost Recovery.

MET SG Structure

3.6 The MET SG/19 meeting proposed that the MET SG task forces and working group be modified to better align with the new METP working groups and to allow a more streamlined working arrangement to complete deliverables relating to the Global Air Navigation Plan (GANP), Aviation System Block Upgrades (ASBU) and APAC regional priorities. Thus the MET SG adopted the following Decision:

Decision 19/2 – Expert working groups of the Meteorology Sub-group (MET SG)

That, in order to assist APANPIRG with its planning and implementation work in close alignment with the Global Air Navigation Plan (GANP) and Aviation System Block Upgrade (ASBU) strategies and the APAC regional priorities, and to facilitate coordination, where necessary, with the Meteorology Panel:

- a) The following expert working groups replace the existing structure of expert task forces and working group under the MET SG:
 - i) Meteorological Requirements Working Group (MET/R WG)
 - ii) Meteorological Services Working Group (MET/S WG)
 - iii) Meteorological Information Exchange Working Group (MET/IE WG); and
- b) The draft Terms of Reference (TOR) for the working groups under the MET SG, as contained in **Appendix A** to this summary report, be adopted.

Note: The Volcanic Ash Exercises Steering Group (VOLCEX/SG) will report to the MET/S WG.

3.7 It was proposed that the chair, membership and work plan of the current Meteorological Requirement Task Force would transition to the Meteorological Requirements Working Group; the Meteorological Hazards Task Force to the Meteorological Services Working Group; and the ROBEX Working Group to the Meteorological Information Exchange Working Group. The WAFS Task Force activities would be allocated primarily to the Meteorological Services Working Group with those regarding WAFS dissemination to the Meteorological Information Exchange Working Group.

3.8 It was also noted that issues concerning facilitation of implementation of cost recovery principles with respect to the provision of MET services would be handled directly by the MET SG. Similarly, the MET SG would be most appropriate group to assist States with the transition from a Quality Management System (QMS) to a Safety Management System (SMS) in relation to MET Services supporting international civil aviation.

4. Agenda Item 4: Planning and monitoring

Regional Air Navigation Plan and Air Navigation Report Form

4.1 The MET SG/19 meeting reviewed the meteorology parts of the draft new APAC electronic Air Navigation Plan (eANP), prepared in accordance with APANPIRG/25 Decision 25/1 – *Development of the New APAC eANP*. The draft MET parts of the new APAC eANP are provided at **Appendix B** to this summary report for review and possible endorsement by APANPIRG.

4.2 The Air Navigation Report Form (ANRF) for B0-AMET was also reviewed and updated by MET SG/19 and is provided at provided at **Appendix C** to this summary report for further review by APANPIRG.

Regional Priorities and Targets and Seamless ATM Plan

4.3 The MET SG/19 meeting reviewed the regional air navigation priorities and targets and the Seamless ATM Plan. Element 310 of the Seamless ATM Plan - *Meteorological Information (B0-AMET)*, contains the following Phase I elements (with expected implementation by 12 November 2015), which are directly relevant to the activities of the MET SG:

7.26 All high density aerodromes should provide meteorological forecasts, aerodrome warnings and alerts that support efficient terminal operations.

7.39 ATM systems should be supported by implementation of appropriate meteorological information reporting systems, providing, inter-alia, observations, forecasts, warnings and alerts, and also provide for information to meteorological authorities or offices where required.

5. Agenda Item 5: Air navigation deficiencies in the MET field

5.1 The MET SG/19 meeting reviewed the list of twenty (20) MET deficiencies in the APANPIRG database and noted that, in most cases, no progress had been reported to the Regional Office on corrective actions. However the MET SG was pleased to note that the Solomon Islands had commenced issuance of SIGMET for the Honiara FIR and both Papua New Guinea and the Solomon Islands had participated in the 2014 SIGMET tests. It was strongly recommended that SIGMET monitoring and targeted in-State SIGMET training/workshops be considered to assist Papua New Guinea and the Solomon Islands. It was also recommended that Nauru designate a MET authority in accordance with ICAO provisions as a matter of urgency in order to progress with implementation of MET service, including SIGMET, in the Nauru FIR. In this regard the following draft conclusion for APANPIRG and decision for the MET SG were formulated:

Draft Conclusion 19/3 – SIGMET Training

That, ICAO, in coordination with the WMO and relevant States and organizations, considers facilitating urgent, targeted training for aeronautical meteorological service providers designated by States in the APAC region to improve the quality, reliability and availability of SIGMET information, particularly in States with identified SIGMET deficiencies, including Solomon Islands and Papua New Guinea.

Notes: the following specific recommendations are provided:

1) Follow-up training programme on SIGMET provision for the Solomon Islands (similar to the TAF training programme conducted on a bilateral basis in 2014);

2) Follow-up on recommendations from previous investigations into SIGMET provision in Pacific Island States (e.g., the diagnostic of MET service provision in Papua New Guinea conducted on a bilateral basis in 2014);

3) Encourage APAC States, in particular Papua New Guinea and the Solomon Islands, to participate in the Japan/WMO SIGMET Seminar planned for 2016, in coordination with WMO RAI/RAV;

4) Coordinate with WMO on the inclusion of possible additional training on SIGMET issuance in the training workshop under the WMO Severe Weather Forecasting Demonstration Project (SWFDP) program.

Decision 19/4 – SIGMET Deficiencies in the APAC Region

That, the ad hoc group, comprising New Zealand (Rapporteur), Australia, China, Indonesia and Japan, continue to assist with rectification of SIGMET Deficiencies in the APAC Region, including coordination of the following activities:

- a) Alignment of the systems/processes/procedures used in Papua New Guinea and Solomon Islands for SIGMET issuance with relevant Annex 3 provisions and regional guidance materials;
- b) Monitor SIGMET issuance by Papua New Guinea and Solomon Islands over a defined period and during specific volcanic ash and tropical cyclone events to determine the level of effective implementation of SIGMET service;

- c) Consider the inclusion of Papua New Guinea and Solomon Islands in volcanic ash scenarios for the second ICAO APAC volcanic ash exercise;
- d) Assist Nauru with respect to the designation of meteorological authority, including associated arrangements for the provision of SIGMET service and, if necessary, establishment of a bilateral agreement for SIGMET issuance; and
- e) Investigate other opportunities (particularly establishment of bilateral agreements or other targeted assistance) to facilitate the rectification of SIGMET deficiencies within the APAC Region.

6. Agenda Item 6: Research, development and implementation issues in the MET field

World Area Forecast System (WAFS)

6.1 The MET SG/19 meeting reviewed WAFS-related updates provided by the WAFS Provider States (United Kingdom and United States), SADIS Provider State (United Kingdom), WIFS Provider State (United States), the WAFS TF chairman and Hong Kong, China.

6.2 The SADIS provider (UK) urged States to confirm with their software providers that their systems could process corrected WAFS data and one minute data updates.

6.3 The SADIS provider (UK) also stressed the importance of users to prepare for the cessation of the SADIS 2G service on 31 July 2016 and ensure migration to Secure SADIS FTP and recommended that this transition be completed by 1 June 2016 at the latest. There are at least three (3) APAC States that will need to act urgently to ensure access to WAFS forecasts after the SADIS 2G service is ceased. The SADIS Provider will continue to inform all SADIS 2G users of the approaching cessation of the SADIS 2G service, and to provide advice with regard to transition from SADIS 2G to Secure SADIS FTP. The meeting noted that users should also consider obtaining a WIFS account for use as a backup should Secure SADIS FTP not be accessible. In light of the above, the following Draft Conclusion was formulated for consideration by APANPIRG:

Draft Conclusion 19/5 - SADIS user States and SADIS users to prepare for cessation of SADIS 2G

That, ICAO be invited to urge SADIS user States and SADIS users to confirm the nature of their SADIS service, and where necessary ensure that they are prepared for the cessation of SADIS 2G. For those users not yet using, or who have not yet arranged accounts for, Secure SADIS FTP, it is strongly recommended that they undertake actions to migrate to the Secure SADIS FTP service at the earliest opportunity.

Notes: 1) Although the SADIS 2G service will continue until 31 July 2016, it is recommended that user's transition is complete and that SADIS 2G is not being used operationally after 1 June 2016; 2) Users are encouraged to establish and regularly test backup accounts with the alternative provider to be used in the rare event that their normal service (Secure SADIS FTP or WIFS, as specified by Regional Air Navigation Plan) is unavailable.

Observations and Reports

6.4 The MET SG/19 meeting noted that Japan's new geostationary meteorological satellite, Himawari-8, began operation on 7 July 2015, providing significantly advanced capability for meteorological observations along with improved capability for detection of SO₂ used for volcanic ash cloud detection. Information is available on the Japan Meteorological Agency (JMA) website.

6.5 The USA informed the MET SG/19 meeting that, in light of a National Transportation Safety Board (NTSB) recommendation, METAR/SPECI distributed by the USA for international availability will include a “remarks” section, with an effective date yet to be established. The "remarks" section is not compliant with the template for METAR and SPECI [Annex 3, Table A3-2] and some States expressed concern that this could have possible impacts for users without proper guidance on how to use the “remarks” section. There was also concern that this may compromise established systems configured to recognize Annex 3 compliant OPMET information. Furthermore, the meeting highlighted that the current IWXXM format does not support a "remarks" section and it is not clear how the “remarks” information could be exchanged within an IWXXM compliant format.

Forecasts Advisories and Warnings

6.6 The Fifth Meeting of the Meteorological Hazards Task Force (MET/H TF/5), held in Seoul, Republic of Korea, from 18-20 March 2015, reviewed results from the 2014 APAC SIGMET tests. Participation in the SIGMET tests had improved noticeably on previous years; however some errors, such as formatting and dissemination, were repeatedly recorded in some areas. ICAO will promulgate results of the SIGMET tests along with guidance on how specific errors may be corrected to States concerned.

6.7 The meeting noted the new system implemented in New Zealand, which graphically displays SIGMETs issued for both the New Zealand Flight Information Region (NZZC) and the Auckland Oceanic Flight Information Region (NZZO). Australia, Japan and Hong Kong, China provide similar services. The Secretariat noted that cross-FIR boundary misalignment of SIGMET information, raised as an issue of concern by users in recent consultative forums, should be a key consideration for States providing SIGMET information, particularly in view of the Seamless ATM Plan.

6.8 Hong Kong, China demonstrated a method for verification of thunderstorm SIGMET information that can be used to promote a continual improvement culture among MET service provision. The meeting also noted the ongoing initiatives by China on SIGMET-related issues, including organizing training, in conjunction with the WMO, to help improve the issuance of SIGMET information in the region, and ongoing cooperation with Cambodia on the provision of aeronautical meteorological services for the Phnom Penh (VDPP) FIR.

6.9 Australia notified the MET SG/19 meeting that the southern boundary of the Darwin Tropical Cyclone Advisory Centre (TCAC) area of responsibility had changed to better align with the Reunion and Nadi TCAC boundaries. The new area of responsibility for Darwin TCAC is bounded by 0 - 40°S / 90 - 160°E and the meeting formulated the following decision:

Decision 19/6 – Darwin TCAC Boundary

That:

- a) the ICAO Secretariat ensure that all relevant documents are updated with the new Darwin TCAC area of responsibility; and
- b) States ensure all procedural documents are updated with the boundary information for Darwin TCAC.

6.10 The METSG reviewed a proposal to improve the tropical cyclone advisory (TCA) and SIGMET information. It was agreed that to improve consistency between products and to ensure that meteorological watch offices (MWOs) have adequate information to construct a tropical cyclone SIGMET, the following should be considered to improve the TCA and associated SIGMET:

For the TCA:

- Add a new element for “Time of Observation” in addition to the “Time of origin”
- Enable “Advisory number” to be greater than 99
- Add a new element for “horizontal and vertical extent” of cumulonimbus cloud associated with a tropical cyclone; and
- Add a new element for “Changes in intensity” of the tropical cyclone.

For the SIGMET:

- Enable “forecast position” of the phenomenon at a specified time other than the end of the validity period of the SIGMET message.

6.11 In view of the above, the meeting formulated the following draft conclusion for consideration by APANPIRG and decision for the MET SG:

Draft Conclusion 19/7 – Tropical Cyclone Advisory (TCA) and SIGMET messages

That, to facilitate clarity and consistency of information within tropical cyclone advisory and SIGMET messages, the ICAO considers updating the templates for advisory messages for tropical cyclones [Annex 3, Table A2-2] and SIGMET [and AIRMET] messages [Annex 3, Table A6-1A].

Decision 19/8 – Tropical Cyclone Advisory (TCA) messages

That, to facilitate clarity and consistency of information within tropical cyclone advisory and SIGMET messages in the Region, the Asia/Pacific Tropical Cyclone Advisory Centre (TCAC) Provider States be encouraged to provide information in the “Remarks” (RMK) element of the advisory messages for tropical cyclones to support Meteorological Watch Offices (MWO) with the provision of tropical cyclone SIGMET information including “Changes in intensity” and the horizontal and vertical extent of “CB TOP”, based on information provided by the TCACs (Consider, also, the provision of an appropriate example in the SIGMET Guide).

6.12 The Tropical Cyclone Advisory Center (TCAC) Tokyo advised that it will start providing tropical cyclone advisory information in graphical form in accordance with the provision in Annex 3 on 26 August 2015.

6.13 It was noted that there are no specific ICAO documented procedures or agreements for the backup of TCACs within APAC, whereas there are formal procedures and agreements for ICAO Volcanic Ash Advisory Centres (VAAC’s) and World Meteorological Organization (WMO) Tropical Cyclone Warning Centres (TCWCs). In this respect the meeting requested ICAO to clarify if possible the global requirements with respect to backup of TCACs and formulated the following decision:

Decision 19/9 – Back up of TCACs

That, ICAO clarifies the requirements, if any, for back-up arrangements with respect to provisions related to TCACs.

6.14 The meeting reviewed the outcomes from the Volcanic Ash Exercise in Kamchatka in 2015 (VOLKAM15) conducted on 15-16 April 2015 and the First Meeting of the Asia/Pacific Volcanic Ash Exercises Steering Group (APAC VOLCEX/SG/1) that was held in Manila, Philippines, from 27 to 29 May 2015. A debrief and future planning meeting, VOLCEX/SG/2, will be held in the ICAO Regional Office, Bangkok on 14 - 16 September 2015. The first ICAO volcanic ash exercise in the APAC Region, will involve a volcanic ash exercise scenario based on an eruption of

the Taal Volcano on the island of Luzon, Philippines, with volcanic ash cloud that spreads northwards and contaminates the Manila FIR.

6.15 In accordance with VAAC back up arrangements between New Zealand and Australia and Japan and Australia, and in order to provide users clarity during backup operations, different WMO Abbreviated Headers will be used by Japan and New Zealand during back up operations. There will be a requirement to update these headers in the relevant ICAO document and notify the relevant stakeholders. Thus the following draft conclusion was formulated for APANPIRG consideration:

Decision 19/10 – WMO Abbreviated Headers for VAAC Wellington/Tokyo backup of VAAC Darwin

That, ICAO be invited to update Document 9766, Handbook on the International Airways Volcano Watch (IAVW), Table 4-3, to include the new WMO Abbreviated Headers for VAA and VAG bulletins issued by the VAAC Wellington/Tokyo when backing up the VAAC Darwin, after the coordination on VAG provision between VAACs Darwin and Tokyo is finalized.

Note: The finalized back-up procedure is expected to be reported to ROBEX WG/14.

6.16 The meeting reviewed the VAAC Darwin Management Report, which addresses the main features of the IAVW operations, highlighting recent developments and difficulties and future planned developments. ICAO was requested to update relevant documents to reflect the new telephone number for VAAC Darwin and the meeting formulated the following decision:

Decision 19/11 – Change to Darwin VAAC telephone number

That the ICAO Secretariat ensure that all relevant documents are updated with the new Darwin VAAC telephone number and promulgate this information to States to ensure all procedural documents are updated accordingly.

6.17 The meeting was reminded the volcano observatories and meteorological watch offices should advise VAACs of any volcanic ash observations, particularly where the information is different to that contained in a VAA. IFALPA was also requested to encourage its members to provide air-reports. The meeting formulated the following decision:

Decision 19/12 – Observations including air-reports of VA

That ICAO reminds States and airspace users (through IFALPA) of the provisions [Annex 3/Doc 4444] relating to observing and reporting of hazardous phenomena, including VA information.

OPMET Exchange

6.18 The MET SG reviewed the outcomes of Thirteenth meeting of the Regional OPMET Exchange (ROBEX) Working Group (ROBEX WG/13), which was held in Seoul, Republic of Korea, from 16 to 18 March 2015, and noted the agreed actions and work plan of the group. It was noted that the FASID Table MET 2A should be the baseline source of information when monitoring the availability of OPMET information on the SADIS and WIFS and that a proposed capacity building workshop to facilitate planning and implementation of digital exchange of aeronautical meteorological information were being organised.

6.19 The MET SG reviewed the results of OPMET monitoring conducted by IATA for the period of 9 weeks (ending at 20th of July, 2015). The results showed some issues with respect the rate of availability of OPMET on the SADIS and WIFS (for aerodromes listed in AOP tables and aerodromes not listed in AOP tables). Noting that States have committed to utilize the monitoring data to improve OPMET availability, the following draft conclusion was formulated for consideration by APANPIRG:

Draft Conclusion 19/13 — Improvement of OPMET data availability for aerodromes listed in AOP tables and aerodromes not listed in AOP tables

That, ICAO be invited to urge APAC States to continue efforts to improve the availability of OPMET data for aerodromes listed in FASID Table MET 2A, as soon as possible, including specifically to:

- a) Achieve 95% availability on the SADIS/WIFS broadcast of OPMET data for the FASID Table MET 2A aerodromes listed in AOP Tables;
- b) Achieve 90% availability on the SADIS/WIFS broadcast of OPMET data for the FASID Table MET 2A aerodromes not listed in AOP Tables; and
- c) Support harmonized availability on the SADIS/WIFS broadcast of OPMET data for the FASID Table MET 2A aerodromes.

6.20 The MET SG noted the IATA position that all OPMET data provided by States, i.e., for AOP-listed aerodromes and for aerodromes not listed in AOP tables, should be distributed and made available to airlines on the global distribution systems. Therefore, it was anticipated that IATA would request ICAO, through an appropriate global group, to facilitate an update of FASID Table MET 2A to reflect the availability of OPMET for AOP-listed aerodromes and for non-AOP-listed aerodromes.

6.21 Amendment 76 to ICAO Annex 3 (2013) enabled the exchange of METAR, SPECI, TAF and SIGMET in digital form (i.e. IWXXM) under a bilateral agreement between States in a position to do so. It is expected that (if approved) Amendment 77 to Annex 3 (2016) and Amendment 78 (2018) will include volcanic ash advisory, tropical cyclone advisory and AIRMET and make the exchange of OPMET in digital form a recommendation and then a standard respectively. In view of this the MET SG noted the requirement for States to plan and implement XML-formatted OPMET (IWXXM) where AMHS is available and to also consider the Common Regional Virtual (CRV) Network project. To monitor progress with the planning and implementation of both IWXXM compliant OPMET and AMHS communications, the survey at **Appendix D** to this summary report was developed along with the following Draft Conclusion for consideration by APANPIRG:

Draft Conclusion 19/14 – IWXXM and AMHS Survey

That, ICAO be invited to urge States to complete the survey located at **Appendix D** to this summary report prior to 30 October 2015 to provide information on the status of planning and implementation of IWXXM and AMHS in support of MET service for international air navigation.

6.22 The MET SG also noted the work of the MET Panel Working Group on Meteorological Information Exchange (WG-MIE) regarding global guidance and testing of digital meteorological data exchange and updates from Australia and Hong Kong, China on the status of IWXXM implementation. To increase awareness and assist States in the implementation of IWXXM the MET SG agreed that an inter-regional workshop be organized in conjunction with the WMO and formulated the following Draft Conclusion for consideration by APANPIRG:

Draft Conclusion 19/15 – Capacity building workshop to facilitate planning and implementation of digital exchange of aeronautical meteorological information

That, ICAO, in coordination with the WMO, be invited to organize and conduct an inter-regional workshop in the first half of 2016 to build capacity in States for digital exchange of aeronautical meteorological information. The workshop should facilitate intra- and inter-regional planning and implementation activities.

MET/ATM Coordination

6.23 The MET SG discussed the work plan and outcomes from the Fourth Meeting of the Meteorological Requirements Task Force (MET/R TF/4) and the Meteorology/Air Traffic Management Seminar 2015, which were held in Tokyo, Japan, from 29 June to 3 July 2015. Key outcomes included:

- The need for collaboration with representative air navigation service organizations (e.g., CANSO) to enhance the formulation of ATM requirements for MET.
- Implementation by some States of ATM-tailored MET services (i.e., in addition to traditional Annex 3 ‘products’) to meet user requirements.
- Coordination was important in order to keep abreast of developments with respect to future global provisions for tailored MET services to support ATM, which shall be managed principally by the MET Panel.
- Further development of the 'Survey of State Meteorological Information Supporting Air Traffic Management' at **Appendix E** to this summary report to assist the MET SG, ATFM Steering Group and provide input into the APAC Seamless ATM Plan. In order to further promote this initiative, the following Draft Conclusion was formulated for consideration by APANPIRG:

Draft Conclusion 19/16 — Survey of State Meteorological Information Supporting Air Traffic Management

That, States are urged to respond to the survey, located at **Appendix E** to this summary report, to gauge the types of meteorological information provided by MET services to support Air Traffic Management including Air Traffic Flow Management operations.

Quality Management

6.24 The MET SG noted the progress in the implementation of quality management systems (QMS) by the MET service providers and identified the need for further assistance for a number of States, in particular in South-East Asia and the Pacific. In this regard, the meeting appreciated the support to QMS implementation provided by several States, including Australia, Finland and New Zealand. The meeting was also advised that the WMO would continue support twinning arrangements between States and encouraged those States in need for assistance in QMS implementation to send a formal request to the WMO Secretariat.

Competencies and Qualifications of Meteorological Personnel

6.25 World Meteorological Organization provisions for the competency of aeronautical meteorological personnel became a standard practice on 1 December 2013. WMO has been providing assistance through training and implementation guidance on competency assessment, however, the status of compliance, and maintenance of compliance, with the competency standard by APAC States was still far from satisfactory. In order to facilitate States understanding and, in turn, planning and implementation of competency requirements for aeronautical meteorological personnel, the MET SG

considered a proposal to include a competency provision in Annex 3 and formulated the following Draft Conclusion for consideration by APANPIRG:

Draft Conclusion 19/17 - Competency of aeronautical meteorological personnel

That, in order to align the provisions concerning the required competency of operational personnel, ICAO be invited to consider inclusion in Annex 3 of a new provision on the competency of aeronautical meteorological personnel, similar to paragraph 3.7.4 in Annex 15 (2013) on the competency of AIS personnel, with appropriate reference to relevant WMO material on competency and qualification of aeronautical meteorological personnel.

7. Agenda Item 7: Regional guidance material

ROBEX Handbook, ICD and SIGMET Guide

7.1 MET SG/19 reviewed and provided a number of additional updates to the Asia/Pacific ROBEX Handbook and OPMET Databanks Interface Control Document (ICD). These are provided in IP/07 and IP/08 for examination by APANPIRG before forwarding for use by States.

7.2 MET SG/19 reviewed and provided a number of additional updates to the draft [new, 5th Edition] Asia/Pacific Regional SIGMET Guide, which is provided in IP/09 for examination by APANPIRG before forwarding for use by States.

7.3 In addition to the above, draft SIGMET pamphlets provided at **Appendix F** to this summary report were reviewed and revised by MET SG/19, which adopted the following Draft Conclusion for consideration by APANPIRG and the following Decision for action by the MET SG:

Draft Conclusion 19/18 – SIGMET Pamphlets

That, the final version of the SIGMET Pamphlets located at **Appendix F** to this Report be adopted as Regional guidance material and distributed to States to facilitate improved format of SIGMET information.

Decision 19/19 – SIGMET Pamphlets

That,

- a) Following endorsement by APANPIRG, the final versions of the WS and WC SIGMET pamphlets (at **Appendix F** to this summary report) be forwarded for use as Regional guidance material by States and published on the ICAO APAC eDocuments website;
- b) The ad hoc group, consisting of Australia, New Zealand, Japan and Hong Kong China, to further develop the WV SIGMET pamphlet; and
- c) The ad hoc group, consisting of Australia, New Zealand, Japan and Hong Kong China, to review the pamphlets again in July 2016 when Amendment 77 to ICAO Annex 3 is published to ensure that they are updated prior to the effective date of November 2016.

7.4 The MET SG/19 meeting reviewed the regional guidance material that had been developed for radioactive cloud. In order to ensure consistency with global activities in this area and to ensure that some level of guidance for MWOs in the region are developed, the meeting adopted the following Decision:

Decision 19/20 – Regional guidance on SIGMET (radioactive cloud)

That,

- a) MET SG members who are members of the METP, be invited to forward the draft guideline on the issuance of SIGMET for radioactive cloud to the METP at the earliest opportunity for further consideration; and
- b) The ad hoc group continues work on Regional guidance material based on the work done so far.

7.5 The MET SG/19 meeting reviewed the regional guidance material that had been developed for tsunami warnings at aerodromes. It was agreed that additional input would be sought and Australia offered to provide information on how they provided tsunami warnings to the aviation community.

Future work programme

7.6 The MET SG/19 meeting reviewed and updated the future work program of the MET SG as provided in the subject/tasks list in the MET field at **Appendix G** to this summary report.

Next meeting

7.7 The MET SG/19 meeting determined that the next meeting of the group (MET SG/20) should be tentatively scheduled for 9-12 May 2016.

8. ACRONYMS and ABBREVIATIONS

ABSRTF	APANPIRG Contributory Bodies Structure Review Task Force
AFTN	Aeronautical Fixed Telecommunications Network
AIS	Aeronautical information service
AMHS	Aeronautical message handling system
ANP	Air navigation plan
ANRF	Air navigation reporting form
ANSP	Air navigation service provider
AOP	Aerodrome operational planning
APAC	Asia and Pacific
APANPIRG	APAC Air Navigation Planning and Implementation Regional Group
ASBU	Aviation System Block Upgrades
ATFM	Air traffic flow management
ATM	Air traffic management
CRV	Common Regional Virtual Private Network
eANP	Electronic air navigation plan
FASID	Facilities and Services Implementation Document
GANP	Global Air Navigation Plan
GRIB2	GRIdded Binary edition 2 (code form standardized by the WMO)
IATA	International Air Transport Association
IAVW	International Airways Volcano Watch
ICAO	International Civil Aviation Organization

MET	Aeronautical meteorology (or aeronautical meteorological information)
METP	Meteorology Panel
MET SG	Meteorology Sub-Group (of APANPIRG)
MET/H TF	Meteorological Hazards Task Force (of MET SG)
MET/IE WG	Meteorological Information Exchange Working Group (of MET SG)
MET/R TF	Meteorological Requirements Task Force (of MET SG)
MET/R WG	Meteorological Requirements Working Group (of MET SG)
MET/S WG	Meteorological Services Working Group (of MET SG)
MWO	Meteorological watch office
OPMET	Operational meteorological information
QMS	Quality Management System
ROBEX	Regional OPMET Bulletin Exchange
RODB	Regional OPMET Data Bank
SADIS	Satellite Distribution System for Information Relating to Air Navigation
SIGMET	Information concerning en-route weather phenomena (ICAO Annex 3 refers)
SIGWX	Global forecasts of significant weather phenomena (ICAO Annex 3 refers)
SMS	Safety Management System
SWIM	System Wide Information Management
TAF	Aerodrome forecast issued in code form (ICAO Annex 3 refers)
TCA	Tropical Cyclone Advisory
TCAC	Tropical Cyclone Advisory Centre
TCWC	Tropical Cyclone Warning Centre
VAA	Volcanic Ash Advisory
VAAC	Volcanic ash advisory centre
WAFS	World area forecast centre
WAFS	World area forecast system
WG-MIE	Working Group on Meteorological Information Exchange (of METP)
WG-MISD	Working Group on Meteorological Information and Service Development (of METP)
WG-MOG	Working Group on Meteorological Operations Group (of METP)
WG-MRI	Working Group on Meteorological Requirements and Integration (of METP)
WIFS	WAFS Internet File Service
WMO	World Meteorological Organization

APPENDIX A – METEOROLOGY SUB GROUP STRUCTURE

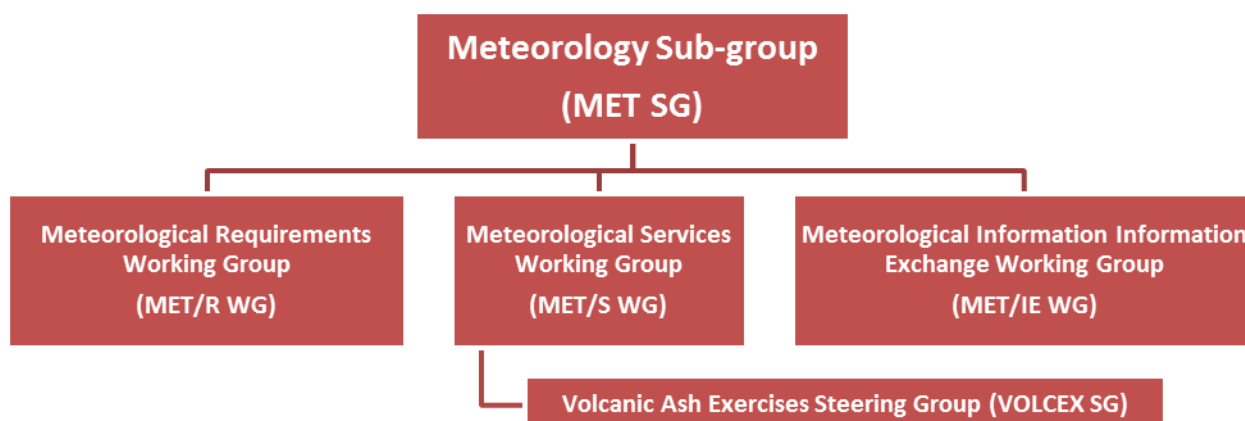


Figure A1 – Proposed Meteorology Sub Group Structure

Draft Terms of Reference for Meteorological Requirements Working Group (MET/R WG)

Under guidance from ICAO APAC MET Secretariat:

- a) Identify and evaluate the current and future requirements for MET in support of ATM (includes ATFM), as well as ATM in support of MET.
- b) Develop and provide guidance and reference material to assist States to meet MET requirements;
- c) Assess aeronautical meteorological services, systems and architecture and how they can integrate weather information into ATM, airspace user systems and decision support tools;
- d) Promote coordination between MET and ATM communities to enhance the level of understanding of MET requirements and capabilities in support of ATM;
- e) Study the successful involvement of MET in the development of CDM/ATFM in other regions with a view to future application;
- f) Monitor regional implementation of global policies, including those associated with source data and delivery of MET information for ATM;
- g) Provide support to other appropriate bodies under the MET Sub-group and ATM Sub-group on the development of ATM contingency plan for specific phenomenon including volcanic ash, radioactive cloud, tropical cyclone and tsunami;
- h) Provide expertise on MET services and information to assist appropriate bodies under the ATM Sub-group in the establishment of sub-regional ATFM and to identify MET service requirements;
- i) Enhance regional implementation of MET services in line with the priorities defined in the ASIA/PAC Seamless ATM Plan, closely referring to the Global Air Navigation Plan (GANP) and the Aviation System Block Upgrades (ASBUs);
- j) Monitor the relevant activities of the MET Panel and appropriate bodies; and

- k) 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.

Draft Terms of Reference for the Meteorological Services Working Group (MET/S WG)

Under guidance from ICAO APAC MET Secretariat:

- a) Identify and evaluate current and future requirements with respect to meteorological services, in particular, observations, forecasts, advisories and warnings, in support of the aviation system block upgrades (ASBUs);
- b) Promote the implementation of meteorological services;
- c) Promote the requirement for, and benefits of, QMS for MET services and competency of aeronautical meteorological personnel
- d) Maintain awareness of, and identify new, meteorological deficiencies and formulate strategies to resolve these deficiencies;
- e) Continually seek ways to improve the quality, compliance against SARPs and operational effectiveness of the meteorological services; Monitor the implementation and use of products and services under the framework of the World Area Forecast System (WAFS), the International Airway Volcano Watch (IAVW) and the International Tropical Cyclone Watch (ITCW);;
- f) Monitor the relevant activities of the MET Panel and appropriate bodies; and
- g) 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.

Draft Terms of Reference for the Meteorological Information Exchange Working Group (MET/IE WG)

Under guidance from the ICAO APAC MET Secretariat:

- 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 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.

APPENDIX B – DRAFT NEW eANP — MET

ASIA/PAC ANP, VOLUME I

PART V – METEOROLOGY (MET)

1. INTRODUCTION

1.1 This part of the ASIA/PAC ANP constitutes the agreed regional requirements considered to be the minimum necessary for effective planning and implementation of aeronautical meteorology (MET) facilities and services in the ASIA/PAC Region(s) and complements the provisions of ICAO SARPs and PANS related to MET. It contains stable plan elements related to the assignment of responsibilities to States for the provision of MET facilities and services within the ICAO ASIA/PAC region(s) in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300) and mandatory requirements related to the MET facilities and services to be implemented by States in accordance with regional air navigation agreements.

1.2 The dynamic plan element related to the assignment of responsibilities to States for the provision of MET facilities and services and the mandatory requirements based on regional air navigation agreements related to MET are contained in the ASIA/PAC ANP Volume II, Part V - MET.

1.3 The ASIA/PAC ANP Volume III contains dynamic/flexible plan elements related to the implementation of air navigation systems and their modernization in line with the ICAO Aviation System Block Upgrades (ASBUs) methodology and associated technology roadmaps described in the Global Air Navigation Plan. The Aviation System Block Upgrades (ASBUs) modules are aimed at increasing capacity and improving efficiency of the aviation system whilst maintaining or enhancing safety level, and achieving the necessary harmonization and interoperability at regional and global level. This includes the regionally agreed ASBU modules applicable to the specified ICAO region/sub-region and associated elements/enablers necessary for the monitoring of the status of implementation of these ASBU modules.

Standards, Recommended Practices and Procedures

1.4 The Standards, Recommended Practices and Procedures (SARPs) and related guidance material applicable to the provision of MET are contained in:

- Annex 3 - *Meteorological Service for International Air Navigation*; and
- *Regional Supplementary Procedures (Doc 7030)*;
- *Handbook on the IAVW (Doc 9766)*;
- *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (Doc 9691)*; and
- *Manual of Aeronautical Meteorological Practice (Doc 8896)*.

2. GENERAL REGIONAL REQUIREMENTS

World area forecast system (WAFS) and meteorological offices

2.1 In the ASIA/PAC Region(s), WAFC London and Washington have been designated as the centres for the operation of the aeronautical fixed service satellite distribution system – ~~WAFS Internet File Service (SADIS and WIFS) and~~ the Internet-based Secure SADIS FTP service ~~and the WAFS Internet File Service (SADIS 2G¹, Secure SADIS FTP and WIFS, respectively)~~. The status of implementation of SADIS and WIFS by States in the ASIA/PAC Region(s) is detailed in Volume III.

2.2 In the ASIA/PAC Region(s), WAFS products in digital form should be disseminated by WAFC London and Washington using the SADIS 2G¹ satellite broadcast and the Secure SADIS FTP service and ~~for~~ and by WAFC Washington using WIFS.

Volcanic Ash

¹ The SADIS 2G Service will be withdrawn by the centre designated for the operation of the aeronautical fixed service satellite distribution system on 31 July 2016

2.3 Volcanic ash advisory centres (VAACs) **Anchorage, Darwin, Tokyo, Toulouse, Washington and Wellington** have been designated to prepare volcanic ash advisory information for the **ASIA/PAC** Region(s), ~~as indicated below~~. The status of implementation of volcanic ash advisory information is detailed in Volume III.

2.4 Selected State volcano observatories have been designated for notification of significant pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash in the atmosphere for the **ASIA/PAC** Region(s) to their corresponding ACC/FIC, MWO and VAAC, as indicated at **Table MET I-1**. The status of implementation of volcano observatory notice for aviation (VONA) is detailed in Volume III.

Tropical Cyclone

2.5 Tropical cyclone advisory centres (TCACs) **Darwin, Honolulu, Nadi, New Delhi, Reunion and Tokyo** have been designated to prepare tropical cyclone advisory information for the **ASIA/PAC** Region(s), ~~as indicated below~~. The status of implementation of tropical cyclone advisory information is detailed in Volume III.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1 **TBD (if necessary)**

TABLE MET I-1 - STATE VOLCANO OBSERVATORIES

Explanation of the Table

Column

- 1 Name of the State responsible for the provision of a volcano observatory
- 2 Name of the volcano observatory

TABLE MET I-1 - STATE VOLCANO OBSERVATORIES

State	Volcano observatory
1	2
China	Heilongjiang Wudalianchi Volcano Observatory
China	Jilin Changbai Mountain Tianchi Volcano Observatory
Japan	Fukuoka Volcano Observations and Information Center, Japan Meteorological Agency
Japan	Kagoshima Local Meteorological observatory, Japan Meteorological Agency
Japan	Sapporo Volcano Observations and Information Center, Japan Meteorological Agency
Japan	Sendai Volcano Observations and Information Center, Japan Meteorological Agency
Japan	Tokyo Volcano Observations and Information Center, Japan Meteorological Agency
India	TBD
Indonesia	Directorate of Volcanology and Geological Hazard Mitigation (DVGHM)
New Zealand	Wairakei Research Centre Institute of Geological and Nuclear Sciences
Papua New Guinea	Rabaul
Philippines	Philippine Institute of Volcanology and Seismology (PHIVOLCS) Central Office

ASIA/PAC ANP, VOLUME II

PART V – METEOROLOGY (MET)

1. INTRODUCTION

1.1 This part of the **ASIA/PAC** ANP, Volume II, complements the provisions in the ICAO SARPs and PANS related to aeronautical meteorology (MET). It contains dynamic plan elements related to the assignment of responsibilities to States for the provision of MET facilities and services within a specified area in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300); and mandatory requirements related to the MET facilities and services to be implemented by States in accordance with regional air navigation agreements. Such agreement indicates a commitment on the part of the States concerned to implement the requirements specified.

2. GENERAL REGIONAL REQUIREMENTS

Meteorological offices

2.1 In the **ASIA/PAC** Region(s), meteorological watch offices (MWO) have been designated to maintain continuous watch on meteorological conditions affecting flight operations within their area(s) of responsibility, as indicated at **Table MET II-1**.

Meteorological observations and reports

2.2 In the **ASIA/PAC** Region(s), routine observations, issued as a METAR, should be made throughout the 24 hours of each day at intervals of one hour or, for RS and AS designated aerodromes² if so determined by regional air navigation agreement, at intervals of one half-hour at aerodromes as indicated in **Table MET II-2**. For aerodromes included on the VHF VOLMET broadcast as indicated in **Table MET II-3**, routine observations, issued as METAR, should be made throughout the 24 hours of each day.

2.3 At aerodromes that are not operational throughout 24 hours, METAR should be issued at least 3 hours prior to the aerodrome resuming operations in the **ASIA/PAC** Region(s).

Forecasts

2.4 In the **ASIA/PAC** Region(s), an aerodrome forecast, issued as a TAF, should be for the aerodromes indicated in **Table MET II-2**.

2.5 In the **ASIA/PAC** Region(s), the period of validity of a routine TAF should be of 9-, 12-, 18-, 24-, or 30-hours to meet the requirements indicated in **Table MET II-2**.

2.6 In the **ASIA/PAC** Region(s), the forecast maximum and minimum temperatures expected to occur during the period of validity, together with their corresponding day and time of occurrence, should be included in TAF at aerodromes indicated in **Table MET II-2**.

2.7 In the **ASIA/PAC** Region(s), landing forecasts (prepared in the form of a trend forecast) should be provided at aerodromes indicated in **Table MET II-2**.

Requirements for and use of communications

2.8 Operational meteorological information prepared as METAR, SPECI and TAF for aerodromes indicated in **Table MET II-2**, and SIGMET and AIRMET ~~if applicable~~ messages prepared for flight information regions or control areas indicated in **Table MET II-1**, should be disseminated to the international OPMET databanks designated for the **ASIA/PAC** Region(s) (namely Bangkok, Brisbane, Nadi, Singapore and Tokyo) and to the centres designated for the operation of the aeronautical fixed service satellite distribution system (SADIS 2G³) and the Internet-based service (Secure SADIS FTP) and ~~for~~ WIFS in the **ASIA/PAC** Region(s).

2.9 SIGMET messages should be disseminated to other meteorological offices in the **ASIA/PAC** Region(s) *in accordance with the regional OPMET bulletin exchange scheme. [if applicable]*

2.10 Special air-reports that do not warrant the issuance of a SIGMET should be disseminated to other meteorological offices in the **ASIA/PAC** Region(s) *in accordance with the regional OPMET bulletin exchange scheme. [if applicable]*

² Refer to Table AOP II-1, Explanation of the table

³ The SADIS 2G Service will be withdrawn by the centre designated for the operation of the aeronautical fixed service satellite distribution system on 31 July 2016

2.11 In the **ASIA/PAC** Region(s), meteorological information for use by aircraft in flight should be supplied through VOLMET broadcasts.

2.12 In the **ASIA/PAC** Region(s), the aerodromes for which METAR and SPECI are to be included in VOLMET broadcasts, the sequence in which they are to be transmitted and the broadcast time, is indicated in **Table MET II-3**.

3. SPECIFIC REGIONAL REQUIREMENTS

EXAMPLES

-

Meteorological observations and reports

-

~~3.1 In the EUR Region, routine observations, issued as METAR, should be made throughout the 24 hours of each day at intervals of one half hour.~~

-

~~3.2 In the (NAME) Region, aeronautical meteorological stations have been established on offshore structures or at other points of significance in support of helicopter operations to offshore structures, as indicated at Table MET II MID X (Former MET 1C Offshore structures). [if applicable]~~

-

~~3.3 In the (NAME) Region, information on the sea surface temperature and the state of the sea or the significant wave height from aeronautical meteorological stations established on offshore structures in support of helicopter operations should be included as supplementary information in METAR and SPECI as indicated in Table MET II MID X (MET 1C Offshore structures). [if applicable]~~

-

~~3.4 In the (NAME) Region, information on the state of the runway should be included as supplementary information in METAR and SPECI as indicated in Table MET II 2 (Former MET 1A Aerodrome meteorological offices). [if applicable]~~

-

~~3.5 In the (NAME) Region, GAMET area forecasts and/or area forecasts for low level flights in chart form prepared in support of the issuance of AIRMET information, and AIRMET information for low level flights relevant to the whole route, should be supplied to operators and flight crew members and kept up to date. Section II of the GAMET area forecast should include information, in addition to the provisions in Annex 3, as contained at Appendix MET LLF to Part V (MET). [if applicable]~~

-

AIRMET information

-

~~3.6 In the (NAME) Region, AIRMET information should be issued by a MWO for its areas of responsibility as indicated in Table MET II 1 (Former MET 1B Meteorological watch offices). [if applicable]~~

-

OPMET information

-

~~3.7 In the EUR Region, The details of the exchange scheme to be used the OPMET information is given in the EUR Region EUR OPMET Data Management Handbook (EUR Doc 018). [if applicable]~~

-

Service for operators and flight crew members

~~3.8 In the (NAME) Region, meteorological information for pre flight planning by operators of helicopters flying to offshore structures as indicated in Table MET II MID X (Former MET 1C Offshore structures) should include data covering the layers from sea level to FL 100. Particular mention should be made of [the expected surface visibility, the amount, type (where available), base and tops of cloud below FL 100, the sea state and sea surface temperature, the mean sea level pressure and the occurrence or expected occurrence of turbulence and icing]. [if applicable]~~

3.9 In the APAC Region, scheduled VOLMET broadcasts should contain TAF and SIGMET.

3.10 In the APAC Region, METAR, SPECI and TAF should be available for uplink to aircraft in flight via D-VOLMET.

TABLE MET II-1 - METEOROLOGICAL WATCH OFFICES

Explanation of the Table

Column

- 1 Name of the State where meteorological service is required
- 2 Name of the flight information region (FIR) or control area (CTA) where meteorological service is required
Note: The name is extracted from the ICAO Location Indicators (Doc 7910) updated quarterly. If a State wishes to change the name appearing in Doc 7910 and this table, ICAO should be notified officially.
- 3 ICAO location indicator of the FIR or CTA
- 4 Name of the meteorological watch office (MWO) responsible for the provision of meteorological service for the FIR or CTA
Note: The name is extracted from the ICAO Location Indicators (Doc 7910) updated quarterly. If a State wishes to change the name appearing in Doc 7910 and this table, ICAO should be notified officially.
- 5 ICAO location indicator of the responsible MWO
- 6 Requirement for SIGMET information (excluding for volcanic ash and for tropical cyclones) to be provided by the MWO for the FIR or CTA concerned, where:
 Y – Yes, required
 N – No, not required
- 7 Requirement for SIGMET information for volcanic ash to be provided by the MWO for the FIR or CTA concerned, where:
 Y – Yes, required
 N – No, not required
- 8 Requirement for SIGMET information for tropical cyclone to be provided by the MWO for the FIR or CTA concerned, where:
 Y – Yes, required
 N – No, not required
- 9 Requirement for AIRMET information to be provided by the MWO for the FIR or CTA concerned, where
 Y – Yes, required
 N – No, not required

TABLE MET II-1 - METEOROLOGICAL WATCH OFFICES

State	FIR or CTA Where Meteorological Service is Required		Responsible Meteorological Watch Office		Meteorological Service To Be Provided			
	Name	ICAO Location Indicator	Name	ICAO Location Indicator	SIGMET (WS)	SIGMET (WV)	SIGMET (WC)	AIRMET (WA)
1	2	3	4	5	6	7	8	9
AFGHANISTAN	KABUL FIR / SSR	OAKX	KABUL AD	OAKB	Y	Y	N	N
AUSTRALIA	MELBOURNE FIR ¹	YMMM	ADELAIDE (REGIONAL FORECASTING CENTRE)	YPRM	Y	N	N	N
	BRISBANE FIR ²	YBBB	BRISBANE (REGIONAL FORECASTING CENTRE)	YBRF	Y	N	Y	N
	BRISBANE FIR ⁴ MELBOURNE FIR ⁵	YBBB YMMM	DARWIN (REGIONAL FORECASTING CENTRE)	YPDM	Y	Y	Y	N
	MELBOURNE FIR ⁶	YMMM	HOBART (REGIONAL FORECASTING CENTRE)	YMHF	Y	N	N	N

State	FIR or CTA Where Meteorological Service is Required		Responsible Meteorological Watch Office		Meteorological Service To Be Provided			
	Name	ICAO Location Indicator	Name	ICAO Location Indicator	SIGMET (WS)	SIGMET (WV)	SIGMET (WC)	AIRMET (WA)
1	2	3	4	5	6	7	8	9
	BRISBANE FIR MELBOURNE FIR	YBBB YMMM	MELBOURNE (WORLD MET CENTRE, BUREAU OF METEOROLOGY)	YMMC	Y	N	N	N
	BRISBANE FIR ⁷ MELBOURNE FIR ⁸	YBBB YMMM	MELBOURNE (REGIONAL FORECASTING CENTRE)	YMRF	Y	N	N	N
	BRISBANE FIR ⁹ MELBOURNE FIR ¹⁰	YBBB YMMM	PERTH (REGIONAL FORECASTING CENTRE)	YPRF	Y	Y	N	N
	BRISBANE FIR ¹¹ MELBOURNE FIR ¹²	YBBB YMMM	SYDNEY (REGIONAL FORECASTING CENTRE)	YSRF	Y	N	N	N
BANGLADESH	DHAKA FIR / SRR	VGFR	HAZRAT SHAHJALAL INTERNATIONAL AIRPORT	VGHS	Y	Y	Y	N
CAMBODIA	PHNOM PENH FIR / SRR	VDPP	PHNOM PENH ¹⁴	VDPP	Y	Y	Y	N
CHINA	BEIJING FIR / SRR	ZBPE	BEIJING/CAPITAL	ZBAA	Y	Y	Y	N
	GUANGZHOU FIR / SRR	ZGZU	GUANGZHOU/BAIYUN	ZGGG	Y	Y	Y	N
	KUNMING FIR / SRR	ZPKM	CHENGDU/SHUANGLIU	ZUUU	Y	Y	Y	N
	LANZHOU FIR / SRR	ZLHW	XI'AN/XIANYANG	ZLXY	Y	Y	N	N
	SANYA FIR / SRR	ZJSA	HAIKOU/MEILAN	ZJHK	Y	Y	Y	N
	SHANGHAI FIR / SRR	ZSHA	SHANGHAI/HONGQIAO	ZSSS	Y	Y	Y	N
	SHENYANG FIR / SRR	ZYSH	SHENYANG/TAOXIAN	ZYTX	Y	Y	N	N
	TAIBEI FIR / SRR	RCAA*	TAIBEI CITY/TAIBEI INTL AP	RCTP	Y	Y	Y	N
	URUMQI FIR / SRR	ZWUQ	URUMQI/DIWOPU	ZWWW	Y	Y	N	N
	WUHAN FIR / SRR	ZHWH	WUHAN/TIANHE	ZHHH	Y	Y	N	N
	HONG KONG FIR / SRR	VHHK	HONG KONG/INTL	VHHH	Y	Y	Y	N
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	PYONGYANG FIR / SRR	ZKKP	SUNAN	ZKPY	Y	Y	Y	N
FIJI	NADI FIR / SRR	NFFF	NADI/INTL	NFFN	Y	Y	N	N
FRENCH POLYNESIA	TAHITI FIR / SRR	NTTT*	TAHITI/FAAA	NTAA	Y	Y	Y	N
INDIA	CHENNAI FIR / SRR	VOMF	CHENNAI	VOMM	Y	Y	Y	N
	DELHI FIR / SRR	VIDF	DELHI/INDIRA GHANDI INTL	VIDP	Y	Y	N	N
	KOLKATA FIR / SRR	VECF	KOLKATA/KOLKATA	VECC	Y	Y	N	N
	MUMBAI FIR / SRR	VABF	MUMBAI/CHHATRAPATI SHIVAJI INTL.	VABB	Y	Y	Y	N
INDONESIA	JAKARTA FIR/UIR / SRR	WIIF	JAKARTA/SOEKARNO-HATTA (COMM CENTER)	WIII	Y	Y	Y	N

State	FIR or CTA Where Meteorological Service is Required		Responsible Meteorological Watch Office		Meteorological Service To Be Provided			
	Name	ICAO Location Indicator	Name	ICAO Location Indicator	SIGMET (WS)	SIGMET (WV)	SIGMET (WC)	AIRMET (WA)
1	2	3	4	5	6	7	8	9
	UJUNG PANDANG FIR/UIR / SRR	WAAF	UJUNG PANDANG/HASANUDDIN (COMM CENTER)	WAAA	Y	Y	Y	N
JAPAN	FUKUOKA FIR / TOKYO SRR	RJJJ	TOKYO (CITY)	RJTD	Y	Y	Y	N
LAO PEOPLE'S DEMOCRATIC REPUBLIC	VIENTIANE FIR / SRR	VLVT	VIENTIANE/WATTAY	VLVT	Y	Y	Y	N
MALAYSIA	KOTA KINABALU FIR / SRR KUALA LUMPUR FIR / SRR	WBFC WMFC	SEPANG/KL INTL AIRPORT	WMKK	Y	Y	Y	N
MALDIVES	MALE FIR / SRR	VRMF	MALE/INTL	VRMM	Y	Y	Y	N
MONGOLIA	ULAANBAATAR FIR / SRR	ZMUB	ULAANBAATAR	ZMUB	Y	Y	N	N
MYANMAR	YANGON FIR / SRR	VYYY	YANGON INTL	VYYY	Y	Y	Y	N
NAURU	NAURU FIR / SRR	ANAU	NAURU I. ¹⁵	ANYN	Y	Y	Y	N
NEPAL	KATHMANDU FIR / SRR	VNSM	KATHMANDU	VNKT	Y	Y	N	N
NEW ZEALAND	AUCKLAND OCEANIC FIR / SRR NEW ZEALAND FIR / SRR	NZZO NZZC	WELLINGTON (AVIATION WEATHER CENTRE)	NZKL	Y	Y	Y	N
PAKISTAN	KARACHI FIR / SRR	OPKR	KARACHI/JINNAH INT'L	OPKC	Y	Y	Y	N
	LAHORE FIR / SRR	OPLR	LAHORE/ALLAMA IQBAL INT'L	OPLA	Y	Y	N	N
PAPUA NEW GUINEA	PORT MORESBY FIR / SRR	AYPY	PORT MORESBY INTL	AYPY	Y	Y	Y	N
PHILIPPINES	MANILA FIR / SRR	RPHI	MANILA/NINOY AQUINO INTL, PASAY CITY, METRO MANILA	RPLL	Y	Y	Y	N
REPUBLIC OF KOREA	INCHEON FIR / SRR	RKRR	INCHEON	RKSI	Y	Y	Y	N
SINGAPORE	SINGAPORE FIR / SRR	WSJC	SINGAPORE/CHANGI	WSSS	Y	Y	Y	N
SOLOMON ISLANDS	HONIARA FIR / SRR	AGGG	HONIARA (HENDERSON)	AGGH	Y	Y	Y	N
SRI LANKA	COLOMBO FIR / SRR	VCBI	BANDARANAIKE INTL AIRPORT COLOMBO	VCBI	Y	Y	Y	N
THAILAND	BANGKOK FIR / SRR	VTBB	BANGKOK/SUVARNABHUMI INTL AIRPORT	VTBS	Y	Y	Y	N
UNITED STATES	ANCHORAGE FIR	PAZA	ANCHORAGE	PAWU	Y	N	Y	N
	OAKLAND OCEANIC / HONOLULU SRR ¹⁶	KZAK	HONOLULU	PHFO	Y	Y	Y	N
	OAKLAND OCEANIC FIR ¹⁷	KZAK	KANSAS CITY	KKCI	Y	N	Y	N

State	FIR or CTA Where Meteorological Service is Required		Responsible Meteorological Watch Office		Meteorological Service To Be Provided			
	Name	ICAO Location Indicator	Name	ICAO Location Indicator	SIGMET (WS)	SIGMET (WV)	SIGMET (WC)	AIRMET (WA)
1	2	3	4	5	6	7	8	9
VIET NAM	HANOI FIR / SRR HO-CHI-MINH FIR / SRR	VVNB VVTS	GIA LAM	VVGL	Y	Y	Y	N

Notes:

1. Limited by the coordinates: 27S/128E; 27S/135E; 26S/138E; 2806S/14012E; 29S/142E; 3414S/14205E; 3345S/14045E; 40S/14045E; 45S/14045E; 45S/129E; 33S/129E; 30S/129E; 2715S/12830E

2. Outside the AOR of YBTL MWO and limited by the coordinates: 0937S/14102E; 0916S/14203E; 0913S/14206E; 0911S/14214E; 0914S/14217E; 0922S/14230E; 0922S/14230E; 0923S/14236E; 0919S/14248E; 0908S/14352E; 0924S/14414E; 0957S/14405E; 1130S/14402E; 1144S/14404E; 12S/144E; 12S/155E; 14S/155E; 14S/16115E; 1740S/163E; 2830S/163E; 2830S/155E; 2850S/15316E; 29S/150E; 29S/14330E; 26S/138E; 14S/138E; 0937S/14102E

~~3. Limited by the coordinates: 26S/138E; 29S/143E; 29S/142E; 2806S/14012E; 26S/138E~~

4. Limited by the coordinates: 1055S/12447E; 0920S/12650E; 07S/135E; 0950S/13940E; 0950S/141E; 14S/138E; 18S/138E; 2215S/138E; 26S/138E; 2218S/13638E; 2128S/13609E; 2111S/13134E; 2151S/13058E; 2313S/12828E; 2322S/12629E; 2327S/12415E; 2250S/12330E; 2030S/12330E; 20S/129E; 16S/12915E; 1528S/12806E; 1450S/12825E; 14S/12730E; 1345S/12609E; 14S/124E; 1055S/12447E

5. Limited by the coordinates: 2250S/12330E; 2327S/12415E; 2322S/12629E; 2313S/12828E; 2151S/13058E; 2111S/13134E; 2128S/13609E; 2218S/13638E; 26S/138E; 27S/135E; 2715S/12830E; 25S/12815E; 25S/12330E; 2250S/12330E

6. Limited by the coordinates: 40S/14045E; 40S/143E; 3953S/14353E; 4006S/14759E; 40S/150E; 45S/150E; 45S/14045E; 40S/14045E

7. Limited by the coordinates: 3730S/15033E; 3730S/163E; 45S/163E; 45S/150E; 4434S/150E; 4351S/15040E; 43S/151E; 3811S/15019E; 3730S/15033E

8. Limited by the coordinates: 3345S/14045E; 3414S/14205E; 3510S/14728E; 3730S/150E; 3730S/15033E; 3811S/15019E; 43S/151E; 4351S/15040E; 4434S/150E; 40S/150E; 4006S/14759E; 3953S/14353E; 40S/143E; 40S/14045E; 3811S/14045E; 3345S/14045E.

9. Limited by the coordinates: 2311S/12831E; 2313S/12827E; 2321S/12631E; 2326S/12414E; 2133S/12226E; 2015S/12113E; 1858S/1203E; 1752S/11821E; 148S/1158E; 12S/11430E; 12S/12319E; 12S/12320E; 1055S/12446E; 140S/1240E; 1345S/1268E; 140S/12730E; 1449S/12825E; 1528S/1286E; 16S/12915E; 20S/1290E

10. Limited by the coordinates: 12S/11430E; 148S/1158E; 1752S/11821E; 1858S/1203E; 2015S/12113E; 2133S/12226E; 2326S/12414E; 2321S/12631E; 2313S/12827E; 2311S/12831E; 25S/12815E; 2715S/12830E; 30S/1290E; 50S/1290E; 50S/75E; 60S/75E; 20S/78E; 20S/92E; 12S/107E

11. Limited by the coordinates: 29S/14632E; 29S/150E; 2850S/15328E; 2830S/155E; 2830S/163E; 3730S/163E; 3730S/15033E; 3657S/15045E; then east of the minor arc of a circle of 120NM radius centred on 3457S/15032E; 3519S/15256E; 3421S/15140E; 3359S/15201E; 3351S/15154E; 3328S/15148E; 3315S/15126E; 3312S/15114E; 3320S/15042E; 3327S/15033E; 3206S/14850E; 29S/14632E

12. Limited by the coordinates: 29S/142E; 29S/14330E; 29S/14632E; 3206S/14850E; 3327S/15033E; 3320S/15042E; 3312S/15114E; 3315S/15126E; 3328S/15148E; 3351S/15154E; 3359S/15201E; 3421S/15140E; 3519S/15256E; then east of the minor arc of a circle of 120NM radius centred on 3457S/15032E; 3657S/15045E; 3730S/15033E; 3730S/150; 3510S/14728E; 3414S/14205E; 29S/142E.

~~13. Limited by the coordinates: 14S/138E; 10S/141E; 09S/142E; 09S/144E; 13S/145E; 15S/147E; 1817S/148E; 2309S/15252E; 2334S/14811E; 1818S/14332E; 18S/138E; 14S/138E~~

14. PHNOM PENH MWO not implemented, however arrangement made for issuance of SIGMET by CHENGDU/SHUANGLIU MWO

15. NAURU I. MWO not implemented, however arrangement made for issuance of SIGMET by PORT MORESBY INTL MWO
16. FIR South of 30N, East of 130E and West of 140W, Honolulu SRR
17. North of 30N of Oakland Oceanic FIR (excluding KZOA); South of 30N between 120W and 140W

TABLE MET II-2 - AERODROME METEOROLOGICAL OFFICES

Explanation of the Table

Column

- 1 Name of the State where meteorological service is required
- 2 Name of the AOP aerodrome where meteorological service is required
Note: The name is extracted from the ICAO Location Indicators (Doc 7910) updated quarterly. If a State wishes to change the name appearing in Doc 7910 and this table, ICAO should be notified officially.
- 3 ICAO location indicator of the AOP aerodrome
- 4 Designation of AOP 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
- 5 Name of the aerodrome meteorological office responsible for the provision of meteorological service
Note: The name is extracted from the ICAO Location Indicators (Doc 7910) updated quarterly. If a State wishes to change the name appearing in Doc 7910 and this table, ICAO should be notified officially.
- 6 ICAO location indicator of the responsible aerodrome meteorological office
- 7 Requirement for METAR/SPECI from the aerodrome concerned, where:
Y – Yes, required
N – No, not required
- 8 Requirement for information on the state of the runway provided by the appropriate airport authority to be included as supplementary information in METAR/SPECI from the aerodrome concerned, where:
Y – Yes, required
N – No, not required
- 9 Requirement for trend forecast to be appended to METAR/SPECI from the aerodrome concerned, where
Y – Yes, required
N – No, not required
- 10 Requirement for TAF from the aerodrome concerned, where
~~C – Requirement for 9-hour validity aerodrome forecasts in TAF code (9H)~~
T - Requirement for 12/18/24-hour validity aerodrome forecasts in TAF code (12/18/24H)
X - Requirement for 30-hour validity aerodrome forecasts in TAF code (30H)
N – No, not required
- 11 Requirement for maximum and minimum temperature (expected to occur during the period of validity of the TAF) to be included in TAF from the aerodrome concerned, where:
Y – Yes, required
N – No, not required
- 12 Availability of METAR/SPECI and TAF from the aerodrome concerned, where:
F – Full availability : OPMET information as listed issued for the aerodrome all through the 24-hour period
P – Partial availability: OPMET information as listed not issued for the aerodrome for the entire 24-hour period

TABLE MET II-2 - AERODROME METEOROLOGICAL OFFICES

State	AOP Aerodrome where meteorological service is to be provided			Responsible aerodrome meteorological office		Observations and forecasts to be provided					METAR/SPECI and TAF availability
	Name	ICAO Location Indicator	Use	Name	ICAO Location Indicator	METAR/SPECI	State of the Runway	Trend forecast	TAF	Temperature Tx/Tn	
1	2	3	4	5	6	7	8	9	10	11	12
AFGHANISTAN	KABUL INTERNATIONAL	OAKB	RS	KABUL INTERNATIONAL	OAKB	Y		Y	T		F
	KANDAHAR	OAKN	AS	KABUL INTERNATIONAL	OAKB	Y			T		F
AMERICAN SAMOA (UNITED STATES)	PAGO PAGO INTERNATIONAL, TUTUILA I.	NSTU	RS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		F
AUSTRALIA	ADELAIDE/ADELAIDE INTL	YPAD	RS	ADELAIDE/ADELAIDE INTL	YPAD	Y		Y	X		F
	ALICE SPRINGS	YBAS	AS	DARWIN/DARWIN INTL	YPDN	Y			T		F
	BRISBANE/BRISBANE INTL	YBBN	RS	BRISBANE/BRISBANE INTL	YBBN	Y		Y	X		F
	CAIRNS/CAIRNS INTL	YBCS	RS	TOWNSVILLE/TOWNSVILLE INTL CAIRNS/CAIRNS INTL	YBTL	Y		Y	T		F
	CHRISTMAS ISLAND	YPMX	RS	PERTH/PERTH INTL	YPPH	Y			T		F
	COCOS (KEELING) ISLANDS INTL	YPCC	RS	PERTH/PERTH INTL	YPPH	Y			T		F
	DARWIN/DARWIN INTL	YPDN	RS	DARWIN/DARWIN INTL	YPDN	Y		Y	X		F
	HOBART	YMHB	RS	HOBART	YMHB	Y			T		F
	MELBOURNE/MELBOURNE INTL	YMML	RS	MELBOURNE/MELBOURNE INTL	YMML	Y		Y	X		F
	NORFOLK ISLAND	YSNF	RS	SYDNEY/SYDNEY (KINGSFORD SMITH) INTL	YSSY	Y			T		F
	PERTH/PERTH INTL	YPPH	RS	PERTH/PERTH INTL	YPPH	Y		Y	X		F
	PORT HEDLAND	YPPD	RS	PERTH/PERTH INTL	YPPH	Y			T		F
	ROCKHAMPTON	YBRK	AS	BRISBANE/BRISBANE INTL	YBBN	Y		YN	T		F
	SYDNEY/SYDNEY (KINGSFORD SMITH) INTL	YSSY	RS	SYDNEY/SYDNEY (KINGSFORD SMITH) INTL	YSSY	Y		Y	X		F
	TINDAL	YPTN	AS	DARWIN/DARWIN INTL	YPDN	Y		Y	T		F
	TOWNSVILLE/TOWNSVILLE INTL	YBTL	RS	TOWNSVILLE/TOWNSVILLE INTL	YBTL	Y		Y	T		F
BANGLADESH	M.A. HANNAN INTL. CHITTAGONG	VGEG	RS		VGZR	Y		Y	T		F
BHUTAN	PARO/INTL	VQPR	RS	PARO/INTL	VQPR	Y					F
BRUNEI DARUSSALAM	BRUNEI/INTL	WBSB	RS	BRUNEI/INTL	WBSB	Y			X		F
CAMBODIA	PHNOM PENH	VDPP	RS	PHNOM PENH	VDPP	Y		Y	T		P
	SIEM REAP	VDSR	AS	PHNOM PENH	VDPP	Y			T		P
CHINA	BEIJING/CAPITAL	ZBAA	RS	BEIJING/CAPITAL	ZBAA	Y		Y	X		F
	CHANGSHA/HUANGHUA	ZGHA	RS	GUANGZHOU/BAIYUN	ZGGG	Y			T		F
	CHENGDU/SHUANGLIU	ZUUU	RS	CHENGDU/SHUANGLIU	ZUUU	Y			T		F
	CHONGQING/JIANGBEI	ZUCK	RS	CHENGDU/SHUANGLIU	ZUUU	Y		Y	T		F
	DALIAN/ZHOUSHUIZI	ZYTL	RS	SHENYANG/TAOXIAN	ZYTX	Y			T		F
	FUZHOU/CHANGLE	ZSFZ	RS	SHANGHAI/HONGQIAO	ZSSS	Y			T		F
	GAOXIONG	RCKH	RS	TAIBEI CITY/TAIBEI INTL AP	RCTP	Y		Y	X		F
	GUANGZHOU/BAIYUN	ZGGG	RS	GUANGZHOU/BAIYUN	ZGGG	Y		Y	X		F
	GUILIN/LIANGJIANG	ZGKL	RS	GUANGZHOU/BAIYUN	ZGGG	Y			T		F
	HANGZHOU/XIAOSHAN	ZSHC	RS	SHANGHAI/HONGQIAO	ZSSS	Y			T		F
	HARBIN/TAIPING	ZYHB	RS	SHENYANG/TAOXIAN	ZYTX	Y			T		F
	HEFEI/XINQIAO	ZSOF	AS	SHANGHAI/HONGQIAO	ZSSS	Y			T		F

State	AOP Aerodrome where meteorological service is to be provided			Responsible aerodrome meteorological office		Observations and forecasts to be provided					METAR/SPECI and TAF availability
	Name	ICAO Location Indicator	Use	Name	ICAO Location Indicator	METAR/SPECI	State-of-the-runway	Trend forecast	TAF	Temperature Tx/Tn	
1	2	3	4	5	6	7	8	9	10	11	12
	HUHHOT/BAITA	ZBHH	RS	BEIJING/CAPITAL	ZBAA	Y			T		F
	JINAN/YAOQIANG	ZSNJ	RS	SHANGHAI/HONGQIAO	ZSSS	Y			T		F
	KASHI/KASHI	ZWSH	RS	URUMQI/DIWOPU	ZWWW	Y			X		F
	KUNMING/CHANGSHUI	ZPPP	RS	CHENGDU/SHUANGLIU	ZUUU	Y			X		F
	LANZHOU/ZHONGCHUAN	ZLLL	AS	XI'AN/XIANYANG	ZLXY	Y			T		F
	NANJING/LUKOU	ZSNJ	RS	SHANGHAI/HONGQIAO	ZSSS	Y			T		F
	NANNING/WUXU	ZGNN	AS	GUANGZHOU/BAIYUN	ZGGG	Y			T		F
	QINGDAO/LIUTING	ZSQD	RS	SHANGHAI/HONGQIAO	ZSSS	Y			T		F
	SANYA/PHOENIX	ZJSY				Y			T		F
	SHANGHAI/HONGQIAO	ZSSS	RS	SHANGHAI/HONGQIAO	ZSSS	Y		Y	T		F
	SHANGHAI/PUDONG	ZSPD	RS	SHANGHAI/HONGQIAO	ZSSS	Y		Y	X		F
	SHENYANG/TAOXIAN	ZYTX	RS	SHENYANG/TAOXIAN	ZYTX	Y		Y	T		F
	SHENZHEN/BAOAN	ZGSZ	RS	GUANGZHOU/BAIYUN	ZGGG	Y			X		F
	TAIBEI CITY/TAIBEI INTL AP	RCTP	RS	TAIBEI CITY/TAIBEI INTL AP	RCTP	Y		Y	X		F
	TAIBEI/SONGSHAN	RCSS	AS	TAIBEI CITY/TAIBEI INTL AP	RCTP	Y			T		F
	TAIYUAN/WUSU	ZBYN	AS	BEIJING/CAPITAL	ZBAA	Y			T		F
	TIANJIN/BINHAI	ZBTJ	RS	BEIJING/CAPITAL	ZBAA	Y			X		F
	URUMQI/DIWOPU	ZWWW	RS	URUMQI/DIWOPU	ZWWW	Y			X		F
	WUHAN/TIANHE	ZHHH	RS	GUANGZHOU/BAIYUN	ZGGG	Y		Y	T		F
	XIAMEN/GAOQI	ZSAM	RS	SHANGHAI/HONGQIAO	ZSSS	Y		Y	T		F
	XI'AN/XIANYANG	ZLXY	RS	XI'AN/XIANYANG	ZLXY	Y		Y	T		F
	XICHANG/QUINGSHAN	ZUXC	RNS	CHENGDU/SHUANGLIU	ZUUU	Y					F
COOK ISLANDS	RAROTONGA INTL.	NCRG	RS	NADI/INTL	NFFN	Y			T		F
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	SUNAN	ZKPY	RS	SUNAN	ZKPY	Y		Y	T		F
FIJI	NADI/INTL	NFFN	RS	NADI/INTL	NFFN	Y		Y	T		F
	NAUSORI/INTL	NFNA	RS	NADI/INTL	NFFN	Y			T		F
FRENCH POLYNESIA (FRANCE)	TAHITI FAAA	NTAA	RS	TAHITI FAAA	NTAA	Y		Y	T		F
HONG KONG, CHINA (CHINA)	HONG KONG/INTERNATIONAL	VHHH	RS	HONG KONG/INTERNATIONAL	VHHH	Y		Y	X		F
INDIA	AHMEDABAD	VAAH	RS	AHMEDABAD	VAAH	Y			X		F
	AMRITSAR	VIAR	RS	DELHI (IGI)	VIDP	Y			X		F
	BANGALORE INTL. AIRPORT	VOBL	RS	BANGALORE INTL. AIRPORT	VOBL	Y		Y	X		F
	CALICUT	VOCL	RS	THIRUVANANTHAPURAM	VOTV	Y			X		F
	CHENNAI	VOMM	RS	CHENNAI	VOMM	Y		Y	X		F
	COCHIN INTL.	VOCI	RS	THIRUVANANTHAPURAM	VOTV	Y		Y	X		F
	COIMBATORE	VOCB	RS	CHENNAI	VOMM	Y			T		F
	DELHI (IGI)	VIDP	RS	DELHI (IGI)	VIDP	Y		Y	X		F
	GAYA	VEGY	RS	PATNA	VEPT	Y			T		F
	GUWAHATI	VEGT	RS	GUWAHATI	VEGT	Y		Y	T		F

State	AOP Aerodrome where meteorological service is to be provided			Responsible aerodrome meteorological office		Observations and forecasts to be provided					METAR/SPECI and TAF availability
	Name	ICAO Location Indicator	Use	Name	ICAO Location Indicator	METAR/SPECI	State-of-the-runway	Trend forecast	TAF	Temperature Tx/Tn	
1	2	3	4	5	6	7	8	9	10	11	12
	HYDERABAD INTL. AIRPORT	VOHS	RS	HYDERABAD INTL. AIRPORT	VOHS	Y		Y	X		F
	JAIPUR	VIJP	RS	JAIPUR	VIJP	Y		Y	T		F
	KOLKATA	VECC	RS	KOLKATA	VECC	Y		Y	X		F
	LUCKNOW	VILK	RS	LUCKNOW	VILK	Y		Y	T		F
	MANGALORE	VOML	RS	BANGALORE INTL. AIRPORT	VOBL	Y			T		F
	MUMBAI	VABB	RS	MUMBAI	VABB	Y		Y	X		F
	NAGPUR	VANP	RS	NAGPUR	VANP	Y		Y	T		F
	PATNA	VEPT	RS	PATNA	VEPT	Y			X		F
	THIRUVANANTHAPURAM	VOTV	RS	THIRUVANANTHAPURAM	VOTV	Y			X		F
	TIRUCHIRAPPALLI	VOTR	RS	CHENNAI	VOMM	Y			T		F
	VARANASI	VIBN	RS	LUCKNOW	VILK	Y			X		F
INDONESIA	AMBON/PATTIMURA	WAPP	RNS	AMBON/PATTIMURA	WAPP	Y			T		F
	BALI INTL/NGURAH RAI	WADD	RS	BALI INTL/NGURAH RAI	WADD	Y			X		F
	BALIKPAPAN/SEPINGGAN	WALL	RS	BALIKPAPAN/SEPINGGAN	WALL	Y			X		F
	BANJARMASIN/SYAMSUDIN NOOR	WAOO	AS	BANJARMASIN/SYAMSUDIN NOOR	WAOO	Y			T		F
	BATAM/HANG NADIM	WIDD	AS	BATAM/HANG NADIM	WIDD	Y			T		F
	BIAK/FRANS KAISIEPO	WABB	RS	BIAK/FRANS KAISIEPO	WABB	Y		Y	X		F
	JAKARTA INTL/SOEKARNO-HATTA	WIII	RS	JAKARTA INTL/SOEKARNO-HATTA	WIII	Y		Y	X		F
	JAKARTA/HALIM PERDANAKUSUMA	WIHH	RNS	JAKARTA/HALIM PERDANAKUSUMA	WIHH	Y		Y	T		P
	JAYAPURA/SENTANI	WAJJ	RS	JAYAPURA/SENTANI	WAJJ	Y			T		F
	KUPANG/EL-TARI	WATT	RS	KUPANG/EL-TARI	WATT	Y			T		F
	MAKASSAR/SULTAN HASANUDDIN	WAAA	RNS	MAKASSAR/SULTAN HASANUDDIN	WAAA	Y		Y	X		F
	MANADO/SAMRATULANGI	WAMM	RS	MANADO/SAMRATULANGI	WAMM	Y			X		F
	MEDAN/KUALANAMU	WIMM	RS	MEDAN/KUALANAMU	WIMM	Y		Y	T		F
	MERAUKE/MOPAH	WAKK	RNS	JAYAPURA/SENTANI	WAJJ	Y			T		P
	PALEMBANG/SULTAN MAHMUD BADARUDDIN II	WIPP	RNS	PALEMBANG/SULTAN MAHMUD BADARUDDIN II	WIPP	Y			T		F
	PANDANG/MINANGKABAU	WIPT		PANDANG/MINANGKABAU	WIPT	Y		Y	T		F
	PEKANBARU/SULTAN SYARIF KASIM II	WIBB	RS	PEKANBARU/SULTAN SYARIF KASIM II	WIBB	Y			T		F
	PONTIANAK/SUPADIO	WIOO	RS	PONTIANAK/SUPADIO	WIOO	Y			T		F
	SURABAYA/JUANDA	WARR	RS	SURABAYA/JUANDA	WARR	Y			T		F
	TANJUNG PINANG/RAJA HAJI FISABILILLAH	WIDN	RS	BATAM/HANG NADIM	WIDD	Y			T		P
	TARAKAN/JUWATA	WALR	RS	BALIKPAPAN/SEPINGGAN	WALL	Y			T		P
JAPAN	CHUBU CENTRAIR INTL	RJGG	RS	TOKYO (CITY)	RJTD	Y			X		F
	FUKUOKA	RJFF	RS	TOKYO (CITY)	RJTD	Y			T		F
	HAKODATE	RJCH	AS	TOKYO (CITY)	RJTD	Y			X		F
	HIROSHIMA	RJOA	RS	TOKYO (CITY)	RJTD	Y			T		F
	KAGOSHIMA	RJFK	RS	TOKYO (CITY)	RJTD	Y			T		F
	KANSAI INTL	RJBB	RS	TOKYO (CITY)	RJTD	Y		Y	X		F
	KUMAMOTO	RJFT	RS	TOKYO (CITY)	RJTD	Y			T		F

State	AOP Aerodrome where meteorological service is to be provided			Responsible aerodrome meteorological office		Observations and forecasts to be provided					METAR/SPECI and TAF availability
	Name	ICAO Location Indicator	Use	Name	ICAO Location Indicator	METAR/SPECI	State-of-the-runway	Trend forecast	TAF	Temperature Tx/Tn	
1	2	3	4	5	6	7	8	9	10	11	12
	NAGASAKI	RJFU	RS	TOKYO (CITY)	RJTD	Y			T		F
	NAHA	ROAH	RS	TOKYO (CITY)	RJTD	Y			X		F
	NARITA INTL	RJAA	RS	TOKYO (CITY)	RJTD	Y		Y	X		F
	NIIGATA	RJSN	RS	TOKYO (CITY)	RJTD	Y			T		F
	OITA	RJFO	RS	TOKYO (CITY)	RJTD	Y			T		F
	OKAYAMA	RJOB	RS	TOKYO (CITY)	RJTD	Y			T		F
	OSAKA INTL	RJOO	AS	TOKYO (CITY)	RJTD	Y			T		F
	SAPPORO/NEW CHITOSE	RJCC	RS	TOKYO (CITY)	RJTD	Y			X		F
	SENDAI	RJSS	RNS	TOKYO (CITY)	RJTD	Y			X		F
	TAKAMATSU	RJOT	RS	TOKYO (CITY)	RJTD	Y			T		F
	TOKYO INTL	RJTT	AS	TOKYO (CITY)	RJTD	Y			T		F
KIRIBATI	CHRISTMAS ISLAND	PLCH	RS	NADI/INTL	NFFN	Y			T		F
	TARAWA/BONRIKI INTL	NGTA	RS	NADI/INTL	NFFN	Y			T		F
LAO PEOPLE'S DEMOCRATIC REPUBLIC	VIENTIANE(WATTAY)	VLVT	RS	VIENTIANE(WATTAY)	VLVT	Y		Y	T		P
MACAO, CHINA (CHINA)	MACAO/INTL AIRPORT	VMMC	RS	MACAO/INTL AIRPORT	VMMC	Y		Y	X		F
MALAYSIA	JOHOR BAHRU/SULTAN ISMAIL	WMKJ	RS	SEPANG/KL INTERNATIONAL AIRPORT	WMKK	Y			T		F
	KOTA KINABALU/INTL	WBKK	RS	KOTA KINABALU/INTL	WBKK	Y		Y	T		F
	KUCHING/INTL	WBGG	RS	KOTA KINABALU/INTL	WBKK	Y			T		F
	PENANG/INTL	WMKP	RS	SEPANG/KL INTERNATIONAL AIRPORT	WMKK	Y			T		F
	PULAU LANGKAWI/INTL	WMKL	RS	SEPANG/KL INTERNATIONAL AIRPORT	WMKK	Y			T		F
	SEPANG/KL INTERNATIONAL AIRPORT	WMKK	RS	SEPANG/KL INTERNATIONAL AIRPORT	WMKK	Y		Y	X		F
MALDIVES	GAN/GAN INTERNATIONAL AIRPORT	VRMG	AS	IBRAHIM NASIR INTERNATIONAL AIRPORT	VRMM	Y			X		F
	HANIMAADHOO	VRMH	RS	IBRAHIM NASIR INTERNATIONAL AIRPORT	VRMM	Y			X		F
	IBRAHIM NASIR INTERNATIONAL AIRPORT	VRMM	RS	IBRAHIM NASIR INTERNATIONAL AIRPORT	VRMM	Y			X		F
	VILLA AIRPORT MAAMIGILI	VRMV	RS	IBRAHIM NASIR INTERNATIONAL AIRPORT	VRMM	Y					
MARSHALL ISLANDS	MARSHALL ISLANDS/INTL MAJURO ATOLL	PKMJ	RS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		P
MICRONESIA (FEDERATED STATES OF)	POHNPEI INTL,POHNPEI ISLAND	PTPN	RS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		P
	WENO ISLAND ,FM CHUUK INTL.	PTKK	RS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		F
	YAP INTL,YAP ISLAND	PTYA	RS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		F
MONGOLIA	ULAANBAATAR/CHINGGIS KHAAN	ZMUB	RS	ULAANBAATAR/CHINGGIS KHAAN	ZMUB	Y		Y	X		F
MYANMAR	YANGON INTERNATIONAL	VYYY	RS	YANGON INTERNATIONAL	VYYY	Y		Y	T		F

State	AOP Aerodrome where meteorological service is to be provided			Responsible aerodrome meteorological office			Observations and forecasts to be provided				
	Name	ICAO Location Indicator	Use	Name	ICAO Location Indicator	METAR/SPECI	State of the runway	Trend forecast	TAF	Temperature Tx/Tn	METAR/SPECI and TAF availability
1	2	3	4	5	6	7	8	9	10	11	12
NAURU	NAURU AIRPORT	ANYN	RS	NAURU AIRPORT	ANYN	Y		Y	T		F
NEPAL	KATHMANDU	VNKT	RS	KATHMANDU	VNKT	Y		Y	T		F
NEW CALEDONIA (FRANCE)	NOUMEA LA TONTOUTA	NWWW	RS	NOUMEA LA TONTOUTA	NWWW	Y		Y	T		F
NEW ZEALAND	AUCKLAND INTL	NZAA	RS	KELBURN (MET OFFICE)	NZKL	Y		Y	T		F
	CHRISTCHURCH INTL	NZCH	RS	KELBURN (MET OFFICE)	NZKL	Y		Y	T		F
	WELLINGTON INTL	NZWN	RS	KELBURN (MET OFFICE)	NZKL	Y		Y	T		F
NIUE (NEW ZEALAND)	NIUE INTL	NIUE	RS	NADI/INTL	NFFN	Y			T		F
NORTHERN MARIANA ISLANDS (UNITED STATES)	ANDERSON AFB, GUAM ISLAND	PGUA	AS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		F
	FRANCISCO C. ADA/SAIPAN INTERNATIONAL, OBYAN	PGSN	RS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		F
	GUAM INTERNATIONAL, GUAM ISLAND	PGUM	RS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			X		F
	ROTA/INTL, ROTA I.	PGRO	RS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		P
PAKISTAN	GWADAR/INTL.	OPGD	RS	KARACHI/JINNAH INT'L	OPKC	Y			T		F
	ISLAMABAD/BENAZIR BHUTTO INT'L	OPRN	RS	KARACHI/JINNAH INT'L	OPKC	Y		Y	X		F
	KARACHI/JINNAH INT'L	OPKC	RS	BINDO	OPBI	Y			X		F
	LAHORE/ALLAMA IQBAL INT'L	OPLA	RS	LAHORE/ALLAMA IQBAL INT'L	OPLA	Y		Y	X		F
	NAWABSHAH	OPNH	AS	LAHORE/ALLAMA IQBAL INT'L	OPLA	Y			T		F
	PESHAWAR/INTL.	OPPS	RS	LAHORE/ALLAMA IQBAL INT'L	OPLA	Y			X		F
PALAU	BABELTHUAP/KOROR, BABELTHUAP ISLAND	PTRO	RS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		F
PAPUA NEW GUINEA	PORT MORESBY INTL	AYPY	RS	PORT MORESBY INTL	AYPY	Y			T		F
	VANIMO	AYVN				Y					F
PHILIPPINES	DAVAO/FRANCISCO BANGROY INTL	RPMD	RNS	MANILA/NINYOY AQUINO INTL	RPLL	Y		Y	T		P
	LAOAG, LAOAG INTL	RPLI	AS	MANILA/NINYOY AQUINO INTL	RPLL	Y		Y	T		P
	LAPU-LAPU/MACTAN INTL	RPVM	RS	MANILA/NINYOY AQUINO INTL	RPLL	Y		Y	X		F
	MANILA/NINYOY AQUINO INTL	RPLL	RS	MANILA/NINYOY AQUINO INTL	RPLL	Y		Y	X		F
	SUBIC BAY, SUBIC BAY INTL	RPLB	RNS	MANILA/NINYOY AQUINO INTL	RPLL	Y		Y	T		P
	ZAMBOANGA INTL	RPMZ	RNS	MANILA/NINYOY AQUINO INTL	RPLL	Y		Y	T		P
REPUBLIC OF KOREA	CHEONGJU	RKTU	RS	INCHEON INTL	RKSI	Y			T		F
	DAEGU INTL	RKTN	RS	INCHEON INTL	RKSI	Y			T		F
	GIMHAE INTL	RKPK	RS	INCHEON INTL	RKSI	Y			T		F
	GIMPO	RKSS	AS	INCHEON INTL	RKSI	Y		Y	X		F
	INCHEON INTL	RKSI	RS	INCHEON INTL	RKSI	Y		Y	X		F
	JEJU INTL	RKPC	RS	INCHEON INTL	RKSI	Y			X		F

State	AOP Aerodrome where meteorological service is to be provided			Responsible aerodrome meteorological office			Observations and forecasts to be provided				
	Name	ICAO Location Indicator	Use	Name	ICAO Location Indicator	METAR/SPECI	State-of-the-runway	Trend forecast	TAF	Temperature Tx/Tn	METAR/SPECI and TAF availability
1	2	3	4	5	6	7	8	9	10	11	12
	MUAN	RKJB	RS	INCHEON INTL	RKSI	Y			X		F
	YANGYANG	RKNY	RS	INCHEON INTL	RKSI	Y			T		F
SAMOA	FALEOLO/INTL	NSFA	RS	FALEOLO/INTL	NSFA	Y		Y	T		F
SINGAPORE	PAYA LEBAR (RSAF)	WSAP	AS	SINGAPORE/CHANGI	WSSS	Y			X		F
	SELETAR	WSSL	RS	SINGAPORE/CHANGI	WSSS	Y			X		F
	SINGAPORE/CHANGI	WSSS	RS	SINGAPORE/CHANGI	WSSS	Y		Y	X		F
SOLOMON ISLANDS	HONIARA (HENDERSON)	AGGH	RS	HONIARA (HENDERSON)	AGGH	Y		Y	T		F
SRI LANKA	HINGURAKGODA/MINNERIYA	VCCH	RS	KATUNAYAKE/BANDARANAIKE		Y					F
	KATUNAYAKE/BANDARANAIKE INTERNATIONAL AIRPORT	VCBI	RS	INTERNATIONAL AIRPORT	VCBI			Y	X		F
	COLOMBO			COLOMBO							
	MATTALA/MATTALA	VCRI	RS	MATTALA/MATTALA	VCRI	Y		Y	X		F
	RAJAPAKSA INTERNATIONAL AIRPORT			RAJAPAKSA INTERNATIONAL AIRPORT							
THAILAND	BANGKOK/DON MUEANG INTL AIRPORT	VTBD	RS	BANGKOK/SUARNABHUMI INTL AIRPORT	VTBS	Y		Y	X		F
	BANGKOK/SUARNABHUMI INTL AIRPORT	VTBS	RS	BANGKOK/SUARNABHUMI INTL AIRPORT	VTBS	Y		Y	X		F
	CHIANG MAI/CHIANG MAI INTL AIRPORT	VTCC	RS	CHIANG MAI/CHIANG MAI INTL AIRPORT	VTCC	Y		Y	X		F
	CHIANG RAI/MAE FAH LUANG-CHIANG RAI INTL AIRPORT	VTCT	RS	CHIANG MAI/CHIANG MAI INTL AIRPORT	VTCC	Y		Y	X		F
	KHON KAEN	VTUK	RS	UBON RATCHATHANI	VTUU	Y			T		P
	KRABI	VTSG	RS	PHUKET/PHUKET INTL AIRPORT	VTSP	Y			T		F
	PHITSANULOK	VTTP	RS	CHIANG MAI/CHIANG MAI INTL AIRPORT	VTCC	Y			T		P
	PHUKET/PHUKET INTL AIRPORT	VTSP	RS	PHUKET/PHUKET INTL AIRPORT	VTSP	Y		Y	X		F
	RAYONG/U-TAPAO PATTAYA INTL AIRPORT	VTBU	RS	RAYONG/U-TAPAO PATTAYA INTL AIRPORT	VTBU	Y			T		F
	SONGKHLA/HAT YAI INTL AIRPORT	VTSS	RS	SONGKHLA/HAT YAI INTL AIRPORT	VTSS	Y		Y	T		F
	SURAT THANI	VTSS	RS	SONGKHLA/HAT YAI INTL AIRPORT	VTSS	Y			T		P
UBON RATCHATHANI	VTUU	RS	UBON RATCHATHANI	VTUU	Y		Y	T		F	
TONGA	FUA'AMOTU INTL.	NFTF	RS	NADI/INTL	NFFN	Y			T		F
	VAVA'U	NFTV	RS	NADI/INTL	NFFN	Y			T		F
TUVALU	FUNAFUTI/INTL	NGFU	RS			Y			T		F
UNITED STATES	ANCHORAGE/ELMENDORF AFB,AK.	PAED	AS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		F
	COLD BAY,AK.	PACD	AS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		F
	FAIRBANKS INTERNATIONAL, AK.	PAFA	RS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			X		F
	FAIRBANKS/EIELSON AFB,AK.	PAEI	AS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		F
	HILO INTERNATIONAL, HILO HI.	PHTO	AS	WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC	Y			T		F
	HONOLULU INTERNATIONAL,	PHNL	RS	WASHINGTON (NWS NATIONAL	KWBC	Y			X		F

State	AOP Aerodrome where meteorological service is to be provided			Responsible aerodrome meteorological office		Observations and forecasts to be provided					METAR/SPECI and TAF availability
	Name	ICAO Location Indicator	Use	Name	ICAO Location Indicator	METAR/SPECI	State of the runway	Trend forecast	TAF	Temperature Tx/Tn	
1	2	3	4	5	6	7	8	9	10	11	12
	OAHU, HI. KAHULUI, HI. KING SALMON, AK. TED STEVENS ANCHORAGE INTERNATIONAL, AK.	PHOG PAKN PANC	AS AS RS	MET CENTER), DC. WASHINGTON (NWS NATIONAL MET CENTER), DC. WASHINGTON (NWS NATIONAL MET CENTER), DC. WASHINGTON (NWS NATIONAL MET CENTER), DC.	KWBC KWBC KWBC	Y Y Y			T T X		F F F
VANUATU	PORT VILA/BAUERFIELD SANTO/PEKOA	NVTV NVSS	RS RS	PORT VILA/BAUERFIELD PORT VILA/BAUERFIELD	NVTV NVTV	Y Y			T T		F F
VIET NAM	CAM RANH CAN THO DA NANG HA NOI/NOI BAI HO CHI MINH/TAN SON NHAT HUE/PHU BAI PHU QUOC	VVCR VVCT VVDN VVNB VVTS VVPB VVPQ	RS RS RS RS RS RS RS	CAM RANH CAN THO DA NANG HA NOI/NOI BAI HO CHI MINH/TAN SON NHAT HUE/PHU BAI PHU QUOC	VVCR VVCT VVDN VVNB VVTS VVPB VVPQ	Y Y Y Y Y Y Y		Y Y Y Y Y Y Y	T T T T X T T		F F F F F F F
WALLIS AND FUTUNA ISLANDS (FRANCE)	WALLIS HIHIFO	NLWW	RS	NADI/INTL	NFFN	Y			T		F

TABLE MET II-3 – VOLMET BROADCASTS

Explanation of the Table

The transmitting station appears at the top of each block.

Names in lower case letters indicate aerodromes for which reports (routine or selected special) are required.

Names in upper-case letters indicate aerodromes for which forecasts are required.

TABLE MET II-3 – VOLMET BROADCASTS

PAC (FREQUENCIES 2863, 6679, 8828, 13282 kHz)

Tokyo	Hong Kong	Auckland	
10–15	15–20	20–25	
40–45	45–50	50–55	
Tokyo (Narita)	Hong Kong	Auckland	
Tokyo (Haneda)	Naha	Christchurch	
Sapporo	Taibei	Wellington	
Chubu	Gaoxiang	Nadi	
Osaka	Manila	Nouméa	
Fukuoka	Mactan	Pago Pago	
Incheon	Guangzhou	Tahiti	
TOKYO (NARITA)	HONG KONG	20–25	50–55
TOKYO (HANEDA)		NADI	AUCKLAND
		NOUMÉA	CHRISTCHURCH

PAC (FREQUENCIES 2863, 6679, 8828, 13282 kHz)

Honolulu		
10–15	15–20	20–25
40–45	45–50	50–55
Honolulu	San Francisco	Anchorage
Hilo	Los Angeles	Fairbanks
Kahului	Seattle	King Salmon
Agana	Portland	Elmendorf
	Sacramento	Cold Bay
	Ontario	Vancouver
	Las Vegas	
SIGMET	SIGMET	SIGMET
HONOLULU	SAN FRANCISCO	ANCHORAGE
HILO	SEATTLE	FAIRBANKS
AGANA	LOS ANGELES	VANCOUVER
		COLD BAY

ASIA (FREQUENCIES 2965, 6676, 11387 kHz)

Sydney	Kolkata	Bangkok	Karachi	Singapore	Mumbai
00–05	05–10	10–15	15–20	20–25	25–30
30–35	35–40	40–45	45–50	50–55	55–60
Sydney	Kolkata	Bangkok	Karachi	Singapore	Mumbai
Brisbane	Delhi	Yangon	Islamabad	Sebang	Ahmadabad
Melbourne	Dhaka	Ha Noi	Lahore	Jakarta	Chennai
Townsville	Yangon	Ho-Chi-Minh	Delhi	Kuching	Colombo
Adelaide	Kathmandu	Phnom-Penh	Mumbai	Brunei	Karachi
Alice Springs		Utapao		Kota Kinabalu	Male
Darwin		Vientiane		Denpasar	
Perth				Penang	
00–05	KOLKATA	BANGKOK	KARACHI	20–25	MUMBAI
SYDNEY	DELHI	YANGON	LAHORE	SINGAPORE	COLOMBO
BRISBANE			MUMBAI	SEBANG	MALE
			DELHI		
30–35	HO-CHI-MINH		SINGAPORE	50–55	

Sydney	Kolkata	Bangkok	Karachi	Singapore	Mumbai
00-05 30-35	05-10 35-40	10-15 40-45	15-20 45-50	20-25 50-55	25-30 55-60
MELBOURNE PERTH			SINGAPORE JAKARTA		

ASIA (FREQUENCIES 3458, 5673, 8849, 13285 kHz)

Guangzhou			Beijing		
00-05 30-35	05-10 35-40	10-15 40-45	15-20 45-50	20-25 50-55	25-30 55-60
Xiamen	Guangzhou Nanning	Changsha Chengdu Kunming Wuhan	Beijing Harbin Dalian Shenyang Hohhot Taiyuan Tianjin	Hangzhou Shanghai	Lanzhou Xían Urumqi
	GUANGZHOU	CHENGDU	BEIJING	SHANGHAI	XÍAN

EXAMPLE FOR SPECIFIC REGIONAL REQUIREMENTS

TABLE MET II MID-X-OFFSHORE STRUCTURES

EXPLANATION OF THE TABLE

Column

- 1 Name of the State where meteorological service is required
- 2 Name of the offshore structure where meteorological service is required
Note: The name is extracted from the ICAO Location Indicators (Doc 7910) updated quarterly. If a State wishes to change the name appearing in Doc 7910 and this table, ICAO should be notified officially.
- 3 ICAO location indicator of the offshore structure
- 4 Latitude of the offshore structure (in the form Nnnnn or Snnnn)
- 5 Longitude of the offshore structure (in the form Ennnnn or Wnnnnn)
- 6 Name of the meteorological office responsible for the provision of meteorological service
Note: The name is extracted from the ICAO Location Indicators (Doc 7910) updated quarterly. If a State wishes to change the name appearing in Doc 7910 and this table, ICAO should be notified officially.
- 7 ICAO location indicator of the responsible meteorological office
- 8 Availability of information on the sea surface temperature as supplementary information in METAR/SPECI from the offshore structure concerned, where:
Y—Yes, available
N—No, not available
- 9 Availability of information on the state of the sea or significant wave height as supplementary information in METAR/SPECI from the offshore structure concerned, where:
Y—Yes, available
N—No, not available
- 10 Availability of forecasts from the offshore structure concerned, where:
Y—Yes, available
N—No, not available

EXAMPLE FOR SPECIFIC REGIONAL REQUIREMENTS

Appendix MET LLF to Part V (MET) Volume II

EUR REGION ONLY

In the EUR Region, Section II of the GAMET area forecast should include the following information in addition to the provisions in Annex 3:

Agenda Item 3.5

-
a) — Short description of general weather situation in addition to the description of pressure centres and fronts;

-
b) — Information about mean surface wind also for values less than 15 m/s (30kt);

-
e) — Upper wind and temperature in mountainous areas for altitude 15000ft, or higher if necessary;

-
Note — Upper wind and temperature information should have a horizontal resolution no more than 500km;

-
d) — Information about widespread surface visibility of 5000 m or more together with the weather phenomena (if any) causing a reduction of visibility and inserted between the upper wind and cloud information;

-
e) — State of the sea and sea surface temperature; and

-
Note — States under whose jurisdiction off shore structure or other points of significance in support of off shore helicopter operations are located should, in consultation with the appropriate operators, establish or arrange for the information on the state of the sea and sea surface temperature to be included in all low level area forecasts.

-
f) — An outlook concerning expected hazardous weather phenomena during the following validity period.

-
Note 1. — When the area forecast for low level flights is issued as a GAMET, the following regional procedures should be followed:

-
i. — the term "widespread" should be used to indicate a spatial coverage of more than 75 per cent of the area concerned; and

-
ii. — the visibility and cloud base information in section II may be complemented in the form of visibility/cloud base categories.

-
Note 2. — Where combined cloud/visibility information is provided, this information should be in the form of visibility/cloud base categories and should be supplied for well defined sub areas and/or route segments. The boundaries of sub areas and/or route segments for which forecasts for low level flights are provided in condensed form should be published in the AIP. For each sub area and/or route segment, the reference height to which the cloud base information refers, should be specified.

-
Note 3. — Where visibility/cloud base categories are used in low level forecasts these should be as follows:

-
O — visibility equal to or more than 8 km and cloud base equal to or higher than 600 m (2000 ft);

-
D — visibility equal to or more than 5 km but less than 8 km with cloud base 300 m (1000 ft) or higher, or cloud base equal to 300 m (1000 ft) or higher but less than 600 m (2000 ft) with visibility equal to or more than 8 km;

-
M — visibility equal to or more than 1.5 km but less than 5 km with cloud base equal to or higher than 150 m (500 ft), or cloud base equal to or higher than 150 m (500 ft) but less than 300 m (1000 ft) with visibility equal to or more than 5 km;

-
X — visibility less than 1.5 km and/or cloud base less than 150 m (500 ft). The visibility/cloud base category indicated in the forecast for a sub area should refer to the prevailing conditions in the sub area concerned. Cloud information should refer to clouds with a coverage of BKN or OVC.

-
[\[1\]](#) Refer to Table AOP II 1, Explanation of the table

APPENDIX C – DRAFT ANRF (ASBU B0-AMET)

1. AIR NAVIGATION REPORT FORM (ANRF)

APAC Regional planning for ASBU Modules

<p>2. REGIONAL PERFORMANCE OBJECTIVE – ASBU B0-AMET: Meteorological Information Supporting Enhanced Operational Efficiency and Safety</p> <p>Performance Improvement Area 2: Globally Interoperable Systems and Data - Through Globally Interoperable System Wide Information Management</p>					
<p>3. ASBU B0-AMET: Impact on Main Key Performance Areas</p>					
	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	N	Y	Y	Y	Y

<p>4. ASBU B0-AMET: Planning Targets and Implementation Progress</p>	
5. Elements	6. Targets and implementation progress (Ground and Air)
1. World Area Forecast System (WAFS)	Reception of WAFS information and making this available to users to support flight planning, dynamic and flexible management of airspace, improved situational awareness, collaborative decision making and flight trajectory planning.
2. Volcanic Ash Advisory Centre (VAAC)	Implementation of VAACs to support International Airways Volcano Watch (IAVW). Agreements in place between Volcano Observatories and VAACs.
3. Tropical Cyclone Advisory Centre (TCAC)	Implementation of TCACs to support tropical cyclone watch.
4. Aerodrome warnings, including wind shear warnings and alerts	Identification of aerodromes that require Aerodrome Warnings, including wind shear warnings and alerts.
5. SIGMET	Implementation of SIGMET for all Flight Information Regions (FIR) within the APAC region.
6. Other OPMET (ie.METAR/SPECI and TAF)	Provision of OPMET data as per the requirements in the Regional Air Navigation Plan.
7. Quality Management System	Implementation of Quality Management Systems at aviation meteorological services in accordance with ICAO and World Meteorological Organization (WMO) provisions.
8. Qualifications and Competencies	Implementation of systems along with an ongoing competency assessment and training program to ensure qualifications and competencies of aviation meteorological personnel in accordance with ICAO and WMO provisions.

<p>7. ASBU B0-AMET: Implementation Challenges</p>				
Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. WAFS	WAFS data reception system, via public internet distribution systems	Nil	Operations manuals. Contingency plans.	N/A

7. ASBU B0-AMET: Implementation Challenges				
Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
2. VAAC	AFTN/AMHS AFS	Nil	Operations manuals. Contingency plans.	N/A
3. TCAC	AFTN/AMHS AFS	Nil	Operations manuals. Contingency plans.	N/A
4. Aerodrome warnings, including wind shear warnings and alerts	AFTN/AMHS AFS ATIS Local networks	Nil	Operations manuals. Contingency plans.	N/A
5. SIGMET	AFTN/AMHS AFS	Nil	Operations manuals. Contingency plans.	N/A
6. Other OPMET	AFTN/AMHS AFS	Nil	Operations manuals. Contingency plans.	N/A
7. Quality Management	Nil	Nil	Quality Manual.	N/A
8. Qualifications and Competencies	Nil	Nil	Training program plans.	N/A

8. ASBU B0-AMET Performance Monitoring and Measurement	
8A. ASBU B0-AMET: Implementation Monitoring	
Elements	Performance Indicators/Supporting Metrics
1. WAFS	Indicator: Percentage of States receiving WAFS via Secure SADIS FTP and WIFS and making this available to users. Supporting metric: Number of States receiving WAFS via Secure SADIS FTP and WIFS and making this available to users.
2. VAAC	Indicator: Percentage of designated VAACs implemented to provide volcanic ash advice to Meteorological Watch Offices (MWO). Percentage of designated volcano observatories implemented and procedures in place to send observations to relevant VAACs and MWOs. Supporting metric: Number of VAACs implemented to provide volcanic ash advice. Number of volcano observatories implemented.
3. TCAC	Indicator: Percentage of designated TCACs implemented to provide tropical cyclone advice to MWO. Supporting metric: Number of TCACs implemented to provide tropical cyclone advice.
4. Aerodrome warnings, including wind shear warnings and alerts	Indicator: Percentage of required aerodromes providing Aerodrome Warnings, including wind shear warnings and alerts. Supporting metric: Number of required aerodromes providing Aerodrome Warnings, including wind shear warnings and alerts.

8. ASBU B0-AMET Performance Monitoring and Measurement	
8A. ASBU B0-AMET: Implementation Monitoring	
Elements	Performance Indicators/Supporting Metrics
5. SIGMET	Indicator: Percentage of States/MWOs providing SIGMET for associated FIR. Supporting metric: Percentage of States/MWOs providing SIGMET for associated FIR.
6. Other OPMET	Indicator: Percentage of availability, reliability and compliance of METAR/SPECI and TAF in accordance with APAC requirements for AOP and non-AOP aerodromes.. Supporting metric: Number of METAR/SPECI and TAF issued in accordance with APAC requirements for AOP and non-AOP aerodromes.
7. Quality Management	Indicator: Percentage of meteorological service providers with a Quality Management System implemented. Supporting metric: Number of meteorological service providers with a Quality Management System implemented.
8. Qualifications and Competencies	Indicator: Percentage of aviation meteorological personnel with the required qualifications. Percentage of meteorological service providers with a competency assessment and training program implemented. Supporting metric: Number of aviation meteorological personnel with the required qualifications. Number of meteorological service providers with a competency assessment and training program implemented.

8. ASBU B0-AMET. Performance Monitoring and Measurement	
8B. ASBU B0-AMET: Performance Monitoring	
Key Performance Areas	Metrics (if not indicate qualitative Benefits)
Access & Equity	Not applicable
Capacity	Optimized usage of airspace and aerodrome capacity due to MET support
Efficiency	Reduced arrival/departure holding time, thus reduced fuel burn due to MET support
Environment	Reduced emissions due to reduced fuel burn due to MET support
Safety	Reduced incidents/accidents in-flight and at aerodromes due to MET support.

APPENDIX D – IWXXM AND AMHS SURVEY

This survey is intended to inform ICAO APANPIRG on the status of planning and implementation of the digital exchange of meteorological information (IWXXM) and Aeronautical Message Handling System (AMHS) links in APAC States necessary to conform to Annex 3 standards envisaged for applicability in November 2018.

Q1. Please provide the name of your State/Territory:

Q2. Please provide your contact details:

Name:

Organisation:

Email address:

Q3. Please confirm if your State is aware that ICAO has initiated work on the development of future standards in Annex 3 for the international exchange of XML-formatted OPMET, including SIGMET, TAF, METAR, SPECI & AIRMET, for potential applicability as early as November 2018?

- a) Yes, we are aware
- b) No, we weren't aware

Q4. Please indicate the status of planning and implementation of XML-formatted OPMET within your State:

- a) Not yet started
- b) Planning
- c) Procuring a solution
- d) Testing
- e) Operational

Q5. If not yet operational, please indicate when operational status is expected (if known):

- a) Yes, during 2015
- b) Yes, during 2016
- c) Yes, during 2017
- d) Yes, during 2018
- e) Not sure
- f) Other (please specify)

Q6. Please indicate which entity will generate XML-formatted OPMET for your State (you may select more than one):

- a) National Meteorological Service Provider
- b) National Air Navigation Service Provider (ANSP)
- c) National Regional OPMET Databank (RODB)
- d) Not yet determined
- e) Other, e.g., from another State (please specify)

Q7. Please indicate whether or not your State has access to an AMHS connection for sending IWXXM data internationally:

- a) Yes, and it currently supports Extended AMHS
- b) Yes, and it supports Extended AMHS although this is not configured
- c) Yes, but it does not support Extended AMHS
- d) No

e) Not sure

Q8. If you answered no to Q6 (i.e., d) not yet determined), please indicate whether or not your State has plans to implement AMHS:

- h) Yes, during 2015
- i) Yes, during 2016
- j) Yes, during 2017
- k) Yes, during 2018
- l) No
- m) Not sure
- n) Other (please specify)

Q9. Please indicate whether or not your State is planning to convert XML-format OPMET messages to traditional alphanumeric code (TAC):

- a) Yes, during 2015
- b) Yes, during 2016
- c) Yes, during 2017
- d) Yes, during 2018
- e) No
- o) Other (please specify)

Comments:

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APPENDIX E – SURVEY OF STATE METEOROLOGICAL INFORMATION SUPPORTING AIR TRAFFIC MANAGEMENT

Please circle all relevant responses (there may be more than one per question).

Q1. Provide the specific meteorological products and/or websites that your administration (and/or State) has available to support Air Traffic Flow Management (ATFM):

- a) Local Routine and Special Report (MET REPORT / SPECIAL)
- b) Aerodrome Report (METAR / SPECI)
- c) Volcanic Activity Report
- d) Volcano Observatory Notice to Aviation (VONA)
- e) Air Report and Special Air Report (ARP and ARS)
- f) Aerodrome Forecast (TAF)
- g) Trend Forecast (TREND)
- h) Area Forecast (GAMET)
- i) Significant Weather Forecast (SIGWX) Low (SFC-FL100)
- j) Significant Weather Forecast (SIGWX) Medium (FL100-250)
- k) Significant Weather Forecast (SIGWX) High (FL250-630)
- l) Volcanic Ash Advisory (VAA)
- m) Volcanic Ash Graphic (VAG)
- n) Tropical Cyclone Advisory (TCA)
- o) Tropical Cyclone Graphic (TCG)
- p) SIGMET
- q) AIRMET
- r) Aerodrome Warning (AD WRNG)
- s) Wind Shear Warning (WS WRNG)
- t) Wind Shear Alert
- u) Climatological Information
- v) Tailored or other MET information (please specify)
- w) Websites:

Q2. What are the methods you use to distribute meteorological information?

- a) Aeronautical Fixed Telecommunications Network (AFTN)
- b) Aeronautical Message Handling System (AMHS)
- c) Telephone
- d) Facsimile
- e) Internet portal
- f) Web/video conferencing
- g) Other (please specify)

Q3. List the MET products your State considers operationally valuable (in order of the most importance) to ATFM (refer to list in Q1).

.....
.....
.....

Q4. Does your State use automated processing of gridded MET data in ATM automation and/or ATFM systems for the calculation of flight trajectories and flight plan updates?

- a) No
- b) Yes from the World Area Forecast System (WAFS)
- c) Yes from another source (please specify)

Q5. If you answered YES to Q4, what gridded data is currently being used?

- a) Wind
- b) Temperature and humidity
- c) Icing
- d) Turbulence
- e) Cumulonimbus cloud
- f) Other (please specify)

Q6. If you answered NO to Q4, does your facility plan to implement ATM/AFTM automation system processes using gridded data, and if so by what date?

- a) No
- b) Yes (specify target implementation date)

Q7. What are your expectations of the MET service provider in the provision of MET services in support of ATFM?

.....
.....
.....

Q8. What efforts are you presently undertaking to improve MET service provision in support of ATFM in your State?

.....
.....
.....

Q9. Has your State enacted primary legislation and supporting regulations for the provision of MET services in accordance with the provisions in Annex 3 to the Convention on International Civil Aviation – *Meteorological Service for International Air Navigation* and applicable regional air navigation agreements?

- a) No
- b) Yes (please specify)

Q10. Does your State have regulations in place requiring that air traffic service authorities and meteorological authorities establish an agreement in accordance with the provisions in Annex 3 [4.2] and guidance in ICAO Doc. 9377 – *Manual on Coordination between Air Traffic Services, Aeronautical information Services and Aeronautical Meteorological Services* defining roles and responsibilities, and the MET information to be provided?

- a) No
- b) Yes (please specify)

APPENDIX F – SIGMET PAMPHLETS

SIGMET QUICK REFERENCE GUIDE WS SIGMET

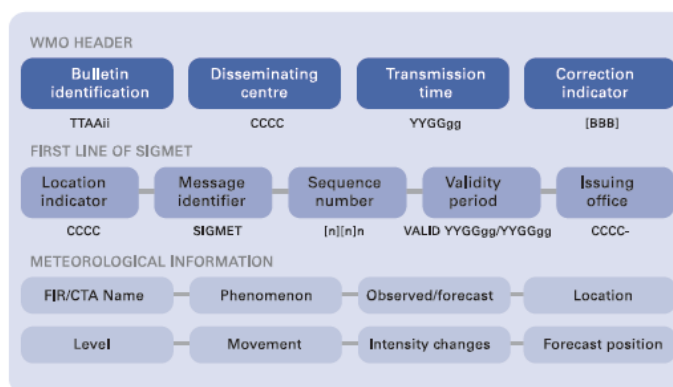
SIGMET Abbreviations

ABV	Above
CNL	Cancel or cancelled
CTA	Control area
FCST	Forecast
FIR	Flight Information Region
FL	Flight level
FT	Feet
INTSF	Intensify or intensifying
KT	Knots
KMH	Kilometres per hour
M	Metres
MOV	Moving
NC	No Change (in intensity)
NM	Nautical Miles
OBS	Observed
SFC	Surface
STNR	Stationary
TOP	Top (of CB cloud)
WI	Within (area)
WKN	Weakening (intensity)
Z	Coordinated Universal Time

WS SIGMET

A SIGMET provides concise information issued by a Meteorological Watch Office (MWO) concerning the occurrence or expected occurrence of specific en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations. The WS SIGMET provides information on phenomena other than tropical cyclones and volcanic ash.

SIGMET Structure



WMO Header

Bulletin identification

TT	Data type designator	WS – for SIGMET for meteorological phenomena other than volcanic ash cloud and tropical cyclone
AA	Country or territory designators	Assigned according to Table C1, Part II of <i>Manual on the Global Telecommunication System, Volume I – Global Aspects</i> (WMO Publication No. 386)
ii	Bulletin number	Assigned on national level according to Part II of <i>Manual on the Global Telecommunication System, Volume I – Global Aspects</i> (WMO Publication No. 386)

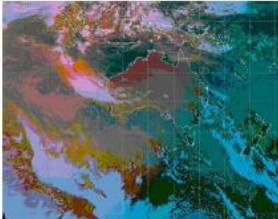
Disseminating centre

CCCC is the ICAO location indicator of the communication centre disseminating the message (this may be the same as the MWO location indicator).

Transmission time

YYGGgg is the date/time group; where YY is the day of the month and GGgg is the time of transmission of the SIGMET in hours and minutes UTC (normally this time is assigned by the disseminating (AFTN) centre).





MTSAT-1R icing enhancement. Dark areas indicate the presence of supercooled liquid water (black by night, red by day). High level cirrus (bright areas) may prevent the satellite from seeing the lower level clouds.



Anvil of a cumulonimbus cloud



Duststorm, Sydney, 23 September 2009. Image courtesy of Ely Spark, Bureau of Meteorology.

Correction indicator

BBB should only be included when issuing a correction to a SIGMET which had already been transmitted. The BBB indicator shall take the form **CCx** for corrections to previously relayed bulletins, where x takes the value A for the first correction, B for the second correction, etc., for a specific SIGMET.

First line of SIGMET

Location indicator

CCCC is the ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET refers.

Message identifier

The message identifier is **SIGMET**.

Sequence number

The daily sequence number in the form **[n][n]n**, e.g. 1, 2, 01, 02, A01, A02, restarts every day for SIGMETs issued from 0001 UTC.

Validity period

The validity period is given in the format **VALID YYGGgg/YYGGgg** where YY is the day of the month and GGgg is the time in hours and minutes UTC. The period of validity for a WS SIGMET shall be no more than 4 hours.

Issuing Office

CCCC- is the ICAO location indicator of the MWO originating the message followed by a hyphen.

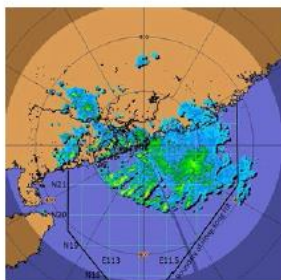
Meteorological Information

FIR/CTA Name

The ICAO location indicator and full name of the FIR/CTA for which the SIGMET is issued in the form **CCCC <name> FIR[/UIR]** or **CCCC <name> CTA**.

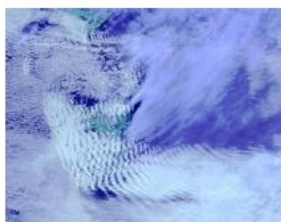
Phenomenon

Code	Description
OBSC TS	Obscured thunderstorms
EMBDTS	Embedded thunderstorms
FRQTS	Frequent thunderstorms
SQLTS	Squall line thunderstorms
OBSC TSGR	Obscured thunderstorms with hail
EMBD TSGR	Embedded thunderstorms with hail
FRQ TSGR	Frequent thunderstorms with hail
SQL TSGR	Squall line thunderstorms with hail
SEVTURB	Severe turbulence
SEV ICE	Severe icing
SEV ICE (FZRA)	Severe icing due to freezing rain
SEV MTW	Severe mountain wave
HVY DS	Heavy duststorm
HVY SS	Heavy sandstorm
RDOACT CLD	Radioactive cloud



Widespread thunderstorms affecting the Southern China and the northern part of South China Sea on 9 May 2014.

E	East or eastern longitude
ENE	East-north-east
ESE	East-south-east
N	North or northern latitude
NE	North-east
NNE	North-north-east
NNW	North-north-west
NW	North-west
S	South or southern latitude
SE	South-east
SSE	South-south-east
SSW	South-south-west
SW	South-west
W	West or western longitude
WNW	West-north-west
WSW	West-south-west



Satellite image of mountain waves over Tasmania, 3 December 2002.

Observed or forecast

Whether the phenomenon is observed or forecast in the form **OBS [AT GGggZ]** or **FCST [AT GGggZ]** where GG is hours and gg minutes UTC.

Location

The location of the phenomenon is provided with reference to geographical coordinates in latitude and longitude in degrees and minutes.

Level

The level or vertical extent of the phenomenon:

FLnnn or **nnnnM** or **nnnnFT** or **SFC/FLnnn** or **SFC/nnnnM** or **SFC/nnnnFT** or **FLnnn/nnn** or **nnnn/nnnnFT** or **TOP FLnnn** or **ABV FLnnn** or **TOP ABV FLnnn**.

Movement

Direction and rate of movement of the phenomenon where the direction is given with reference to one of the sixteen points of the compass (using the appropriate abbreviation) and the rate is given in KT (or KMH) in the form **MOV <direction> <speed>KT** or **KMH**. The abbreviation **STNR** (Stationary) is used if no significant movement is expected.

Intensity changes

The expected evolution of the phenomenon's intensity as indicated by: **INTSF** or **WKN** or **NC**

Forecast position (optional)

The forecast position of the hazardous phenomena at the end of the validity period of the SIGMET message in the form **FCST <GGgg>Z <location>**.

Renewing a SIGMET

A SIGMET is renewed with a new sequence number when the validity period is due to expire but the phenomenon is expected to persist.

Cancelling a SIGMET

If, during the validity period of a SIGMET, the phenomenon for which the SIGMET was issued is no longer occurring or is no longer expected, the SIGMET shall be cancelled by issuing a SIGMET with the abbreviation **CNL** in lieu of meteorological information.

CNL SIGMET [n][n]n YGGggg/YYGGgg

Source of Information

Source of Information	Phenomena
Surface and upper-air observations Special AIREP Satellite pictures NWP forecasts	Thunderstorms, dust/sandstorms, turbulence, mountain waves, icing
RADAR Lightning information	Thunderstorms
WMO RSMC (Atmospheric transport modelling for environmental emergency)	Radioactive cloud

SIGMET Dissemination

SIGMET is part of operational meteorological (OPMET) information and should be exchanged via aeronautical fixed service (AFS). The SIGMET priority indicator used shall be **FF**.

WS Examples

Format

WSAAii CCCCYYGGgg [BBB]
 CCCC SIGMET [n][n]n VALIDYYGGgg/YYGGgg CCCC-
 CCCC <FIR/CTA Name> FIR <Phenomenon> OBS/FCST
 [AT GGggZ] <Location> <Level> <Movement> <Intensity
 changes> <Forecast position>=

Thunderstorms

WSSS20 VHHH 090900
 VHHK SIGMET 3 VALID 090900/091300 VHHH-
 VHHK HONG KONG FIR EMBD TS OBS AT 0900Z N OF
 N2000 AND E OF E11330 TOP FL400 INTSF FCST 1300Z
 N OF N2000 AND E OF E11300=

Duststorms

WSAU21 ADRM 240330
 YMMM SIGMET D01 VALID 240330/240430 YPDM-
 YMMM MELBOURNE FIR HVY DS OBS WI S2300
 E13415 - S2240 E13800 - S2520 E13800 - S2525
 E13520 - S2300 E13415 SFC/7000FT MOV N 25KT NC=

Sandstorms

WSC133 ZBAA 301110
 ZBPE SIGMET 2 VALID 301110/301510 ZBAA-
 ZBPE BEIJING FIR HVY SS OBS AT 1100Z N OF N40
 SFC/2000M MOV E 30KMH NC=

Turbulence

WSNZ21 NZKL 232134
 NZCC SIGMET 18 VALID 232134/240134 NZKL-
 NZCC NEW ZEALAND FIR SEV TURB FCST WI S3929
 E17602 - S4305 E17136 - S4522 E17000 - S4538
 E17159 - S4112 E17624 - S3929 E17602 FL180/260 MOV
 E 25KT INTSF=

Mountain waves

WSAU21 AMRF 061700
 YMMM SIGMET M07 VALID 061700/062100 YMRF-
 YMMM MELBOURNE FIR SEV MTW OBS WI S3704 E14244
 - S3611 E14753 - S3736 E14943 - S4006 E14800 - S3952
 E14353 - S3704 E14244 FL080/140 STNR NC=

Icing

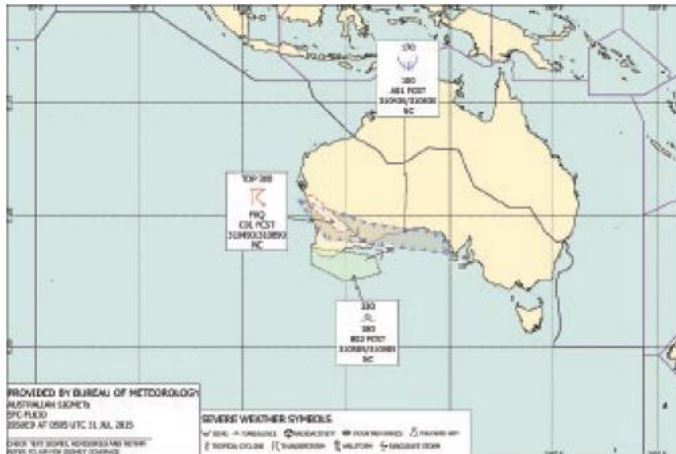
WSC145 ZHHH 021100
 ZHWH SIGMET 3 VALID 021100/021500 ZHHH-
 ZHWH WUHAN FIR SEV ICE FCST N OF N28 SFC/FL200
 STNR NC=

Radioactive cloud

WSSS20 VHHH 180830
 VHHK SIGMET 1 VALID 180830/181230 VHHH-
 VHHK HONG KONG FIR RDOACT CLD FCST E OF E114
 SFC/FL100 MOV E 20KT WKN=

Cancellation

WSSS20 VHHH 181100
 VHHK SIGMET 2 VALID 181100/181230 VHHH-
 VHHK HONG KONG FIR CNL SIGMET 1 180830/181230=



Refer to the following for more information

ICAO Annex 3 - Meteorological Service for International Air Navigation
 (Amd 76)
 ICAO Regional SIGMET Guide
 ICAO Doc.8896 - Manual of Aeronautical Meteorological Practice
 WMO No.49 Technical Regulations Volume II - Meteorological Service for
 International Air Navigation (2013 ed)
 WMO No.732 Guide to Practices for Meteorological Offices Serving
 Aviation

SIGMET QUICK REFERENCE GUIDE WC SIGMET

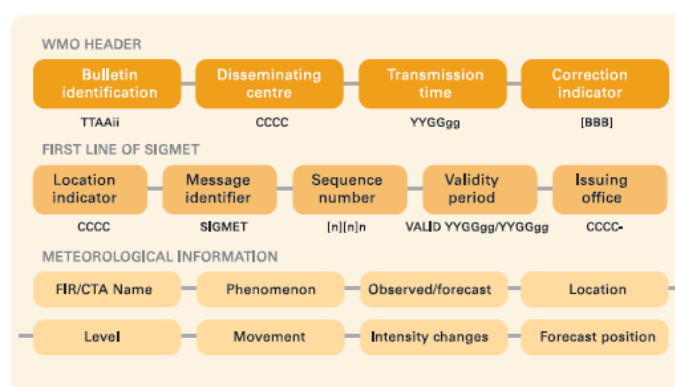
SIGMET Abbreviations

ABV	Above
BLW	Below
CB	Cumulonimbus cloud
CNL	Cancel or cancelled
CTA	Control area
FCST	Forecast
FIR	Flight Information Region
FL	Flight level
FT	Feet
INTSF	Intensify or intensifying
KT	Knots
KMH	Kilometres per hour
M	Metres
MOV	Moving
NC	No Change (in intensity)
NM	Nautical Miles
OBS	Observed
SFC	Surface
STNR	Stationary
TOP	Top (of CB cloud)
WI	Within (area)
WKN	Weakening (intensity)
Z	Coordinated Universal Time

WC SIGMET

A SIGMET provides concise information issued by a Meteorological Watch Office (MWO) concerning the occurrence or expected occurrence of specific en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations. The WC SIGMET provides information on tropical cyclones (intensity 34 knots or greater). WC SIGMET should be based on the Tropical Cyclone Advisory.

SIGMET Structure



WMO Header

Bulletin identification

TT	Data type designator	WC – for SIGMET for tropical cyclone
AA	Country or territory designators	Assigned according to Table C1, Part II of <i>Manual on the Global Telecommunication System, Volume I – Global Aspects</i> (WMO Publication No. 386)
ii	Bulletin number	Assigned on national level according to Part II of <i>Manual on the Global Telecommunication System, Volume I – Global Aspects</i> (WMO Publication No. 386)

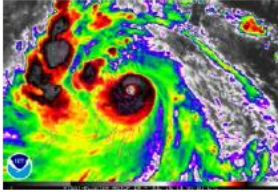
Disseminating centre

CCCC is the ICAO location indicator of the communication centre disseminating the message (this may be the same as the MWO location indicator).

Transmission time

YYGGgg is the date/time group; where YY is the day of the month and GGgg is the time of transmission of the SIGMET in hours and minutes UTC (normally this time is assigned by the disseminating (AFTN) centre).





Typhoon Rammasun landfall in the Philippines on 15 July 2014. Image courtesy NOAA Satellite Services Division.



Damage from Supertyphoon Pongsona on the island of Rota, 20 December 2002. Image courtesy FEMA Photo Library, Andrea Booher.



Satellite image of Severe Tropical Cyclone Yasi approaching Queensland, Australia on 2 February 2011. Image courtesy NASA; MODIS.

Correction indicator

BBB should only be included when issuing a correction to a SIGMET which had already been transmitted. The BBB indicator shall take the form **CCx** for corrections to previously relayed bulletins, where x takes the value A for the first correction, B for the second correction, etc., for a specific SIGMET.

First line of SIGMET

Location indicator

CCCC is the ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET refers.

Message identifier

The message identifier is **SIGMET**.

Sequence number

The daily sequence number in the form **[n][n]n**, e.g. 1, 2, 01, 02, A01, A02, restarts every day for SIGMETs issued from 0001 UTC.

Validity period

The validity period is given in the format **VALID YYGGgg/YYGGgg** where YY is the day of the month and GGgg is the time in hours and minutes UTC. For an observed TC, the start of validity for the SIGMET should be the same as the issue time. For a forecast TC, the start of validity should be the time the TC is expected to enter/develop in a MWO's FIR and can be issued no more than 12 hours prior to the start of validity. The validity period for a WC SIGMET shall be no more than 6 hours.

Issuing Office

CCCC- is the ICAO location indicator of the MWO originating the message followed by a hyphen.

Meteorological Information

FIR/CTA Name

The ICAO location indicator and full name of the FIR/CTA for which the SIGMET is issued in the form **CCCC <name> FIR[/UIR]** or **CCCC <name> CTA**.

Phenomenon

The description of the tropical cyclone consists of the abbreviation TC followed by the international name given by the corresponding WMO RSMC in the form **TC <name>**. If the disturbance is expected to become a TC, but is not yet named, the term **TC NN** should be used.

Observed or forecast

Whether the tropical cyclone is observed or forecast in the form **OBS [AT GGggZ]** or **FCST [AT GGggZ]** where GG is hours and gg minutes UTC.

Location

The location of the centre of the tropical cyclone is provided with reference to geographical coordinates in latitude and longitude in degrees and minutes.

Level

The vertical and horizontal extent of the tropical cyclone in the form:
CB TOP [ABV or BLW] <FLnnn> WI <nnnKM or nnnNM> OF CENTRE

E	East or eastern longitude
ENE	East-north-east
ESE	East-south-east
N	North or northern latitude
NE	North-east
NNE	North-north-east
NNW	North-north-west
NW	North-west
S	South or southern latitude
SE	South-east
SSE	South-south-east
SSW	South-south-west
SW	South-west
W	West or western longitude
WNW	West-north-west
WSW	West-south-west

Movement

Direction and rate of movement of the tropical cyclone where the direction is given with reference to one of the sixteen points of the compass (using the appropriate abbreviation) and the rate is given in KT (or KMH) in the form **MOV <direction> <speed>KT or KMH**. The abbreviation **STNR** (Stationary) is used if no significant movement is expected.

Intensity changes

The expected evolution of the tropical cyclone's intensity as indicated by: **INTSF** or **WKN** or **NC**

Forecast position (optional)

The forecast position of the tropical cyclone in the form: **FCST <GGgg>ZTC CENTRE <location>**.

Renewing a SIGMET

A SIGMET is renewed with a new sequence number when the validity period is due to expire but the tropical cyclone is expected to persist.

Cancelling a SIGMET

If, during the validity period of a SIGMET, the tropical cyclone intensity falls below 34 knots or if it has moved out of the FIR, the SIGMET shall be cancelled by issuing a SIGMET with the abbreviation CNL in lieu of meteorological information.

CNL SIGMET [n][n]n YYGGgg/YYGGgg

When cancelling a WC SIGMET consider the need for a WS SIGMET for thunderstorms.

Source of Information



Typhoon Jelawat on 9 August 2000, showing clear Annular characteristics. Image courtesy NASA.

Source of Information	Types of Information	Issue a WC SIGMET
MWO, TCAC	Observations that confirm a tropical cyclone has developed.	TC observed – issue immediately.
	Information concerning a tropical cyclone is received from a TCAC.	TC forecast to enter/develop in MWOs FIR – Issue up to 12 hours before the time the TC is expected to enter/develop in FIR.

SIGMET Dissemination

SIGMET is part of operational meteorological (OPMET) information and should be exchanged via aeronautical fixed service (AFS). The SIGMET priority indicator used shall be **FF**.

TCA and WC SIGMET Examples

Tropical Cyclone Advisory (TCA) Example

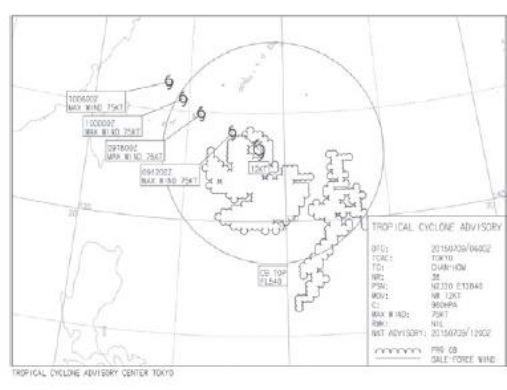
```

FKAU05 ADRM 071830
TC ADVISORY
DTG: 20130307/1800Z
TCAC: DARWIN
TC: SANDRA
NR: 02
PSN: S1500 E15600
MOV: NE 07KT
C: 989HPA
MAX WIND: 35KT
FCST PSN +6HR: 08/0000Z S1500 E15630
FCST MAX WIND +6HR: 40KT
FCST PSN +12HR: 08/0600Z S1448 E15706
FCST MAX WIND +12HR: 45KT
FCST PSN +18HR: 08/1200Z S1454 E15736
FCST MAX WIND +18HR: 50KT
FCST PSN +24HR: 08/1800Z S1500 E15800
FCST MAX WIND +24HR: 60KT
RMK: NIL
NXT MSG: 20130308/0100Z
    
```

```

FKPQ30 RJTD 090600
TC ADVISORY
DTG: 20150709/0600Z
TCAC: TOKYO
TC: CHAN-HOM
NR: 38
PSN: N2320 E12840
MOV: NW 12KT
C: 960HPA
MAX WIND: 75KT
FCST PSN +6HR: 09/1200Z N2405 E12720
FCST MAX WIND +6HR: 75KT
FCST PSN +12HR: 09/1800Z N2455 E12540
FCST MAX WIND +12HR: 75KT
FCST PSN +18HR: 10/0000Z N2535 E12440
FCST MAX WIND +18HR: 75KT
FCST PSN +24HR: 10/0600Z N2620 E12350
FCST MAX WIND +24HR: 75KT
RMK: NIL
NXT MSG: 20150709/1200Z =
    
```

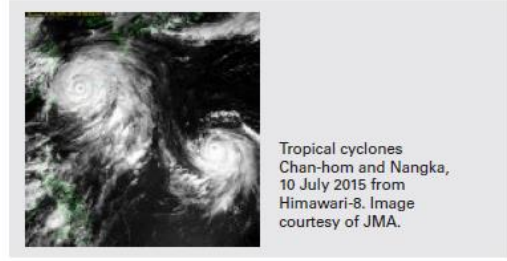
Tropical Cyclone Advisory Graphic (TCG) Example



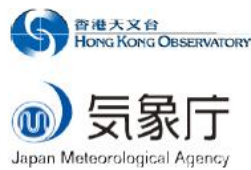
Tropical Cyclone SIGMET Format
 WCAAi CCCC YGGGg [BBB]
 CCCC SIGMET [n][n] VALIDYYGGg/YYGGg CCCC-
 CCCC <FIR/CTA Name> FIR TC <Name> OBS/FCST [AT
 GGgZ] <Location> <Level> <Movement> <Intensity
 changes> <Forecast position>=

Tropical Cyclone SIGMET Example
 WCJP31 RJTD 090710
 RJJJ SIGMET X03 VALID 090710/091310 RJTD-
 RJJJ FUKUOKA FIR TC CHAN-HOM OBS AT 0600Z N2320
 E12840 CB TOP FL520 WI 140NM OF CENTRE MOV NW
 12KT NC FCST 1200Z TC CENTRE N2405 E12720=

Tropical Cyclone SIGMET (WC) Example
 WCAU01 ABRF 071910
 YBBB SIGMET D02 VALID 071915/080115YBRF-
 YBBB BRISBANE FIR TC SANDRA OBS AT 1800Z S1500
 E15600 CB TOP FL500 WI 280NM OF CENTRE MOV NE
 07KT INTSF



Cancellation
 WCAU01 ABRF 100515
 YBBB SIGMET D12 VALID 100515/100715 YBRF-
 YBBB BRISBANE FIR CNL SIGMET D06 100115/100715=



Refer to the following for more information
 ICAO Annex 3 – Meteorological Service for International Air Navigation (Amd 76)
 ICAO Regional SIGMET Guide
 ICAO Doc.8896 – Manual of Aeronautical Meteorological Practice
 WMO No.49 Technical Regulations Volume II – Meteorological Service for International Air Navigation (2013 ed)
 WMO No.732 Guide to Practices for Meteorological Offices Serving Aviation

APPENDIX G – METEOROLOGY SUB GROUP WORK PROGRAMME

SUBJECT/TASKS LIST IN THE MET FIELD

Updated by **MET SG/19**

The priorities assigned in the list have the following connotation:

A = Tasks of a high priority on which work should be expedited;

B = Tasks of medium priority on which work should be under taken as soon as possible but not to the detriment of Priority "A" tasks; and

C = Tasks of medium priority on which work should be undertaken as time and resources permit but not to the detriment of priority "A" and "B" tasks.

TOR = Terms of Reference of the Sub-Group

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
1 (32)	RAN/3 C.8/14 APANPIRG/14 (TOR 3)	A-Safety Sustainability GPI-19	Subject: Inadequate implementation of procedures for advising aircraft on volcanic ash (VA) and tropical cyclones (TC) and other hazardous weather Task: Monitoring of the implementation of meteorological advisories and warnings which includes VA and TC	A	Monitor and provide assistance in the implementation of meteorological advisories and warnings procedures to ensure provision of timely information on weather hazardous to aircraft. Monitor outcomes of ICAO global groups and WMO for developing framework of contingency plan for specific phenomenon including VA, TC, radioactive cloud and Tsunami for the Region (coordinate with MET/R-TF MET/R WG and RACP/TF as necessary)	MET SG (MET/H TF MET/S WG)	On going
2 (36)	APANPIRG D. 4/46 RAN/3 C.12/3	C- Sustainability All GPIs	Subject: Provision of adequate MET services Task: Monitor performance based systems research and development, trials and	A	1) Encourage States to conduct R&D, trials & demonstrations of new MET services; 2) Monitor global	MET SG	On-going

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
	<p>APANPIRG 5/3</p> <p>(TOR 3)</p>		<p>demonstrations in the fields of MET and facilitate the transfer of this information and expertise between States.</p>		<p>developments that may have beneficial consequences on regional planning activities;</p> <p>3) Consolidate information on new capabilities in the CNS/ATM system, for the Sub-Group’s review and action;</p> <p>4) Serve as a focal point for review of ongoing work of regional formal and informal working groups that is relevant to MET;</p> <p>5) Provide for coordinated training/seminars to keep all States informed on developments of trials and demonstrations.</p>		

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
3 (37)	C 12/24	C- Sustainability GPI-19	Subject : Transition to the GRIB and BUFR coded WAFS products Task : Implementation of the transition to the GRIB and BUFR coded WAFS products	A	1) Monitoring of implementation of BUFR coded SIGWX forecasts	MET SG (WAFS TF)	Completed
					2) Monitoring of the migration to SADIS 2G	WAFS TF	Completed
					3) Assist in preparation for the new gridded products for turbulence, icing and cumulonimbus	WAFS TF	Completed
					4) Monitoring of the implementation of WIFS until cessation of ISCS G2 broadcast	WAFS/I TF	Completed
4 (38)	C12/36 APANPIRG C14/45	C- Sustainability GPI-19	Subject: Developing the new requirements for MET products and services in support of ATM	A	1) Development of the initial draft of the MET Chapter;	CNS/MET SG with assistance of MET	Completed
					2) Development of the MET components of the CNS/ATM concept/ strategy;	WG on CNS/ATM Plan	Completed
					3) Inclusion of ATM requirements for MET information in the CNS/ ATM Plan;	CNS/MET SG	Completed
					4) MET/ATM Coordination Seminar – February 2006.	MET/ATM TF	Completed
					5) Conduct survey on ATM requirements for MET information	MET/R TF MET/R WG	2014 2016

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
					6) MET/ATM meeting in 2009	MET/ATM TF	Completed
					7) MET/ATM seminar in 2010 (in coordination with WMO)	MET/ATM TF	Completed
					8) MET/ATM seminar and MET/R TF meeting	MET/R TF	2013 Completed 2015 Completed
5 (39)	APANPIRG/13 D 13/28	A - Safety C- Sustainability GPI-19	Subject: To increase the OPMET availability and reliability needed for flight planning (efficiency) and in-flight planning (safety) of the regional and inter-regional OPMET exchange from the ASIA/PAC Region Task: Review and optimize the ROBEX scheme and other OPMET exchanges; introduce monitoring and management procedures for the ROBEX centres and Regional OPMET data banks	A	1) Review regional guidance material related to OPMET data; 2) Identify gaps in processes, procedures and OPMET exchange; 3) Improve the availability of OPMET data at the Regional OPMET Data Banks (RODB) and WAFS Provider States; 4) Improve the timeliness and regularity of exchange; 5) Facilitate and monitor the migration to AIM and new MET codes (eg. XML); 6) Review the current RODB structure in light XML implementation	MET SG (ROBEX WG MET/IE WG)	Recurrent task Recurrent task Recurrent task Recurrent task 2014 2015 -2016 2014 2015 -2016

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
6 (43)		C- Sustainability GPI17,18,19,22	Subject: Implementation of data link Task: Encourage implementation	A	Encourage States to implement CPDLC, D-ATIS, D-VOLMET, PDC and DPC	MET SG CNS SG	
7 (45)	APANPIRG List of deficiencies	A – Safety GPI - 19	Subject: Implementation of SIGMET Task: Improve regional procedures and availability of SIGMET from ASIA/PAC States	A	1) Assist States in implementing SIGMET requirements; 2) Conduct regular SIGMET tests; 3) Review and update training and guidance material; 4) Regular monitoring on the availability and quality of SIGMET and advisories.	MET SG (MET/HTF MET/S WG in coordination with MET/IE WG ROBEX WG)	Recurrent task Recurrent task Recurrent task Recurrent task

* Number in bracket indicates sequential number since establishment of the Sub-group.