INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

REPORT OF

THE EIGHTEENTH MEETING OF THE METEOROLOGY SUB-GROUP (MET SG/18) OF APANPIRG

18 – 21 August 2014
Beijing, China

The views expressed in this Report should be taken as those of the Meeting and not the Organization.

Approved by the Meeting
and published by the ICAO Asia and Pacific Office, Bangkok

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1. Introduction

1.1 The Eighteenth Meeting of the Meteorology Sub-group (MET SG/18) of the Asia and Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) was held in the International Civil Aviation Organization – Regional Sub Office (RSO) in Beijing, China from 18 to 22 August 2014.

2. Attendance

2.1 The meeting was attended by 56 experts from Australia, Bangladesh, Bhutan, Cambodia, China, Hong Kong, China, Macao, China, Democratic People's Republic of Korea, Indonesia, Japan, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United Kingdom, United States, Viet Nam, the International Air Transport Association (IATA) and the International Civil Aviation Organization (ICAO). The List of Participants is provided in **Attachment 1** to this Report.

3. Opening of the meeting

3.1 Mr. Xiao Jing, Deputy Chief of the RSO, provided the welcome address.

4. Chair and Secretariat

4.1 Ms. Sue O'Rourke presided over the meeting in the role as chairperson and was assisted by Dr. Cheng Cho Ming in the role as vice chairperson.

4.3 Mr. Peter Dunda, ICAO Regional Officer Aeronautical Meteorology, acted as secretary of the meeting.

5. Organization and language of the meeting

5.1 The meeting met as a single body. Working language was English including all papers and this Report. The meeting considered 24 working papers and 28 information papers. A list of papers is provided in **Attachment 2** to this Report.

6. Draft Conclusions, Draft Decisions and Decisions

6.1 The Meteorology Sub-group recorded its actions in the form of Draft Conclusions, Draft Decisions and Decisions within the following definitions:

a) Draft Conclusions deal with matters that, according to APANPIRG terms of reference, require the attention of States, or action by the ICAO in accordance with established procedures;

b) Draft Decisions deal with the matters of concern only to APANPIRG and its contributory bodies; and

c) Decisions relate solely to matters dealing with the internal working arrangements of the Meteorology Sub-group.

6.2 Draft Conclusions – MET SG/18 formulated the following six (6) Draft Conclusions:

Draft conclusion 18/2 – Follow-up to APANPIRG/24 decisions and conclusions

Draft Conclusion 18/4 – Improvement of OPMET data format

Draft conclusion 18/6 – Initiatives to reduce deficiencies in SIGMET information

Draft Conclusion 18/7 – Improvement of OPMET data availability for AOP aerodromes, and for non-AOP aerodromes listed in FASID Table MET 2A

Draft conclusion 18/8 – Establishment of a volcanic ash exercises steering group in the APAC region

Draft conclusion 18/9 – APAC MET/ATM seminar

6.3 Draft Decisions – MET SG/18 formulated no Draft Decisions

6.4 Decisions – MET SG/18 formulated the following four (4) Decisions:

Decision 18/1 – Follow-up to MET SG/17 decisions

Decision 18/3 – Status of OPMET provision in Bhutan

Decision 18/5 – Updates to the requirements for WIFS of APAC States

Decision 18/10 – Contact information for approving officials in WIFS user States

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ACRONYMS AND ABBREVIATIONS USED IN THE REPORT

ACC	Area control centre
A-CDM	Airport collaborative decision making
AIM	Aeronautical information management
AIRMET	Information concerning en-route weather phenomena (ICAO Annex 3 refers)
AIS	Aeronautical information service
AMHS	ATS message handling system
AMOFSG/10	Aerodrome Meteorological Observation and Forecast Study Group, Tenth Meeting
ANC	Air Navigation Council
AN-Conf/12	Twelfth Air Navigation Conference (Montréal, 16 to 17 November 2012)
ANP	Air navigation plan
ANRF	Air navigation reporting form
ANSP	Air navigation service provider
AOP	Aerodrome operational planning
APAC	Asia and Pacific
APANPIRG/24	APAC Air Navigation Planning and Implementation Regional Group, Twenty-fourth Meeting
ASBU	Aviation System Block Upgrades
ATC	Air traffic control
ATFM	Air traffic flow management
ATM	Air traffic management
ATM/SG/2	Air Traffic Management Sub-Group (of APANPIRG), Second Meeting
ATMet	Air Traffic Meteorology (used by Japan)
ATMetC	Air Traffic Meteorology Centre (used by Japan)
ATS	Air traffic services
B0-AMET	Block zero – advanced meteorological information (refers to the ASBU methodology)
B1-AMET	Block one – advanced meteorological information (refers to the ASBU methodology)
BMKG	Indonesian Meteorological, Climatological and Geophysical Agency (Badan Meteorologi, Klimatologi, Dan Geofisika)
BoM	Bureau of Meteorology (Australia)
CAA	Civil aviation authority
CAeM	Commission for Aeronautical Meteorology (of the WMO)
CAT	Clear air turbulence
CVGHM	Centre for Volcanology and Geological Hazard Mitigation (Indonesia)
DGCA	Director General of Civil Aviation
eANP	Electronic air navigation plan
eANP WG	eANP Working Group
EASA	European Aviation Safety Agency
FASID	Facilities and Services Implementation Document
GRIB2	GRIdded Binary edition 2 (code form standardized by the WMO)
IATA	International Air Transport Association
IAVW	International Airways Volcano Watch
IAVWOPSG/8	International Airways Volcano Watch Operations Group, Eighth Meeting
ICAO	International Civil Aviation Organization
IP	Information paper
IVATF	International Volcanic Ash Task Force
IWXXM	ICAO meteorological information exchange model
MARIE-PT	Meteorological Aeronautical Requirements and Information Exchange Project Team

MET	Aeronautical meteorology (or aeronautical meteorological information)
MET SG/17	Meteorology Sub-Group (of APANPIRG), Seventeenth Meeting
MET/14	Meteorology Divisional Meeting, 2014
MET/H TF/4	Meteorological Hazards Task Force (of MET SG), Fourth Meeting
MET/R TF/3	Meteorological Requirements Task Force (of MET SG), Third Meeting
METWSG/5	Meteorological Warnings Study Group, Fifth Meeting
MID	Middle East (ICAO region)
MoU	Memorandum of understanding
MWO	Meteorological watch office
NOF	NOTAM Office
NOTAM	Notice to Airmen
OPMET	Operational meteorological information
PIRG	Planning and Implementation Regional Group (ICAO)
RO	Regional Office (of ICAO Asia and Pacific, located in Bangkok, Thailand)
ROBEX	Regional OPMET Bulletin Exchange
ROBEX WG/12	ROBEX Working Group (of MET SG), Twelfth Meeting
RODB	Regional OPMET Data Bank
RSO	Regional Sub-Office (of ICAO Asia and Pacific, located in Beijing, China)
SADIS	Satellite Distribution System for Information Relating to Air Navigation
SADISOPSG/18	Satellite Distribution System Operations Group, Eighteenth Meeting
SADISOPSG/19	Satellite Distribution System Operations Group, Eighteenth Meeting
SATAID	Satellite Animation and Interactive Diagnosis (Japan)
SIGMET	Information concerning en-route weather phenomena (ICAO Annex 3 refers)
SIGWX	Global forecasts of significant weather phenomena (ICAO Annex 3 refers)
SWIM	System wide information management
TAF	Aerodrome forecast issued in code form (ICAO Annex 3 refers)
TBO	Trajectory based operations
VAA	Volcanic ash advisory information (ICAO Annex 3 refers)
VAAC	Volcanic ash advisory centre
WAFC	World area forecast centre
WAFS	World area forecast system
WAFS TF	WAFS Task Force (of MET SG)
WAFSOPSG/8	World Area Forecast System Operations Group, Eighth Meeting
WIFS	WAFS Internet File Service
WMO	World Meteorological Organization
WP	Working paper

Agenda Item 1: Opening of the meeting

1.1 Mr. Xiao Jing, Deputy Chief of the RSO, welcomed the participants of MET SG/18 to Beijing. He explained that the RSO recently celebrated its first anniversary having been established a year ago to support air navigation activities in the APAC region. Mr. Xiao Jing noted that the RSO conducts meetings, training and other related services supporting air traffic flow management, collaborative decision making, and performance based navigation implementation and the like. To this end, he stated that the RSO was very glad to host MET SG/18, particularly in view of the recent Meteorology Divisional Meeting and the ICAO President's supporting message that meteorological services provision is essential to the safety and efficiency of international air transport.

Agenda Item 2: Organizational matters

2.1 Mr. Wang Xiaoyin (Ian), Program Assistant from the RSO, provided a briefing on safety, security and general RSO administrative and visitor information to the group.

Adoption of the agenda *[WP/02]*

2.2 The agenda was adopted by the meeting as follows:

Agenda Item 1: Opening of the meeting

Agenda Item 2: Organizational matters

Agenda Item 3: Review outcomes from ICAO global groups

Agenda Item 4: Review outcomes from ICAO APAC groups

Agenda Item 5: Planning and monitoring

Agenda Item 6: Air navigation deficiencies in the MET field

Agenda Item 7: Research, development and implementation issues in the MET field

- 7.1 WAFS
- 7.2 Observations and reports
- 7.3 Forecasts
- 7.4 Advisories and warnings
- 7.5 Data exchange
- 7.6 MET/ATM coordination
- 7.7 Climatological information
- 7.8 Governance and training (incl. quality management, cost recovery, qualification and competencies of meteorological personnel)
- 7.9 Other

Agenda Item 8: Regional guidance material

Agenda Item 9: Inter-regional and intra-regional coordination

Agenda Item 10: Future work programme

Agenda Item 11: Any other business

Order of business

2.3 The proposed order of business of the meeting was adopted by the chairperson as a guide for the conduct of the meeting. The order of business is given in **Attachment 3** to this Report.

Agenda Item 3: Review outcomes from ICAO global groups

3.1 The meeting reviewed relevant outcomes from the following ICAO global groups: AN-Conf/12, MET/14, WAFSOPSG/8, SADISOPSG/18 and /19, AMOFSG/10, IAVWOPSG/8 and METWSG/5.

AN-Conf/12

3.2 Six (6) APAC States had submitted feedback to the RO concerning follow-up taken on the Twelfth Air Navigation Conference (AN-Conf/12) held in Montréal from 19 to 30 November 2012 with respect to Recommendation 4/7 – *ICAO aviation system block upgrades relating to meteorological information [IP/01]*. A copy of the feedback on the AN-Conf/12 Recommendation 4/7 is provided in the **Appendix A** to this Report.

MET/14

3.3 The Meteorology Divisional Meeting (MET/14) held in Montréal between 7 and 18 July 2014 developed twenty-nine (29) recommendations setting forth global objectives and implementation timelines, and directing the course of work for enhancing the provision of meteorological service to international air navigation for the next decade or more *[IP/02]*. A copy of the executive summary of MET/14 is provided in the **Appendix B** to this Report.

3.4 The meeting noted that MET/14 recommended appropriate ICAO expert groups be tasked to further develop initiatives including the SADIS, WIFS, IAVW, information on the release of radioactive material into the atmosphere, regional advisory system for hazardous meteorological conditions, meteorological service requirements and capabilities to support ASBU implementation, meteorological information integration for TBO and the inclusion of meteorological information in the future SWIM environment – work that had previously been performed by the global groups (WAFSOPSG, SADISOPSG, IAVWOPSG, METWSG, AMOFSG and MARIE-PT).

3.5 The secretary informed the meeting that there is an ongoing discussion with the ANC on the modernization of ICAO expert groups – including those relating to MET. A decision on the establishment of a new MET Panel has not yet been taken, but may occur over the coming few months and a significant part of the restructuring/repurposing of the MET-related expert groups (WAFSOPSG, IAVWOPSG, etc.) will be based around the outcomes of MET/14, which have not yet been considered by the ANC and the ICAO Council.

WAFSOPSG/8

3.6 Outcomes from the Eighth Meeting of the World Area Forecast System Operations Group (WAFSOPSG/8), held in Bangkok, Thailand, from 2 to 5 September 2013, included the adoption of eight (8) decisions and eleven (11) conclusions related to the operation and development of the WAFS. The meeting noted that follow-up action to WAFSOPSG/8 Conclusion 8/2 included amendments to the APAC Air Navigation Plan, Volume I, Basic ANP and Volume II, FASID (Doc 9673) *[IP/03]*.

SADISOPSG/18 and SADISOPSG/19

3.7 Outcomes from the Eighteenth and Nineteenth Meetings of the Satellite Distribution System Operations Group (SADISOPSG/18 and SADISOPSG/19), held in Dakar, Senegal, from 29 to 31 May 2013 and London, United Kingdom, from 27 to 29 May 2014, included the adoption of nine (9) and twelve (12) decisions and nineteen (19) and fifteen (15) conclusions related to the operation and development of the SADIS. The meeting noted that follow-up action to SADISOPSG/18 and SADISOPSG/19 included distribution of State letters by the RO to facilitate the SADIS improvements in the APAC region *[IP/05]*.

IAVWOPSG/8

3.8 Outcomes from the Eighth Meeting of the International Airways Volcano Watch Operations Group (IAVWOPSG/8), held in Melbourne, Australia, from 17 to 20 February 2014 included the adoption of five (5) decisions and twenty-one (21) conclusions related to the operation and development of the IAVW and development of guidance on radioactive materials, toxic chemicals in the atmosphere and space weather. The meeting noted that follow-up action to IAVWOPSG/8 Conclusion 8/2 would generate updates to the FASID Table MET 3B and FASID Chart MET 2 to realign the area of responsibility of the VAACs with current requirements *[IP/06]*.

3.9 The meeting noted that IAVWOPSG/8 Decision 8/10 required effective 1 March 2014 the VAACs to implement operational use of the standardized international volcano database as provided by the Smithsonian Institution.

3.10 With respect to the work of the IAVWOPSG, the United States apprised the meeting of the recent EASA decision (2014/027/R) on the issue of volcanic ash ingestion in turbine engines and noted the good support to the work being done by the ICAO.

3.11 The meeting also noted that MET/14 (in Recommendation 2/6) had endorsed the roadmap developed by the IAVWOPSG for the IAVW in support of international air navigation.

3.12 With respect to the development of a draft concept of operations for the provision of information about the release of radioactive material into the atmosphere in support of international air navigation, the meeting noted that the IAVWOPSG was trying to address the need for a definition of what constitutes a radiation hazard to aviation.

METWSG/5

3.13 The meeting noted outcomes from the Fifth Meeting of the Meteorological Warnings Study Group (METWSG/5), held in Montréal, Canada, from 20 to 21 June 2013, included the adoption of twenty six (26) agreed actions aimed at furthering the development of proposals related to the provision of information for hazardous meteorological conditions and SIGMET, and Annex 3[1] provisions and guidance material related to SIGMET, AIRMET, aerodrome warnings and related information. Follow-up to METWSG/5 Action Agreed 5/4 included the development of a regional SIGMET guide template, including its alignment with Amendment 76 to Annex 3, which was made available at the RO to assist in the issuance or updating of regional SIGMET guides in the ICAO Regions *[IP/07]*.

[1] Annex 3 to the Convention on International Civil Aviation – *Meteorological Service for International Air Navigation*

Agenda Item 4: Review outcomes from ICAO APAC groups

4.1 The meeting reviewed significant outcomes, progress and issues from the regional ICAO groups: APANPIRG/24 and MET SG/17, MET/R TF/3, ROBEX WG/12, MET/H TF/4, WAFS TF, ATM/SG/2 and 50th DGCA Conference.

MET SG/17 and APANPIRG/24

4.2 The meeting recalled that the Seventeenth Meeting of the Meteorology Sub-Group (MET SG/17), held in Bangkok, Thailand, from 13 to 16 May 2013, adopted two (2) decisions requiring follow-up action by ICAO and a further two (2) draft decisions and four (4) draft conclusions that were subsequently adopted (as APANPIRG Conclusions 24/48, 24/49, 24/50, 24/51 and Decisions 24/52, 24/53) at the Twenty Fourth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/24), held in Bangkok, Thailand, from 24 to 26 June 2013 *[WP/02]*.

4.3 With respect to MET SG/17 Decision 17/1, Hong Kong, China prepared the necessary paper (WAFSOPSG/8 IP/7) providing the background information on APANPIRG Conclusions 21/46 and 22/42 to assist with the WAFSOPSG follow-up.

4.4 The meeting was apprised that, with respect to the first part of MET SG/17 Decision 17/1 (i.e., APANPIRG Conclusion 21/46), WAFSOPSG/8 had formulated Conclusion 8/9 that required the secretary, in coordination with the WAFC Provider States, to update the guidance for handling WAFS SIGWX correction messages currently available on the WAFSOPSG website.

4.5 With respect to the second part of MET SG/17 Decision 17/1 (i.e., APANPIRG Conclusion 22/42), the WAFSOPSG/8 reported that SIGWX chart verification results are currently not available, mainly due to the limited availability of observational data required to perform adequate verification and unresolved challenges in the comparison of the simplified 'object' representations of the phenomena on SIGWX charts with the more complex nature of actual SIGWX phenomena.

4.6 With respect to MET SG/17 Decision 17/4, the meeting was reminded that State letter Ref.: T 4/9.5:AP124/13 (MET), issued on 21 August 2013, invited States to update contact details on the list of approving officials for WIFS accounts. A copy of the current version of the aforementioned list of contact details is provided in the **Appendix C** to this Report.

4.7 Details of the MET-related APANPIRG/24 Conclusions and Decisions are included in the copy of the APANPIRG/24 action plan provided in the **Appendix D** to this Report. *Note: The status of outstanding MET-related APANPIRG Conclusions and Decisions (prior to APANPIRG/24) are also provided.*

4.8 With respect to APANPIRG Conclusion 24/51, concerning the investigation and assessment of the feasibility of bilateral agreements for the provision of SIGMET services as a corrective action towards resolution of air navigation deficiencies listed in the MET field, and APANPIRG Decision 24/52, concerning a survey on the level of implementation of competency assessment, qualifications and training for meteorological personnel, the meeting noted there was no further progress to report.

4.9 In view of the discussions above, the meeting adopted the following decision and draft conclusion:

Decision 18/1 – Follow-up to MET SG/17 decisions

That, the follow-up action on the MET SG/17 decisions be considered closed.

Note: In relation to part of MET SG/17 Decision 17/1, the relevant APANPIRG Conclusion 22/42 was considered by the WAFSOPSG/8 and resulted in no further actions due to unresolved challenges in the comparison of the simplified object representations of the phenomena on SIGWX charts with the more complex nature of actual SIGWX phenomena.

Draft conclusion 18/2 – Follow-up to APANPIRG/24 decisions and conclusions

That, except for APANPIRG Conclusion 24/51 and Decision 24/52, the follow-up action on the MET-related APANPIRG/24 decisions and conclusions be considered completed.

MET/H TF/4

4.10 The meeting reviewed outcomes from the Fourth Meeting of the Meteorological Hazards Task Force (MET/H TF/4), held in Beijing, China, from 19 to 21 March 2014 *[WP/05]*. A copy of the executive summary and table of actions agreed is provided in the **Appendix E** to this Report.

4.11 The meeting noted that the MET/H TF was tasked to assist the establishment of an APAC regional ATM volcanic ash contingency plan based on the ATM volcanic ash contingency plan template arising from the IVATF. Furthermore, the meeting agreed that the conducting of future volcanic ash / ATM exercises in the APAC region would be a necessary component towards improving the response of the air traffic system in the region to volcanic ash events. While recognizing the need to progress with developing volcanic ash exercises in the APAC region, the meeting cautioned against a potential situation with multiple ATM volcanic ash contingency plans within a region noting that such a situation may not be in the spirit of the original intention of the IVATF, which was to foster a collaborative and consistent regional response.

4.12 With respect to the MET/H TF/4 outcomes related to the standardized international volcano database for the preparation of volcanic ash advisories (formulated in response to the IAVWOPSG Decision 8/10), Japan advised the meeting that it had implemented the database as of 24 July 2014 and, therefore, invited the secretariat to follow-up on the relevant actions concerning the notification of the implementation of the new database and any necessary updates to the VAAC back-up procedures between Darwin and Tokyo (MET/H TF/4 Agreed action 4/10 and 4/11 refer).

4.13 With respect to the MET/H TF/4 outcomes related to the SIGMET posters (MET/H TF/4 Agreed action 4/12 refers), on behalf of the relevant ad-hoc group, Australia advised the meeting that the revised SIGMET guidance material concerned would be provided in the form of on-line documents (in PDF format pamphlets) that users would access on a self-serve basis. To this end, the ad-hoc group would coordinate with the WMO and the ICAO to determine appropriate arrangements for hosting the on-line SIGMET pamphlet information.

MET/R TF/3

4.14 The meeting reviewed outcomes from the MET/ATM Seminar 2013 and the Third Meeting of the Meteorological Requirements Task Force (MET/R TF/3), held in Bangkok, Thailand, from 25-28 December 2013 *[WP/03]*. A copy of the executive summary and table of actions agreed is provided in the **Appendix F** to this Report.

ROBEX WG/12

4.15 The meeting reviewed outcomes from the ROBEX WG/12 *[WP/04]*. A copy of the executive summary and table of actions agreed is provided in the **Appendix G** to this Report.

ATM/SG/2

4.16 The meeting reviewed outcomes from the Second Meeting of the Air Traffic Management Sub-Group (ATM/SG/2), held in Hong Kong, China from 4 to 8 August 2014 *[WP/06]*. Under agenda item 6 of the ATM/SG/2, guidance on airport operations in adverse weather conditions were noted not to include thunderstorm conditions. Therefore, the ATM/SG/2 adopted a draft conclusion (ATM/SG/2/8) inviting the ICAO to provide guidance on airport operations procedures in thunderstorm conditions.

4.17 When discussing the development of volcanic ash exercises in the APAC region, the ATM/SG/2 recognised the importance of such planning to minimise the adverse effect on ATM of any volcanic activity.

50th DGCA Conference

4.18 The meeting reviewed outcomes from the 50th DGCA Conference *[IP/08]*, which included fifteen (15) action items related to the advancement of safety, security and sustainability in civil aviation in the region. The meeting noted the importance of proper planning and implementation of meteorological facilities and services was a key enabler supporting a number of the DGCA action items concerning ATM capability development and innovation, A-CDM and ATFM, the transition from AIS to AIM; and the APAC Seamless ATM Plan.

WAFS TF

4.19 An updated version of the WAFS service reference document was drafted and presented by the WAFS TF chairman to, inter alia, incorporate changes made in Amendment 76 to Annex 3, update the hyperlinks to relevant websites included in the WAFS service reference document and update the plan for future changes to WAFS *[IP/09]*. The United Kingdom (WAFS Provider State) advised the meeting it would provide editorial comments on the WAFS service reference document directly to the WAFS TF chairman. An update of the document would be distributed to States/Territories in the APAC region later in 2014.

Contributory bodies to MET SG

4.20 Side meetings were conducted by members of the WAFS TF, MET/R TF, MET/H TF and ROBEX WG to review and update the respective work plans of the groups. The updated work plans are contained in the **Appendices H, I, J and K** to this Report, respectively.

Agenda Item 5: Planning and monitoring

ANRF and Seamless ATM Plan

5.1 The meeting reviewed information provided by the secretary on the Air Navigation Reporting Form (ANRF), Seamless ATM reporting and monitoring *[WP/07]*.

5.2 With respect to the sharing of information on Seamless ATM planning required in accordance with the APANPIRG Decision 24/56, the meeting agreed that seminars and information sharing activities would assist with the coordination and input to be provided to the Seamless ATM plan through MET-related contributory bodies to APANPIRG.

5.3 Australia and Hong Kong, China, assisted by the secretary and the United States, drafted input to the ANRF for ASBU Module B0-AMET (conducted outside of the plenary session). The meeting reviewed the aforementioned draft ANRF and appreciated the work done, but considered the draft ANRF was not mature enough to be considered a final draft insofar as the group required further information concerning the intent of and level of detail required in the ANRF. Therefore the meeting agreed that the drafted material (which is provided in **Appendix L** to this Report) should be forwarded to the APANPIRG, including the caveat that it was not mature, and requested the secretary to coordinate further within the ICAO (in the RO, headquarters and other regions) in order to progress the work done.

Regional priorities

5.4 The meeting reviewed regional priorities, targets and indicators developed by the Chairpersons of the Sub-Groups in accordance with the APANPIRG Conclusion 24/2 *[WP/08]*.

FASID

5.5 The meeting reviewed updates to OPMET-related FASID Tables, necessary to support regional planning by operators, measurement of implementation and input to cost-recovery of MET Services *[WP/09]*.

5.6 In view of recent updates to FASID Tables MET 1A and 2A with respect to requirements for OPMET at additional locations in Viet Nam, the meeting noted the outstanding requirement to develop necessary consequential updates to the ROBEX Handbook to ensure the most efficient exchange of the added OPMET information within the ICAO APAC and MID regions as well as with the other ICAO regions. The meeting also recalled from the discussion above at 3.8 that follow-up to IAVWOPSG/8 Conclusion 8/2 would generate updates to the FASID Table MET 3B and FASID Chart MET 2 to realign the area of responsibility of the VAACs with current requirements.

5.7 The secretary apprised the meeting of the process followed by the ICAO secretariat for amendment of FASID Table MET 2A for OPMET data from non-AOP aerodromes, which is not subject to regional air navigation agreement: a) Amendments are either initiated by regular review (e.g., based on the annual review by the SADISOPSG) or by proposals made directly by the States concerned; b) Regular amendments are usually proposed by users (e.g., IATA) then reviewed by the SADISOPSG and proposed to States concerned through ROs, then, if agreed by States, adopted by the secretary of the SADISOPSG for incorporation into the OPMET database. Non-regular amendments are expected to be proposed by States concerning their own OPMET data and are transmitted to the secretary of the SADISOPSG for incorporation into the ICAO OPMET database.

New ANP template

5.8 The meeting reviewed the new ANP template developed by the eANP WG – a secretariat body formed in follow-up to the AN-Conf/12 Recommendation 6/1 (Regional Performance Framework – Planning Methodologies and Tools) regarding the alignment of regional ANPs with the fourth edition of the Global Air Navigation Plan (GANP) (Doc 9750) – and a proposal for developing a new APAC regional ANP document based on the eANP WG's new ANP template *[WP/10]*.

5.9 The meeting expected that the secretary would coordinate a work plan for populating/developing the MET parts of a new APAC regional ANP based on the eANP WG's new ANP template with a target date of mid-2015 for agreement on its content. A copy of the new ANP template is in the **Appendix M** to this Report.

Agenda Item 6: Air navigation deficiencies in the MET field

6.1 The meeting reviewed the list of MET deficiencies in the APANPIRG database and noted the progress being made in some States in implementing corrective actions *[WP/11]*.

6.2 With respect to MET deficiency AP-MET-02 concerning the provision of aerodrome meteorological observations and reports in Kiribati, New Zealand (Ministry of Foreign Affairs and Trade) had received a request from Kiribati to assist with the supply of a new meteorological observing system to replace the existing one that was no longer fully operational. In addition, options for funding a new meteorological observing system, and the resources needed to support a full observing programme, were being considered by Kiribati.

6.3 With respect to MET deficiency AP-MET-03 concerning the provision of information on volcanic activity in Indonesia and MET deficiency AP-MET-06 concerning the provision of SIGMET for volcanic ash in Indonesia, the meeting was pleased to note Indonesia has submitted in writing an official report to the RO (August 2014) providing details of the corrective action taken, including: (a) implementation of a MoU between the meteorological authority, the State volcano observatory authority and the civil aviation authority; (b) implementation of a volcanic activity report dissemination system (since 1 May 2012) covering all key stakeholders; (c) coordination between the meteorological authority, the State volcano observatory authority and the civil aviation authority in Indonesia with the VAAC in Darwin to improve the dissemination of information on volcanic activity in Indonesia; and (d) implementation of procedures at relevant MWOs for the provision of SIGMET (since April 2013) and successful participation in regional SIGMET tests.

6.4 In accordance with the APANPIRG procedures, the RO will endeavour to validate the action taken to rectify AP-MET-03 and AP-MET-06 and report to APANPIRG for review and possible removal from the open list of air navigation deficiencies. The meeting also noted that, according to SIGMET test results, Indonesia had a problem with the issuance of SIGMET from one of its MWOs in the 2013 SIGMET test, however follow-up action was recommended to resolve the issue (conjoint session of the ROBEX WG/12 and MET/H TF/4; Agreed action 12/12 and 4/3 refers).

6.5 With respect to MET deficiency AP-MET-04 concerning the reporting of information on volcanic eruptions to civil aviation units in Papua New Guinea, MET deficiencies AP-MET-07 and AP-MET-08 concerning the provision of SIGMET for volcanic ash in the Philippines and in Papua New Guinea and MET deficiency AP-MET-22 concerning the provision of SIGMET information in Papua New Guinea, no further updates have been received at the RO. In addition, according to SIGMET test results, Papua New Guinea did not participate in the 2013 SIGMET tests. The meeting noted that a recent analysis of the meteorological services provided in Papua New Guinea (conducted by Papua New Guinea, Australia and the ICAO) produced a number of recommendations for Papua New Guinea including actions that would strengthen services and help with the rectification of the MET deficiencies in that State. The meeting also noted that future volcanic ash exercises in the APAC region (also discussed under agenda item 7) would provide the opportunity to build capacity for the provision of SIGMET for volcanic ash and the reporting of information on volcanic eruptions to civil aviation units in States concerned.

6.6 With respect to MET deficiency AP-MET-09 concerning the provision of service for operators and flight crew members and the provision of WAFS products for flight documentation in Cambodia, the meeting noted that specific training necessary for the personnel to provide the WAFS products for flight documentation was expected to be addressed by Cambodia.

6.7 With respect to MET deficiency AP-MET-11 concerning the establishment of a MWO and provision of SIGMET in Cambodia, the meeting noted that Cambodia has arranged for the issuance of SIGMET on its behalf by China and this has been successful in addressing part of the listed deficiency.

6.8 With respect to MET deficiency AP-MET-12 concerning the provision of SIGMET information in Lao People's Democratic Republic, the meeting was reminded that, according to SIGMET test results, Lao People's Democratic Republic did not successfully participate in each of the three SIGMET tests conducted in 2013 (for volcanic ash, tropical cyclone and phenomena other than volcanic ash and tropical cyclone).

6.9 With respect to MET deficiency AP-MET-14 concerning the provision of SIGMET information in Nepal, the meeting was pleased to learn that Nepal has informed the RO of progress towards rectifying this deficiency. Nepal advised it is now able to issue SIGMET when necessary; training was conducted by the WMO in November 2013; SIGMET issuance has been in operation since 16 July 2013; and SIGMET information is transmitted to ATS units and other civil aviation units concerned. Furthermore, SIGMET test results indicated increased participation by MWOs and States in 2013, which was attributable, mostly, to participation by Bangladesh and Nepal. Therefore the meeting envisaged that Nepal will be in a position to submit in writing an official report to the RO providing details of the corrective action taken and that, on receipt of the report, the RO would endeavour to validate the action taken to rectify AP-MET-14 and report to APANPIRG for review and possible removal from the open list of air navigation deficiencies.

6.10 With respect to MET deficiency AP-MET-16 concerning the establishment of a MWO and provision of SIGMET in the Democratic People's Republic of Korea, the meeting was reminded that, following updates provided at previous meetings, an official report is expected to be submitted in writing to the RO (by the State) providing details of the corrective action taken. Upon receipt of the report, the RO would endeavour to validate the action taken to rectify AP-MET-16 and report to APANPIRG for review and possible removal from the open list of air navigation deficiencies. The meeting noted that validation of the corrective action would necessarily require SIGMET monitoring to confirm receipt at required offices. The meeting also noted that, according to SIGMET test results, SIGMETs were not received at the RODBs from the Democratic People's Republic of Korea, however the Democratic People's Republic of Korea informed the group that it did produce test SIGMET in 2013 and it would require assistance from the ROBEX WG to resolve the communication issues.

6.11 With respect to MET deficiency AP-MET-17 concerning the provision of volcanic activity information to ATS units, MWO and VAAC by Tonga, Tonga had submitted an official report in writing to the RO (10 May 2013) advising that a MoU had been implemented between the authorities responsible for volcanic activity information and civil aviation covering the coordination procedures for the dissemination of volcanic ash information to the appropriate ACC, VAAC and MWO. The RO will endeavour to validate the action taken to rectify AP-MET-17 and report to APANPIRG/25 for review and possible removal from the open list of air navigation deficiencies.

6.12 New Zealand confirmed that VAAC Wellington would assist the secretariat in the validation of Tonga's corrective action to resolve AP-MET-17.

6.13 With respect to MET deficiencies AP-MET-23 and AP-MET-24 concerning the provision of SIGMET information in the Solomon Islands and Nauru, the meeting recalled that there was an arrangement for the issuance of SIGMET on behalf of the Solomon Islands and Nauru by Papua New Guinea, but this strategy has not been successful towards rectifying the deficiencies. To assist, APANPIRG/24 adopted Conclusion 24/51 to further investigate and assess the feasibility of bilateral agreements for the provision of SIGMET services as a corrective action towards resolution of air navigation deficiencies listed in the MET field.

6.14 The meeting was reminded that the intention of APANPIRG Conclusion 24/51 was to assess the feasibility of implementing effective bilateral agreements for the provision of SIGMET services and to promote these as effective corrective action towards resolution of deficiencies related to SIGMET. To this end, the spirit of the conclusion was focussed more on the potential for effective bilateral agreements to be considered as a corrective action, rather than looking into details of agreements, perhaps adopted in the past, that do not provide an effective solution to SIGMET deficiencies.

6.15 In addition to the above, the meeting noted that, in accordance with outcomes from ROBEX WG/11 in which the challenges of providing OPMET information in Bhutan were discussed (agreed action 11/1 refers), the RO has written to Bhutan (7 March 2014) requesting an up-to-date synopsis of the status of implementation of OPMET in Bhutan with respect to the requirements set out for international air navigation. To this end, the meeting was reminded that details of OPMET provision were expected to be provided by Bhutan, but had still not been addressed. In view of the importance of following this up, the meeting adopted the following decision:

Decision 18/3 – Status of OPMET provision in Bhutan

That, the ICAO be invited to remind Bhutan of ICAO's request for verification of the status of implementation of OPMET information in Bhutan to meet the requirements for international air navigation.

6.16 A copy of the reporting form on air navigation deficiencies in the MET field, updated by MET SG/18 for review by APANPIRG, is provided in the **Appendix N** to this Report.

6.17 The meeting reviewed OPMET data deficiencies identified and reported by IATA *[WP/12]*.

6.18 Most deficiencies identified by the IATA in TAF messages relate to errors in the time/date groups, which could be eliminated or minimized through the proper application of validation processes by the suppliers of the information before the messages are disseminated.

6.19 The United States recalled that it had resolved very similar problems (to those identified above) through the implementation of software by the MET service provider to automatically identify coding errors in TAF enabling correction of errors before the message dissemination stage. Furthermore, the meeting was pleased to note that the United States offered to make the software available to other States individually, by request, as a potential solution to the OPMET deficiencies identified by the IATA.

6.20 In view of the information provided by IATA, the group formulated the following draft conclusion:

Draft Conclusion 18/4 - Improvement of OPMET data format

That, ICAO urges States to:

a) ensure full implementation of the applicable Standards and Recommended Practices in Annex 3 with respect to the format of OPMET information; and

b) establish and implement necessary systems to provide for the quality management of the OPMET information, which should include verification, validation and monitoring to assure that the OPMET information complies with the stated requirements.

Notes:
1) IATA requested States to ensure the percentage of OPMET issued with formatting errors should be limited to less than 3%; and

2) all OPMET provided should be made available to the SADIS and WIFS gateways in accordance with provisions in FASID Table MET 2A and the Regional SIGMET Guide.

Agenda Item 7: Research, development and implementation issues in the MET field

7.1 WAFS

7.1.1 The WAFS Provider States (United Kingdom and United States) presented a summary of recent and forthcoming developments to the WAFS *[WP/13]*, which are also provided in the **Appendix O** to this Report.

7.1.2 With respect to the additional flight level (FL410) introduced for WAFS gridded forecasts, the WAFS Provider States confirmed there were no changes to the horizontal grid resolution of the forecasts, which remained at 1.25 degrees x 1.25 degrees.

7.1.3 With respect to implementation of re-issuance of SIGWX and GRIB2 data for reason of corruption or error (but not amendment), the meeting noted that implementation would be delayed until November 2014. The SADIS Provider State (United Kingdom) noted that a 'test' account would be available for users as soon as possible. The details of the methodology are provided in the **Appendix O** to this Report.

7.1.4 The chairman of the WAFS TF presented a summary of regional progress in WAFS implementation *[IP/13]*.

7.1.5 The WAFC Provider States (United Kingdom and United States) encouraged users to notify the WAFCs preferably in real-time concerning significant discrepancies (*WAFS Service Reference Document* refers). The meeting noted that issues of a more generic nature should be raised directly with the WAFS TF or WAFSOPSG.

7.1.6 The SADIS Provider State presented a summary of recent and forthcoming developments to the SADIS *[WP/14]*, which is also provided in the **Appendix P** to this Report.

7.1.7 The chairman of the WAFS TF presented results of the WAFS survey *[IP/14]*, which are also provided in the **Appendix Q** to this Report.

7.1.8 The meeting noted that the WAFS TF would review the survey results and be expected to develop appropriate follow-up actions.

7.1.9 Hong Kong-China presented verification of the harmonized WAFS gridded forecast of CAT potential *[IP/15]*.

7.1.10 The WAFC Provider States appreciated the provision of verification information by Hong Kong, China. In order to make better use of the verification data, the WAFC Provider States invited user States with raw data, where possible, to forward it on to the WAFCs to perform verification and invited the user States to work collaboratively with the WAFCs regarding verification.

7.1.11 The WIFS Provider State (United States) presented an update of the information regarding WIFS accounts assigned to user States in the APAC region *[IP/16]*.

7.1.12 The information presented showed six (6) APAC States were listed as primary WIFS users in the APAC FASID Table MET 6 but had no WIFS account. New Zealand pointed out that, in some of those States, there may be no requirement to obtain WAFS data. Thus, it would be useful for States to provide updates with respect to the requirements for WIFS in order for the WIFS Provider State to eliminate redundant information from the monitoring of WIFS accounts. In view of the discussion above, the meeting adopted the following decision:

Decision 18/5 - Updates to the requirements for WIFS of APAC States

That, the ICAO be invited to request updates with respect to the requirements for WIFS accounts from APAC States that are listed as primary WIFS users in FASID Table MET 6 but have not obtained a WIFS account according to information from the WIFS Provider State.

7.2 Observations and reports

7.2.1 There were no papers presented under this agenda item.

7.3 Forecasts

7.3.1 There were no papers presented under this agenda item.

7.4 Advisories and warnings

Regional hazardous weather advisory system

7.4.1 Japan presented a summary of the discussion on a regional hazardous weather advisory framework conducted at MET/14 and discussed the importance of expeditious implementation of the framework in the APAC region with the suggestion of the development of transparent and fair designation procedures *[WP/15]*.

7.4.2 China also presented information describing the enhanced capability developed to support a regional hazardous weather advisory system *[IP/29]*.

7.4.3 In view of the action proposed by MET/14 in Recommendation 2/9 – *Implementation of a regional advisory system for select en-route hazardous meteorological conditions*, the meeting noted that the proposed new MET Panel (i.e., if a decision is taken by the ANC to establish a MET Panel) and/or an expert group will need to work on the establishment of a regional advisory system, including the provisions needed to foster implementation.

7.4.4 The meeting recognized that it would be premature to formulate definitive regional action on matters which still have to be fully worked out at the global level. However, there was a strong feeling among the group that preparatory actions could and should be discussed and that some action could be developed of a preparatory nature, noting it would be subject to the outcomes of the ANC review of the MET/14 recommendations and would need to be in-line with any subsequent global developments. In any case, the meeting was cognisant that care should be taken in developing any actions when the global standards and provisions are yet to be determined.

7.4.5 The chairs convened a side meeting of representatives of the MET/H TF to discuss this issue further, particularly with respect to the urgent need to address the safety issues related to non-issuance of SIGMET by some States within the APAC region. In view of the discussion above and outcomes from the side meeting, the meeting formulated the following draft conclusion:

Draft conclusion 18/6 – Initiatives to reduce deficiencies in SIGMET information

That the Meteorological Hazards Task Force (MET/H TF) of the MET SG, investigate options and implement viable solutions to reduce SIGMET deficiencies in the APAC Region as a matter of urgency.

Volcanic ash exercises

7.4.6 Japan presented an overview of outcomes from the volcanic ash exercise (VOLKAM14) conducted in Kamchatka in the far east of the Russian Federation in 2014 *[IP/18]*.

7.4.7 The information provided by Japan highlighted the positive outcomes from the exercise. Indonesia supported the concept of conducting similar volcanic ash exercise/s in the APAC region and noted its preparedness to participate as a main actor (this issue was discussed further under agenda item 7.6).

Volcanic Ash Advisory Centres

7.4.8 Australia presented the VAAC Darwin management report providing updates on the IAVW operations and highlights of recent developments and difficulties and future planned developments *[IP/17]*.

7.4.9 The meeting appreciated efforts by Indonesia and Australia in conducting coordination meetings between BMKG, CVGHM, DGCA (Indonesia) and the BoM concerning the dissemination of volcanic ash information. The coordination meetings conducted in December 2012 and on 23 June 2014 resulted in a number of significant outcomes to improve the availability of volcanic ash information.

7.4.10 With respect to VAAC back-up arrangements, the meeting noted that Australia had entered into a ‘scheme of cooperation’ with Japan and a ‘memorandum of understanding’ with New Zealand, but for practical purposes the two arrangements could be considered the same.

7.4.11 The meeting was pleased to note that the back-up operation between VAACs Tokyo and Darwin was successfully conducted on 23 May 2014: VAAC Darwin issued VAA on behalf of VAAC Tokyo, and on 13 August 2014: VAAC Tokyo issued VAA on behalf of VAAC Darwin, and there were no significant problems reported.

7.5 Data exchange

OPMET monitoring

7.5.1 IATA presented the results of OPMET data monitoring for the APAC region focused on the availability of OPMET in SADIS and WIFS *[WP/17]*, which is also provided in the **Appendix R** and the **Appendix S** to this Report.

7.5.2 With respect to the provision of two types of TAF reported in the IATA monitoring, and noting that the ICAO provisions require that not more than one TAF is valid at an aerodrome at any given time (Annex 3, 6.2.7 refers), Australia advised that it was leading an investigation into the cause and a potential solution for the cases reported by the IATA.

7.5.3 With respect to the monitoring data and results presented by the IATA, the meeting formulated the following draft conclusion:

Draft Conclusion 18/7 - Improvement of OPMET data availability for AOP aerodromes, and for non-AOP aerodromes listed in FASID Table MET 2A

That, the ICAO be invited to urge APAC States to:

a) continue efforts to improve the availability of OPMET data for AOP aerodromes, and for non-AOP aerodromes listed in FASID Table MET 2A;

b) ensure all OPMET data for AOP[1] aerodromes, and for non-AOP[2] aerodromes listed in FASID Table MET 2A, is distributed to SADIS and WIFS Provider States via RODBs; and

c) ensure only one type[3] of TAF is issued and transmitted from aerodromes.

Notes:
[1], [2] IATA's requirements with respect to availability of OPMET (METAR and TAF) are 95% [90%] for all required AOP [non-AOP] aerodromes; and
[3] IATA's requirements with respect to the period of availability and validity of TAF are F – Full: OPMET data as listed issued for the aerodrome all through the 24-hour period, and T – Requirement for 18/24-hour validity aerodrome forecasts in TAF code, i.e., FT, only.

7.5.4 The WIFS Provider State presented an overview of the evaluation of WIFS OPMET data *[IP/21]*.

7.5.5 The United States acknowledged the differences in availability of OPMET in WIFS compared with SADIS (as reported by the IATA and discussed above in 7.5.1-7.5.3) and noted it would coordinate with concerned stakeholders to resolve any outstanding issues.

Digital exchange of OPMET

7.5.6 The secretary provided a review of the background to the ROBEX WG/12 agreed action 12/2 – *Capacity building to foster the implementation of digital exchange [WP/18]*.

7.5.7 Australia noted the particular importance of this activity and any other significant activity that the ICAO may conduct to help the APAC region's preparations for the global developments in digital information exchange.

7.5.8 The meeting noted that in view of the envisaged time-frame (2019) for the elevation to an ICAO standard of the exchange of OPMET (and possibly other meteorological information) in a digital form, some APAC States may face significant challenges in meeting the implementation milestones. Therefore, to keep abreast of regional developments with respect to capability for the exchange of digital information, the meeting noted it would be useful to monitor the implementation of the AMHS, which would provide a platform for exchange of meteorological information in a digital form.

7.5.9 The United States summarized results of initial testing and demonstrations of exchanging SWIM-enabled MET information. The demonstrations included both ground-to-aircraft as well as ground-to-ground exchange *[IP/22]*.

7.5.10 Australia presented a brief update on the status and plans for the support of the ICAO logical data model, IWXXM, and the reception and distribution of meteorological products in IWXXM format in Australia *[IP/26]*.

7.5.11 With consideration to facilitating other States with the implementation of digital exchange of OPMET, Australia advised, as an RODB Provider State, it would consider developing the capability for converting and exchanging OPMET in a digital form on behalf of other States.

7.6 MET/ATM coordination

Volcanic ash exercises

7.6.1 Japan discussed and promoted the necessity and the benefit of conducting volcanic ash exercises in the APAC region and invited the group to discuss conducting hypothetical volcanic ash exercises led by ICAO APAC Office.

7.6.2 In support of Japan's proposal, the meeting considered the guidance provided in the ICAO Doc 9766 – *Handbook on the IAVW* (Appendix F – Guidance for conducting volcanic ash exercises in ICAO regions) as the appropriate basis on which to plan volcanic ash exercises.

7.6.3 With respect to the aforementioned guidance, the meeting noted that a volcanic ash exercises steering group may be established by a PIRG to coordinate all aspects of the organization and conduct of the exercises. The steering group should have representatives from, as a minimum, the VAACs concerned, ANSPs, airspace users and regulators.

7.6.4 With respect to the coordination necessary to conduct volcanic ash exercises in the APAC region, the meeting considered that none of the existing contributory bodies under the APANPIRG would have all the experts required to do the work of a volcanic ash exercises steering group, however the MET/H TF, ROBEX WG, MET/R TF, MET SG, RACP/TF and ATM/SG would all be considered key stakeholders in the progress of such work.

7.6.5 Noting that key stakeholders in volcanic ash exercises would also include representation from some or all of the following entities: volcano observatories, MWOs, ACCs, NOFs and airline operations, the meeting proposed that a steering group to organize and oversee volcanic ash exercises in the APAC region should be formed comprising the minimum list of representatives set out in the [Doc 9766] guidance and that invitations could be extended to other appropriate experts as required.

7.6.6 To this end, the chairs and secretary proposed that a quorum comprising: VAAC managers/delegates from Tokyo, Darwin and Wellington; ANSP expert/s nominated by the ATM/SG; IATA expert/s representing airspace users; CAA expert/s representing regulators and an ICAO expert should initially form the volcanic ash exercises steering group.

7.6.7 Furthermore, in support of Japan's proposal, the meeting developed a preliminary/draft terms of reference for the volcanic ash exercises steering group, based closely on the guidance in Appendix F to Doc 9766, as the basis on which to initiate the APAC volcanic ash exercises steering group *[Flimsy 1]*, and noted that the terms of reference would be improved in due course through consultation among the key stakeholders. A copy of the preliminary/draft terms of reference is provided in the **Appendix T** to this Report.

7.6.8 In view of the discussion above, the meeting formulated the following draft conclusion:

Draft conclusion 18/8 – Establishment of a volcanic ash exercises steering group in the APAC region

That, the ICAO, in consultation with the MET/H TF, ROBEX WG, MET/R TF, MET SG, RACP/TF and ATM/SG as appropriate, be invited to establish a steering group comprising appropriate experts representing key stakeholders to organize and conduct volcanic ash exercises in the APAC region. The terms of reference, including composition of the group, should be based on Appendix F to the Handbook on the International Airways Volcano Watch (Doc 9766).

*Note: A preliminary/draft terms of reference is provided in the **Appendix T** to this Report.*

ATM-tailored meteorological information

7.6.9 Japan discussed the need for development of ATM-tailored meteorological information for approach control areas to help ATC and ATM officers make timely and effective decisions *[IP/31]*.

7.6.10 Japan also presented information on the potential use of a weather impact ratio (WXIR) in ATM operations to indicate the likelihood of weather-related impacts on air traffic flow. Japan noted that the WXIR it currently used for continuous evaluation of ATMet Category Forecasts has potential as a future standard index for weather impact on ATM, which may suit the type of advanced weather information required to support the improvements described in the ASBU block 1 Module B1-AMET *[IP/32]*.

7.7 Climatological information

7.7.1 There were no papers presented under this agenda item.

7.8 Governance and training (incl. quality management, cost recovery, qualification and competencies of meteorological personnel)

Qualification and competencies of meteorological personnel

7.8.1 Australia presented an overview of a quality management training activity for internal and lead (QMS) auditors provided to ten (10) south-west Pacific States' meteorological services *[IP/27]*.

7.8.2 The meeting congratulated Australia for its efforts in this area. The capacity for personnel to perform internal audits of QMS has increased vastly as a result. However, the meeting was not encouraged by the lack of necessary support from relevant authorities in some States for the implementation of ICAO Annex 3 provisions for QMS. It was apparent to the meeting that the lack of implementation of international policies and principles on air navigation services cost-recovery with respect to aeronautical meteorological services in a number of States would be a significant contributing factor to this situation.

7.8.3 Australia also presented an overview of the competency assessment program for aviation forecasters in Australia *[IP/28]*, in which the forecasters are responsible for ensuring their own qualifications are kept up-to-date.

7.8.4 With respect to available guidance for meteorological competencies, Australia reminded the meeting that the WMO CAeM website (http://www.caem.wmo.int/moodle/) provides a resource for aeronautical meteorological forecaster and observer competency assessment guidance information. Additionally, Australia would make its high-level policy documentation concerning aeronautical meteorological forecaster and observer competencies openly available to other States via the Bureau of Meteorology website (www.bom.gov.au).

7.8.5 Indonesia expressed appreciation for the availability of the generic and high-level guidance documentation, but also noted that more practical and specific implementation guidance covering detailed aspects of aeronautical meteorological forecaster and observer competency programs would be useful to a number of States. Given that Annex 3 required States to ensure qualifications and training of meteorological personnel comply with WMO requirements, the secretary noted that ICAO would refer States to the WMO resources for guidance on competencies.

7.8.6 Noting that the WMO requirements for aeronautical observer competencies became applicable in December 2013, the meeting considered there would be a number of States (e.g., in the south-west Pacific) that may face significant challenges complying with the requirements. In such cases, the meeting agreed that detailed implementation guidance would potentially be very useful.

7.8.7 Additionally, the meeting was encouraged to learn that Australia is able to provide direct guidance and assistance to States on a bilateral basis if requested with respect to implementation of an aeronautical meteorological forecaster competency programme.

7.8.8 While Australia operated its forecaster competency program on a 5-year cycle for competency reassessment and 1-year for observers, the meeting noted that the WMO requirements are not prescriptive and that the States themselves can decide what timescale for reassessment of competencies is required to maintain compliance. In New Zealand, the CAA was responsible for auditing the meteorological service provider's competency assessment system, including the refresher training program.

7.9 Other

Meteorological satellites

7.9.1 Japan presented an overview of its next generation of geostationary meteorological satellites, Himawari-8 and -9, and the current status of plans for the satellite imagery distribution and dissemination *[IP/24]*.

7.9.2 Japan advised that the launch of Himawari-8 was proposed to take place on 7 October 2014; and Himawari-9 will be launched in 2016 as a backup and successor satellite.

7.9.3 The meeting was pleased to be informed by Japan that users of the visualization software for satellite data known as SATAID will be able to continue to use the software to visualize the new satellite data without any requirement to upgrade the software or additional cost to users.

7.9.4 The meeting noted the additional new satellite channels and enhanced frequency and resolution of data would represent an exciting and significant step-advance in the capabilities for remote sensing applications, such as the detection of sulphur dioxide cloud following volcanic eruptions.

7.9.5 Some States were already preparing communication systems and data processing systems to ingest and process the increased rate of data that would be made available. The VAAC Provider States (Australia, Japan and New Zealand) were coordinating to develop new applications to take advantage of the enhanced capabilities for volcanic activity detection using the new data.

Space weather information

7.9.6 The United States presented the capabilities of the space weather prediction center to provide information on space weather events to support international air navigation *[IP/23]*.

7.9.7 China also presented information on the operational space weather forecast and tailored space weather service provided by China in support of international air navigation, including some suggestions on future development of space weather services *[IP/30]*.

7.9.8 The meeting recalled that, with regard to the development of initial provisions for information on space weather, involving the establishment of space weather centres, the MET/14 agreed not to include them in the draft Amendment 77 to Annex 3 in view of a lack of maturity, but agreed that ICAO should work towards enabling space weather services for aviation by developing Annex 3 provisions for inclusion in 2018 (MET/14 Recommendation 2/7 refers).

7.9.9 With respect to the discussion above, the meeting expressed its appreciation for the comprehensive information provided by both the United States and China on their respective systems to provide space weather services in support of air navigation. As both States are members of the IAVWOPSG, which was the key global group working towards enabling space weather services for aviation, the meeting thanked both States for their valuable contributions. Furthermore, the meeting looked forward to keeping abreast of future developments in this field that would set forth the global objectives and implementation timelines, and direct the course of work for enhancing the provision of meteorological service, and in particular space weather service, to international air navigation in the APAC region.

Agenda Item 8: Regional guidance material

SIGMET Guide

8.1 The secretary provided an update on the Regional SIGMET Guide template that was provided by the METWSG and was being adapted by an ad-hoc group assigned by the conjoint session of ROBEX WG/12 and MET/H TF/4 for use in the APAC region and possible adoption as the updated, Fifth Edition of the APAC Regional SIGMET Guide *[WP/19]*.

8.2 Indonesia suggested that the information in the SIGMET Guide regarding the distribution of SIGMET and SIGMET Tests should be consistent. The secretary and members of the ad-hoc group invited the meeting to forward any additional suggested changes for the APAC Regional SIGMET Guide for consideration by the ad-hoc group and advised that the next steps to be taken to finalize adoption of the template as the Fifth Edition of the APAC Regional SIGMET Guide would be as follows: a) consolidated final draft to be forwarded to the RO; b) State letter issued promulgating the final draft for comments from States; and c), subject to any necessary follow-up on comments received from States, notification of adoption by State letter and publishing of Fifth Edition of the APAC Regional SIGMET Guide on the ICAO APAC website.

ROBEX Handbook and ICD

8.3 The secretary also provided a review of the updates required to the APAC ROBEX Handbook *[WP/20]* and the updates required to the APAC OPMET Data Banks Interface Control Document (ICD) *[IP/21]*.

Agenda Item 9: Inter-regional and intra-regional coordination

MET/ATM seminar

9.1 The secretary provided a review of the proposal under development for the next MET/ATM seminar in the APAC region *[WP/22]*, which originated in response to the MET/R TF/3 meeting in Decision 3/8.

9.2 Japan offered to host an APAC MET/ATM seminar in Tokyo in 2015 to provide the MET and ATM communities the opportunity to share ideas and experience on developments in MET to support ATM operations and to provide States the opportunity to review first-hand the newly established MET/ATM collaboration in the terminal area around Tokyo International Airport (also discussed at 7.6.8-7.6.9).

9.3 The meeting was pleased to receive the offer from Japan and noted that the secretary would continue to liaise with Japan to develop the proposal for the next MET/ATM Seminar, including finalizing the dates and a draft programme and seeking collaboration with the WMO, and would report to the chairs of the MET SG in due course.

9.4 In view of the discussion above, the meeting formulated the following draft conclusion:

Draft conclusion 18/9 – APAC MET/ATM seminar

That, the ICAO and Japan be invited to conduct a MET/ATM seminar in Tokyo, Japan in 2015 in coordination with the WMO and with necessary coordination between MET and ATM groups within ICAO.

Agenda Item 10: Future work programme

10.1 The meeting reviewed the future work program of the MET SG and adopted editorial changes in the subject/tasks list in the MET field as provided in the **Appendix U** to this Report.

Agenda Item 11: Any other business

Contact details for MET-related issues

11.1 The secretary presented lists of contact details required by the RO for liaison on MET-related issues, which need to be kept correct and up-to-date *[WP/24]*. Copies of the lists are provided in the **Appendices V**, **W** and **X** to this Report, with updates provided by the meeting highlighted.

11.2 The WIFS Provider State reiterated that the designated WIFS approving official is always requested to validate requests for new WIFS accounts or changes to existing accounts as a necessary step in maintaining the integrity of the service. The meeting was reminded that this means new accounts cannot be established and existing accounts cannot be changed if the WIFS Provider State is unable to contact the appropriate approving official.

11.3 Noting that it had been a year since the relevant States were last formally requested to provide updates to the list of WIFS approving officials, and in order to facilitate the ongoing management of the WIFS, the meeting adopted the following decision:

Decision 18/10 – Contact information for approving officials in WIFS user States

That, the ICAO be invited to request States concerned to update the list of the approving officials, or designees, to approve requests within respective States for new WIFS accounts, or changes to existing accounts.

Next meeting

11.4 Noting that the timing for the next meeting of the group (MET SG/19) would need to be coordinated carefully to avoid conflict with related ICAO groups and other relevant international meetings, and to optimize opportunities to either review or report to other meetings as necessary, the chairs requested the secretary to do the necessary coordination and report back to the chairs in due course with proposed dates for MET SG/19.

11.5 The group agreed that the timing should be appropriate for the APANPIRG work plan and, if possible, consider a parallel or back-to-back arrangement with a related meeting to facilitate attendance by members and promote cooperation and coordination among the MET and air navigation communities.

11.6 With particular emphasis on the current, tentative schedule of meetings listed under the APANPIRG work plan, and the possibility of conducting a MET/ATM seminar most likely after the WMO Congress in June 2015, the chairs agreed that MET SG/19 should be scheduled if possible after the MET/ATM seminar and during the June-July 2015 period.

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RECOMMENDATIONS ADOPTED BY AN-CONF/12	Follow-up action to be initiated PIRGS/States/International Organizations (IO)	Proposed Response/Actions By ACSICG/1	Proposed Response/Actions By ADS-B SITF	AUSTRALIA	HONG KONG CHINA	NEW ZEALAND	SINGAPORE	THAILAND	USA
Recommendation 4/7 – ICAO aviation system block upgrades relating to meteorological information That the Conference: a) endorse the aviation system block upgrade module relating to meteorological information included in Block 1, including the addition of the provision of information on space weather, and recommend that ICAO uses it as the basis of its work programme on the subject; b) agree in principle the aviation system block upgrade module relating to meteorological information included in Block 3 as the strategic direction for this subject; That ICAO: c) include, following further development and editorial review, the aviation system block upgrade modules relating to meteorological information in the draft Fourth edition of the *Global Air Navigation Plan* (Doc 9750, GANP); d) undertake the development of the air traffic management meteorological information integration plan and an associated roadmap by a cross-disciplinary group of experts; e) work on defining the meteorological information exchange model as an enabler for system-wide information management; f) invite the next Meteorology Divisional Meeting, held in coordination with the World Meteorological Organization, to develop initial provisions in Annex 3 — *Meteorological Service for International Air Navigation* relating to the aviation system block upgrade modules concerning meteorological	c) to f): Note.			Australia will implement meteorological related ASBU based on operational needs. Australia is active in ICAO and other fora developing SARPs and promoting implementation.	g) Hong Kong, China has implemented ASBU B0-AMET. h) A Plan is being developed to implement ASBU Block 1 and 3 relating to meteorological information. Education and training investment will be enhanced as necessary.	Addressed in the National Airspace and Air Navigation Plan. New Zealand participates widely in international aviation meteorology working groups.	g & h) Singapore has implemented B0-AMET and is working closely with the MET Services Singapore to enhance ATM operations	Noted.	g) The FAA supports the ASBU and is leading the development of Roadmaps for volcanic ash and the World Area Forecast System and supports the provision of OPMET data via the World Area Forecast System File Service (WIFS) h) The FAA in cooperation with the NWS supports computer based training that is accessible to all aviation weather meteorologist to further improve their skills and is ensuring that the meteorological services provided by the United States as defined in the ASBU are in harmony as practicable with U.S. National practices.

RECOMMENDATIONS ADOPTED BY AN-CONF/12	Follow-up action to be initiated PIRGS/States/International Organizations (IO)	Proposed Response/Actions By ACSICG/1	Proposed Response/Actions By ADS-B SITF	AUSTRALIA	HONG KONG CHINA	NEW ZEALAND	SINGAPORE	THAILAND	USA
information and f) above, and to develop a long-term strategy to support their further development and full implementation; That States: g) according to their operational needs, to implement the aviation system block upgrade module relating to meteorological information included in Block 0, including the addition of the provision of OPMET information; h) work together in the implementation of the aviation system block upgrades relating to meteorological information and to increase investment in education and training.	g): States , according to their operational needs, to implement the ASBU module relating to meteorological information included in Block 0, including the addition of the provision of OPMET information; h) work together in the implementation of the ASBU relating to meteorological l information and to increase investment in education and training.								

Meteorology (MET) Divisional Meeting
(2014)

(7 to 18 July 2014, Montréal, Canada)

EXECUTIVE SUMMARY1

1. INTRODUCTION

1.1 The Meteorology (MET) Divisional Meeting of 2014 (MET/14), conjoint with the 15th Session of the World Meteorological Organization (WMO) Commission for Aeronautical Meteorology (CAeM) was held at the Headquarters of the International Civil Aviation Organization (ICAO) in Montreal, 7 to 18 July 2014. The meeting was attended by 308 participants from 95 States and 7 international organizations (the Agency for Air Navigation Safety in Africa and Madagascar (ASECNA) the Civil Air Navigation Services Organisation (CANSO) the European Union (EU), the European Organisation for the Safety of Air Navigation (EUROCONTROL), the International Air Transport Association (IATA), the International Federation of Air Line Pilots' Associations (IFALPA), and the WMO).

1.2 The Secretary of the meeting was Mr. G. Brock, Chief, Meteorology Section, ICAO assisted by Mr. D. Ivanov, Chief, Aeronautical Meteorology Division, WMO. Mr. Brock and Mr. Ivanov were assisted by Mr. R. Romero, Mr. N. Halsey, Mr. G. Vega, Mr. A. B. Okossi, Mr. V. Ahago, Mr. P. Dunda and Mr. J. Armoa as agenda item Secretaries. Other officers of the ICAO Secretariat provided advice to the meeting, as required.

1.3 The following officers were elected at the first Plenary meeting to serve both the Plenary and the MET Committee:

Chairman: Mr. P. Lechner (New Zealand)

First Vice-Chairman: Mr. W. Maynard (Canada)

Second Vice-Chairman: Mr. D. Egere (Nigeria)

2. SUPPORTING THE "ONE SKY" CONCEPT THROUGH THE ENHANCEMENT OF METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION

2.1 The meeting was apprised of a new (fourth) edition of ICAO's Global Air Navigation Plan (GANP) (Doc 9750) together with a companion new edition of the ICAO's Global Aviation Safety Plan (GASP) (Doc 10004), which had been approved by the ICAO Council and endorsed by the 38th Session of the ICAO Assembly in 2013. To meet the global need for airspace interoperability while maintaining its focus on safety, the meeting noted that, under the concept of "One Sky" for international air navigation, the Organization had initiated an aviation system block upgrade (ASBU) methodology as part of the GANP in order to develop a set of air traffic management (ATM) solutions or upgrades, take advantage of existing equipage, establish a transition plan, and enable global interoperability.

2.2 To ensure that the MET-specific ASBU modules were understood in the context of their relationships and interdependencies with the other modules and including those related to system wide information management (SWIM), the meeting recommended to update the GANP and ASBU methodology to reflect such interdependencies as well as including a B2-AMET module in the Block 2 timeframe covering the period 2023-2028 which had not been explicitly developed previously. (Recommendations 1/1 and 1/2).

2.3 The meeting requested ICAO to ensure that the evolution of aeronautical meteorological service provisions was in the spirit of Resolution A38-11 of the 38th Session of the ICAO Assembly and consistent with the rolling fifteen-year strategy contained in the GANP (Recommendation 1/3).

3. IMPROVING THE SAFETY AND EFFICIENCY OF INTERNATIONAL AIR NAVIGATION THROUGH ENHANCED METEOROLOGICAL SERVICE PROVISION

3.1 To support the ASBU methodology contained in the GANP the meeting agreed to develop the world area forecast system (WAFS) during the 2013 to 2028 timeframe focussed around a set of principles including the implementation of improved turbulence and icing algorithms and other forecast improvements, the use of forecast ensembles and the integration of WAFS information into the SWIM environment (Recommendations 2/1, 2/5 and 2/13 refer).

3.2 To ensure that the operation of the aeronautical fixed service (AFS) satellite distribution system for information relating to air navigation (SADIS), and the Secure SADIS FTP and WAFS Internet File Service (WIFS) Internet-based services, continue to meet user expectations the meeting recommended an appropriate ICAO expert group be tasked to further develop them in a manner consistent with the GANP. In addition, in deciding that SADIS 2G should not be extended beyond 2019, the meeting recommended that an appropriate expert group should undertake formal testing of the exchange of global OPMET information and WAFS forecasts on the ATS message handling system (AMHS) (Recommendations 2/2 and 2/3).

3.3 With regard to international airways volcano watch (IAVW), the meeting agreed that it was vital that the IAVW continue to evolve in line with the GANP. Therefore the meeting recommended that an appropriate ICAO expert group be tasked, in close coordination with WMO, to further develop the requirements for the IAVW consistent with the GANP including its integration into the future SWIM environment (Recommendation 2/6).

3.4 With regard to the development of initial provisions to meet the requirements for information concerning space weather, involving the establishment of space weather centres the meeting agreed not to include them in the draft Amendment 77 to Annex 3in view of a lack of maturity but agreed that ICAO should work towards enabling space weather services for aviation by developing Annex 3 provisions for inclusion in 2018 (Recommendation 2/7).

3.5 With regard to the dissemination of information on the release of radioactive material into the atmosphere, the meeting recommended that an appropriate ICAO expert group, in close coordination with WMO, should be tasked to further develop provisions consistent with the evolving GANP (Recommendation 2/8).

3.6 The meeting supported, in principle, the evolution of the existing WAFS and IAVW, and the further development of provisions for space weather information, release of radioactive material and toxic chemicals and other hazardous meteorological phenomena. However, the meeting agreed that it was imperative that the future management and governance of the aeronautical meteorology system serving international air navigation be assessed in relation to the overall migration to the use of digital information. (Recommendation 2/4 refers).

3.7 In view of long-standing SIGMET implementation deficiencies in some States, the meeting agreed that there was an urgent need for the establishment of regional hazardous weather advisory centres (RHWACs) to assist meteorological watch offices (MWOs) with the provision of SIGMET information for select hazardous meteorological conditions that included, as a minimum, thunderstorms, icing, turbulence and mountain waves, but which excluded volcanic ash and tropical cyclones. Therefore the meeting recommended that a regional hazardous weather advisory framework should be implemented expeditiously and requested that an appropriate ICAO expert group, in close

coordination with WMO, be tasked to develop a regional advisory system for select en-route hazardous meteorological conditions especially in those States where notable SIGMET-related deficiencies persist (Recommendation 2/9).

3.8 The meeting recommended that ICAO, in close coordination with WMO, should be tasked to include meteorological service for the terminal area and other relevant operational requirements in Block 1 and subsequent blocks of the ASBU methodology to highlight potential related impacts on air traffic flow in consideration of air traffic control and ATM (Recommendation 2/10).

3.9 To support the implementation by 2028 of module B3-AMET of the aviation system block upgrades (ASBU) methodology the meeting recommended that an appropriate ICAO expert group be tasked, in close coordination with WMO, to undertake advanced planning, in the 2015 to 2020 timeframe, of the technological requirements and aeronautical meteorological service capabilities needed (Recommendation 2/11).

3.10 To support transition to a more collaborative operating environment and increased automation, the meeting recommended the development of provisions for aeronautical meteorological information services in the context of CDM and common situational awareness (Recommendation 2/13). Additionally, the meeting recommended that ICAO and WMO should ensure that human factors considerations remain integral to aeronautical meteorological service provision during the transition. (Recommendation 2/14).

4. INTEGRATING METEOROLOGICAL INFORMATION EXCHANGE DEVELOPMENTS INTO THE FUTURE SYSTEM WIDE INFORMATION MANAGEMENT ENVIRONMENT

4.1 To support trajectory based observations (TBO), the meeting recommended that an appropriate ICAO expert group (or groups), in close coordination with WMO finalize a draft concept of operations and roadmap concerning aeronautical meteorological information integration for TBO and establish further ATM requirements and aeronautical meteorological service capabilities (Recommendation 3/1).

4.2 To support the integration of meteorological information into a future SWIM environment, to allow the ATM system to develop along with the expectations of the GANP, the meeting recommended that ICAO, through an appropriate expert group and in close coordination with WMO, develop provisions to enable the inclusion of aeronautical meteorological information in the future SWIM environment consistent with the GANP based on given milestones and guided by an appropriate roadmap. (Recommendation 3/2).

4.3 To ensure that the meteorology-related developments within the SWIM environment are fully aligned with the mandates of both ICAO and WMO, the meeting recommended ICAO, through an appropriate expert group and in close coordination with WMO, to include consideration of a number of issues including the identification and recognition of approved data sources, cost recovery and the scalability of data requirements (Recommendation 3/3).

5. INSTITUTIONAL ISSUES

5.1 The meeting recommended that ICAO and WMO undertake a thorough review of the Working Arrangements between ICAO and WMO (Working Arrangements between the International Civil Aviation Organization and the World Meteorological Organization (Doc 7475)) in order to ensure that they appropriately reflect the respective mandates, governance structures and modes of operation of the two organizations (Recommendation 4/1).

5.2 In order to clarify the use of the terms “Contracting State” and “Meteorological Authority” in certain provisions of Annex 3/Technical Regulations [C.3.1] and in related guidance material, the meeting recommended ICAO, in coordination with WMO, to further clarify the notion of meteorological authority, through appropriate amendments to ICAO provisions and supporting guidance material (Recommendation 4/2).

5.3 With regard to the oversight of aeronautical meteorological service provision, the meeting recommended ICAO to urge States to ensure that the personnel performing safety oversight functions of the aeronautical meteorological service are adequately qualified and competent, thus meeting the requirements of Annex 19, and to develop appropriate guidance material to assist States (Recommendation 4/3).

5.4 To strengthen guidance on national cost recovery, particularly in those States with complex airspace arrangements, the meeting recommended that ICAO and WMO undertake a review and, as necessary, update of guidance/guidelines on the recovery of costs of aeronautical meteorological service provision (Recommendation 4/4).

5.5 To ensure that the competency and underpinning training of the aeronautical meteorological personnel is sufficient to adapt to new working practices, the meeting tasked WMO, in coordination with ICAO, to undertake steps through the implementation of a competency framework based on quality management system principles and supported by relevant training material. (Recommendation 4/5).

5.6 To mitigate the risk of critical misunderstandings caused by language problems that may, have flight safety implications downstream, the meeting recommended that ICAO, in close coordination with WMO, consider the development of provisions concerning the required level of English language proficiency of aeronautical meteorological personnel (Recommendation 4/6).

5.7 Taking into account existing ICAO provisions and WMO Resolution 40, and appreciating that the cost for the provision of aeronautical meteorological service was entirely recoverable from aviation, the meeting recommended that ICAO and WMO remind States/Members of their obligations in respect of the provision and use of aeronautical meteorological information for aeronautical purposes only (Recommendation 4/7).

6. STANDARDS, RECOMMENDED PRACTICES AND PROCEDURES

6.1 Taking into account the discussions under Agenda Items 1 to 5 the meeting formulated a draft Amendment 77 to Annex 3/Technical Regulations [C.3.1] and consequential amendments to Annex 11, PANS-ABC and PANS-ATM (Recommendation 5/1).

6.2 Noting the need for the clear distinction between functional and performance requirements and the elaboration of those requirements through technical specifications the meeting recommended that ICAO, in coordination with WMO, undertake a restructuring of Annex 3/ Technical Regulations [C3.1] and the development of a Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc xxxx). This restructure would be done as part of Amendment 78 to Annex 3 (Recommendation 5/2)

7. NEXT STEPS

7.1 In late 2014, the Air Navigation Commission (ANC) will review the recommendations of the meeting during its 197th Session, with the Council likewise taking action, as necessary, during its 203rd Session.

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List of WIFS Accounts in the APAC Region

ICAO State (dd/mm/yy last updated)	WIFS USER ID	POC Name	POC e-mail	POC Phone	Approving Official – Title and Name[1]	Approving Official e-mail
Australia **03/10/13**	WAFSYMMC01 WAFSYMML02 WAFSYMMM01	Ian Senior Tim Hailes Tim Hiles	ies@bom.gov.au t.hailes@bom.gov.au t.hailes@bom.gov.au	+613 9669 4293 +613 9669 4273 +613 9669 4273	Sue O'Rourke Section Head, Meteorological Authority	metauthority@bom.gov.au
Brunei Darussalam	WAFSWBSB01	Yunus M. Tahir	hyunus.dkz@gmail.com	+673 238 1342		
China **(03/10/13)**	WAFSZBAA01 WAFSZBAA02 WAFSZBAA03 WAFSZBAA04 WAFSZBBB01 WAFSZSSS01	Jin Shan Ke Wang Aimin Liang Xiangyang Feng Xiaochuan Pian Haifeng Hu	ashan_1981@163.com wangke1.66@tom.com lycwowner@163.com fxy06870@sina.com ifdamc@atmb.net.cn hhfmetcaac@sina.com	135 2080 9610 +86 (10) 6459 5557 +86 (10) 6459 8450 +86 (10) 6459 2560 +86 (10) 8792 2092 +86 (21) 2232 7561	Ms. Juan Zou, Aviation Meteorological Center, Air Traffic Management Bureau, CAAC	zoujuan@atmb.net.cn
Fiji **(02/10/13)**	WAFSNFFN01 WAFSNFFN03	Alipate Waqaicelua Leonard Bale	Alipate.Waqaicelua@met.gov.fj leonard.bale@met.gov.fj	+679 6724 888 (Ext. 5015) +679 672 4888	The Director, Fiji Meteorological Service (FMS), Mr. Alipate Waqaicelua	Alipate.Waqaicelua@met.gov.fj
French Polynesia (29/08/13)	WAFSNTAA01	Xavier Marescot	pf_tti_d@meteo.fr	+689 803 371	Gérard BOSSARON Directeur Adjoint du service interrégional de Météo-France en Polynésie Française	pf_da@meteo.fr
Hong Kong, China (01/10/13)	WAFSBADJ99 WAFSVHHH01 WAFSVHHH02	Mr. LI Luen -on	loli@hko.gov.hk	+852 2926 8209	Ms. LAU Sum-yee Assistant Director of the Hong Kong Observatory (Aviation Weather Services Branch)	sylau@hko.gov.hk
India (31/12/13)	WAFSVOBL01	Mr. N.K. Pangasa	pangasank@hotmail.com nk.pangasa@imd.gov.in	+91 (11) 4382 4279	Dr. L.S. Rathore, Director General of Meteorology & P.R. of India with WMO India Meteorological Department	ls.rathore@imd.gov.in
Indonesia (10/09/13)	WAFSWAAA01 WAFSWARR02 WAFSWIII02 WAFSWADD01 WAFSWIDD01	Mr. Imam Sukardi Mr. Syamsul Huda Mr. Zulkarnain Mr. Daryatno Mr. Yuyun Ardiansyah	imamskd@yahoo.com syamsul.huda@bmkg.go.id zulkarnain@bmkg.go.id daryatnobmkg@yahoo.com yoeyun@gmail.com	+62 411 553019 +62 813 4736 2299 +62 813 8539 1410 +62 813 3799 5599 +62 813 1700 8355	Mr. Syamsul Huda, Director of Aviation and Marine Meteorological Centre	huda@bmkg.go.id
Japan (13/09/13)	WAFSSRJD99 WAFSRJTD01	Mr. Yuichi Yamakoshi	y-yamakoshi@met.kishou.go.jp	+81 (3) 3212 8341 (Ext. 3351)	Senior Scientific Officer, Japan Meteorological	y-yamakoshi@met.kishou.go.jp

ICAO State (dd/mm/yy last updated)	WIFS USER ID	POC Name	POC e-mail	POC Phone	Approving Official – Title and Name[1]	Approving Official e-mail
					Agency, Yuichi Yamakoshi (Mr.)	
Kiribati	WAFSNGTA01	Iokenti Beniamina	beniamina70490@gmail.com	+686 91074		
Malaysia (02/10/13) (08/10/13)	WAFSWMKK01	Mr. Jailan Simon	jailan@met.gov.my	+603 8787 2388	Mr. Che Gayah Ismail Director General of Malaysian Meteorological Department	cgayah@met.gov.my
Mongolia (02/10/13)	WAFSZMUB01	Maasuren Dagva	maasuren@mcaa.gov.mn	+976 1128 5048		
		Batlyi Bolormaa	bolormaa@mcaa.gov.mn	+976 9980 9356		
Nauru	WAFSANYN01	Stryker Solomon	stryker.solomon@naurugov.nr	+674 557 3127		
New Caledonia (02/09/13)	WAFSNWWN02	Michel Argent	contact-iscs-nc@meteo.fr	+687 279327	Deputy Director for operation	michel.argent@meteo.fr
	WAFSNWWN03					
New Zealand (23/08/13)	WAFSNZKL01	Keith Mackersy	Keith.Mackersy@caa.govt.nz	+64 (4) 904 0543	Mr.Peter Lechner Chief Meteorological Officer Civil Aviation Authority of New Zealand	Peter.Lechner@caa.govt.nz
	WAFSNZKL02	Wim Vandijk	data.manager@metservice.com	+64 (4) 470 0752		
Papua New Guinea	WAFSAYPY02	Jimmy Gomoga	jgomoga@pngmet.gov.pg	+675 324 4583		
Philippines	WAFSRPLL01	Rolymer Canillo	rpcanillo@yahoo.com	+63 (2) 929 4570		
	WAFSRPHI01	Enrico Salita	ehsalita@yahoo.com	+63 91785 55896		
	WAFSRPVM01	Alfredo Jr. Quiblat	alquib@yahoo.com	+63 3234 01868		
	WAFSRPLL02	Rolymer Canillo	rpcanillo@yahoo.com	+63 (2) 9285287		
Republic of Korea (28/08/13)	WAFSRKSI01	KIM Younjeong	bj414@korea.kr	+82 (32) 740-2850	Dr. CHOI Chee-young Director-general Korea Aviation Meteorological Agency (KAMA)	av_pod@kma.go.kr
Samoa (29/08/13)	WAFSNSAP01	Mulipola Ausetalia Titimaea	ausetalia.titimaea@mnre.gov.ws	+685 20855		
Singapore (05/09/13)	WAFSWSSS01	Chua Guat Mui	Chua_guat_mui@nea.gov.sg	+65 6542 2861	Ms. Patricia Ee Director (Weather Services Department) Meteorological Service Singapore	Ee_gek_may@nea.gov.sg

ICAO State (dd/mm/yy last updated)	WIFS USER ID	POC Name	POC e-mail	POC Phone	Approving Official – Title and Name[1]	Approving Official e-mail
Solomon Islands (27/08/13)	WAFSAGGH01	Solomon Sammy Freddy Ferah	s.sammy@met.gov.sb f.ferah@met.gov.sb	+677 36310 or (cell) +677 747 1192 +677 27658	David Hiriasia Director (SIMS)	david.hiba@met.gov.sb
Thailand (02/10/13)	WAFSVTBB01 WAFSVTBS01 WAFSVTBD01	Somchai Yimsricharoenkit	somchai_yim@tmd.go.th	+66 (2) 287 8508 +66 (2) 134 0011 Ext. 214 +66 (2) 287 8508	Mr. Charoon Laohalertchai, Director, Bureau of Aeronautical Meteorology	charoon_lao@hotmail.com

[1]The Meteorological (MET) Authority or their designated representative. WIFS will only recognize one approving official for each State.

Adapted from APANPIRG/24 Conclusions/Decisions – Action Plan
(Updated at MET SG/18)

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Target date	Status as of 22 August 2014	Action agreed by ANC
…	…	…	…	…	…	…	…
C 24/48 A & C	**Migration to WAFS gridded global forecasts in WMO GRIB Edition 2 code form as soon as possible**	That, in view of the cessation of GRIB1 on 14 November 2013, States be invited to: a) urgently migrate to receiving, decoding and using the WAFS gridded global forecasts in WMO GRIB Edition 2 code form as soon as possible, if they have not already done so; and b) if required, urgently contact their workstation/software providers or consider contacting another State already using the GRIB2 datasets for assistance in migrating to GRIB2. Note: States who feel unable to migrate prior to 14 November 2013 should advise ICAO as soon as possible.	ICAO APAC Office	State letter	July 2013	COMPLETE State letter Ref.: T 4/8.1:AP118/ 13 (MET) issued 6 August 2013	To note
C 24/49 A & C	**Improvements to SIGMET Implementation and Distribution**	That, the ICAO be invited to urge: a) MWOs to improve upon the compliance and availability of SIGMET information; and b) Regional OPMET databanks to ensure that all SIGMET data is forwarded to the SADIS and WIFS Providers in accordance with section 1.2.2 of Appendix 6 to ICAO Annex 3 — Meteorological Service for International Air Navigation.	ICAO APAC Office	State letter	July 2013	COMPLETE State letter Ref.: T 4/7.5:AP120/ 13 (MET) issued 9 August 2013	To urge compliance

Conclusion/ Decision No --- Strategic Objective*	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Target date	Status as of 22 August 2014	Action agreed by ANC
C 24/50 A & C	**Use of VONA format**	That, States be invited to consider ways to ensure implementation of the VONA format to report volcanic activities by Volcano Observatories.	ICAO APAC Office	State letter	July 2013	COMPLETE State letter Ref.: T 4/9.1.1:AP126 113 (MET) issued 20 August 2013	To urge all relevant States to comply
C 24/51 A & C	**Assessment of bilateral agreements for the provision of SIGMET services**	That, in coordination with ICAO, States to investigate and assess the feasibility of implementing effective bilateral agreements for the provision of SIGMET services as a corrective action towards resolution of air navigation deficiencies listed in the MET field.	ICAO APAC Office & States	State Letter and Working paper developed	September 2013 & March 2014	IN PROGRESS	To note
D 24/52 A & C	**Survey on the implementation of meteorological competency**	That, ICAO coordinates a survey on the level of implementation of competency assessment, qualifications and training for meteorological personnel providing service for international air navigation and report the result to the MET SG/18 meeting.	ICAO APAC Office	State Letter and Working paper developed	September 2013 & March 2014	IN PROGRESS	To note
D 24/53 A & C	**Guidance on QMS, competencies and cost recovery**	That, ICAO investigates opportunities to provide States with guidance information regarding implementation of QMS, competencies and cost recovery within the APAC Region	ICAO APAC Office	State letter	July 2013	COMPLETE State letter Ref.: T 4/7.1.2:AP039 /14 (MET) issued 11 March 2014	To note
…	**…**	…	…	…	…	…	…

Adapted from APANPIRG/24, Status of Outstanding Conclusions/Decisions – Action Plan

(Updated based on MET SG/18 discussions)

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 19/43 **D**	**Training for the new WAFS gridded forecasts**	That, in order to facilitate the implementation by the States of the new WAFS gridded forecasts, a) WAFC Provider States, in coordination with ICAO and WMO, be invited to organize training on the use of the new WAFS gridded forecasts for icing, turbulence and cumulonimbus clouds; and	a) Organize training	ICAO HQ	conduct training programme	Revised target date- Dec 2013	**COMPLETED** Under the auspices of the WAFSOPSG, the WAFC Provider States developed computer-based training material for WAFS gridded global forecasts for CB clouds, icing and turbulence (April 2013)
		b) WAFSOPSG be invited to consider, in addition to the planned regional training seminars, developing alternative methods for provision of training to the States on the new gridded forecasts for icing, turbulence and cumulonimbus clouds in order to ensure that a maximum number of WAFS users in the States will have access to the training in the most efficient way. *Note: The alternative training methods include computer based training products distributed to States and web-based training.*	b) Develop alternative methods for provision of training to the States on the new gridded forecasts for icing, turbulence and cumulonimbus clouds	ICAO HQ	Alternative training methods	Revised target date Sep 2012	ICAO made the training material available on the WAFSOPSG website in all official languages of ICAO (November 2013)

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 20/68	**Expanded WV SIGMET Test Development**	That, a) Japan be invited to further develop an expanded WV SIGMET Test utilizing automated templates in consultation with the Darwin VAAC; and b) upon completion of a) above, Japan conducts the expanded WV SIGMET Test and produce an analysis to the OPMET/M TF/8 meeting for further review and subsequent reporting to the CNS/MET SG/14 meeting to determine the next phase of the test.	Develop WV expansion SIGMET test Conduct and report on trial test	Japan/ VAAC Darwin Japan	Updated WV expansion SIGMET Test Test results included in OPMET/M TF/8 and CNS/MET SG/14 reports	Revised target date July 2014	**IN PROGRESS** Efforts suspended due to earthquake/Tsunami and accidental release of radioactive material; Japan to resume work on developing an expanded SIGMET test for volcanic ash in the APAC Region; Australia to assist. Draft Conclusion formulated by MET SG/18 to establish a volcanic ash exercises steering group in the APAC region will overtake this action.

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
D 21/9	**Develop Sub-Regional volcanic Ash Contingency Plan**	That, a) in view of the recent volcanic activity in Iceland, the CNS/MET Sub-Group be requested to develop sub-regional volcanic ash contingency plans; and	CNS/MET SG to develop volcanic ash contingency plans	ICAO APAC	Volcanic ash regional contingency plan	Revised date- July 2014	a) **IN PROGRESS** A framework for APAC regional contingency plans developed (Mar 2011); Ad-hoc group to consider input to ATM VACP.
		b) urge States to designate appropriate contact points to establish/maintain contacts in the interim period until the sub-regional volcanic ash contingency plans become available.	States to provide POC for volcanic ash events	ICAO APAC	Contingency contact list Assignment of duties – CNS/MET SG/14 D14/30 to METWARN/I TF and MET/ATM TF	Jan 2011	b) **COMPLETED**

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 21/46	**Improvements to WAFS Implementation**	That, the WAFSOPSG is invited to discuss and consider the following improvement measures in WAFS implementation:					
		a) the WAFC Provider States inform users in advance about forthcoming changes to the contents of the WAFS forecasts; and	Determine changes, if necessary, to the WAFS change bulletin notice	WAFSOPSG/ 6 (March 2011)	Update WAFS bulletin notice, if required	July 2011	a) **COMPLETED** WAFSOPSG/7 (Sep 2012) Conclusion 7/8.
		b) further guidance be provided regarding the specific actions to be taken by the MET service providers and all relevant end users of WAFS upon receiving the administrative message. *Note: Guidance should also include any requirement for a user State to generate its own administrative message for a product affected by a received administrative message.*	Determine further guidance, if necessary, for users of WAFS administrative messages	WAFSOPSG/ 6 (March 2011)	Update guidance on WAFS administrative messages, if required	Sept 2013	b) **COMPLETED** WAFSOPSG/8 Conclusion 8/9: ICAO updated the *Guidance for Handling WAFS SIGWX Correction Messages* on the WAFSOPSG website (April 2014)

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 21/48	**Update of SADIS and ISCS User Guide**	That, the SADISOPSG and WAFSOPSG consider the need to update the SADIS and ISCS User Guides by aligning with regional Meteorological Watch Offices requirements (Regional FASID Tables) *Note: To achieve this, the following steps should be taken in time for the regional SIGMET advisory trial (1 April 2011)*					
		a) Regional amendment proposals on FASID Table MET 1B;	Amendment Proposals to Tables in the Regions, where necessary	ICAO APAC	Up-to-date FASID Tables MET 1B for all Regions	Dec 2010	a) **COMPLETED** b) & c) **IN PROGRESS** (all regions submitted latest version table in excel format to HQ in Nov 2010, except for NAM) WAFSOPSG/6 noted development of database at HQ (but will not meet target date) Development of a global database of SIGMET requirements is underway in ICAO headquarters (along with the development of a database for all MET Tables contained in the air navigation plan).
		b) Develop global database based on Regional requirements in a); and	HQ IT develop global database of FASID Table MET 1B	ICAO HQ	Global MWO database	Mar 2011	
		c) Consider global database on SIGMET requirements for use in SADIS and ISCS User Guides	Incorporate SIGMET requirements in SADIS Users Guide (as a link to the global database)	WAFSOPSG/ 6 (March 2011) SADISOPSG/ 15 (May 2011)	Provide link to global database for SIGMET requirements	Apr 2011	

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 22/42 **A &C**	**Improvement of WAFC SIGWX charts**	That, the WAFSOPSG be invited to request the WAFC Provider States to provide SIGWX chart verification results, if any, to illustrate the degree of accuracy of their SIGWX charts.	Invite WAFSOPSG to request WAFC provider States to improve SIGWX charts	ICAO APAC Office	Letter to Secretary WAFSOPG	February 2012	**DEFERRED** APANPIRG Conclusion 22/42 was considered by the WAFSOPSG/8 and resulted in **no further actions** due to unresolved challenges in the comparison of the simplified object representations of the phenomena on SIGWX charts with the more complex nature of actual SIGWX phenomena.
C 22/44 **C**	**SIGMET template and example for no VA expected**	That, a) ICAO consider modifying the SIGMET template in Annex 3 to include an example to report a situation when no ash is expected in the forecast section of a SIGMET; and b) the Asia/Pacific SIGMET Guide be amended accordingly with an example of a SIGMET satisfying the condition in a).	ICAO to consider modification of Annex 3 provisions relating to SIGMET	ICAO HQ/ ANB/MET ICAO APAC Office	Amendment to relevant provision of Annex 3. Amendment to Asia/Pacific SIGMET guide.	March 2012	**COMPLETED** Am76 to Annex 3 adopted by Council 27 Feb 2013 (AN 10/1.1-13/39 refers) Applicability 14 Nov 2013; SIGMET Guide updated accordingly on APAC eDocuments website (Nov 2013).

Conclusion/ Decision No. --- Strategic Objective*	Title of Conclusion/ Decision	Text of Conclusion/Decision	Follow-up Action	To be initiated by	Deliverable	Target date	Status
C 23/41	**VAAC Backup Procedures in the ASIA/PAC Region**	That, Australia, Japan and New Zealand considers the further development of: a) VAAC Backup Procedures in the Asia-Pacific Region, as given at **Appendix Q** to the Report on agenda item 3.4, in order to include Tokyo, Wellington and Darwin VAACs; and b) Procedures for VAAC Backup Tests between Tokyo, Wellington and Darwin VAACs for inclusion in the Asia/Pacific Regional SIGMET Guide.	a) Japan, New Zealand and Australia; b) ICAO APAC Office	a) VAAC Backup Procedures for Tokyo/Wellington/Darwin; and b) Appendix (VAAC Backup Test Procedures) in ASIA/PAC Regional SIGMET Guide	November 2012 (Revised March 2013) (Revised based on expected time-frame for Darwin/ Wellington procedures)	**In Progress**	**IN PROGRESS** a) Regional SIGMET Guide template under review (including VAAC Backup Procedures) for adoption in APAC Region. b) VAAC Backup Test procedures have been developed between Wellington and Darwin for inclusion in the Asia/Pacific Regional SIGMET Guide
C 23/45	**Implementation of Quality Management Systems for Meteorological Service Provision**	That ICAO, in coordination with the World Meteorological Organization (WMO), considers urgent strategies to foster the implementation of quality management systems for meteorological service amongst States in the Asia/Pacific Region in light of the ICAO Annex 3 – Meteorological Service for International Air Navigation requirement applicable 15 November 2012.	ICAO APAC office	Strategy/plan	October 2012 (Revised June 2013)	**In Progress**	**IN PROGRESS** States surveyed on QMS status; ICAO/WMO in discussion on plan for assistance

FOURTH MEETING

METEOROLOGICAL HAZARDS TASK FORCE

(MET/H TF/4)

(Beijing, China, 19 to 21 March 2014)

EXECUTIVE SUMMARY[1]

1. Introduction

1.1 The Fourth Meeting of the Meteorological Hazards Task Force (MET/H TF/4) was held in Beijing, China, from 19 to 21 March 2014. Thirty four (34) participants from thirteen (13) States and Administrations and the ICAO attended the meeting. A conjoint session was held on 19 March 2014 with the Twelfth Meeting of the APAC Regional Operational Meteorological (OPMET) Bulletin Exchange Working Group (ROBEX WG/12) to address issues common to both groups related to the implementation of SIGMET and advisory information.

1.2 Mr. Chan Pak Wai presided over the meeting in the role as chairperson and was assisted by Ms. Sujin Promduang, chairperson of the ROBEX WG, during the conjoint session on 19 March 2014.

2. Follow-up of MET/H TF/3 agreed action

2.1 With regard to the follow-up of MET/H TF/3 agreed action, the task force considered that action was completed with the review of the surveys on States' capabilities to provide information on radioactive cloud and tsunami, discussed later in this summary at 5.1 and 5.2. *Note: the table of follow-up of MET/H TF/3 agreed action is provided in **Appendix A** to this summary.*

3. VAAC back-up tests (conjoint session)

3.1 Volcanic Ash Advisory Centres (VAACs) Wellington and Darwin had developed back-up test procedures. The task force suggested minor editorial adjustments and requested the Secretariat to include the VAAC back-up test procedures in the regional SIGMET Guide (Agreed action 4/1). *Note: the table of MET/H TF/4 agreed action is provided in **Appendix B** to this summary.*

3.2 Japan and Australia had endorsed a Scheme of Cooperation (SoC) for VAACs Tokyo and Darwin, effective 1 March 2014.

4. SIGMET and advisory information (conjoint session)

SIGMET tests / Regional SIGMET monitoring and coordination

4.1 APAC SIGMET tests were conducted on 12, 19 and 26 November 2013 to test the issuance and reception of SIGMET messages for tropical cyclones (WC SIGMET), volcanic ash (WV SIGMET) and for phenomena other than tropical cyclones and volcanic ash (WS SIGMET).

4.2 Results from the WC and WV SIGMET tests were almost the same as those in 2012, though in some cases multiple test bulletins were received from meteorological watch offices (MWOs), which could cause confusion and affect the results of the SIGMET tests. In some cases, as

[1] The full report is available at the following website: http://www.icao.int/APAC/Meetings/Pages/2014-MET-HTF4.aspx

reported by Australia and New Zealand, MWOs were not configured to issue WC SIGMET in particular FIRs, which would have had an impact on the SIGMET test results. Two States reported lack of specific guidance for when the test advisory message (tropical cyclone or volcanic ash), required to trigger the issuance of test WC or WV SIGMET, is not received. The meeting suggested the SIGMET Guide and SIGMET test procedures should be reviewed and updated, accordingly (Agreed action 4/2).

4.3 Results from the WS SIGMET test showed overall participation by States and MWOs had increased on the previous year, mainly due to the participation by Bangladesh and Nepal. The average reception rate of test messages at RODBs also increased on the previous year and the reception rate at three European Regional OPMET Centres (EUR ROCs) was high.

4.4 The task force agreed that the annual State letter notifying details of the 2013 SIGMET test results should urge States to resolve the errors identified in the tests and to report back to ICAO on any issues that cannot be resolved so as to enable the Secretariat to provide, or coordinate the provision of, targeted assistance to States to address the SIGMET test errors where necessary (Agreed action 4/3).

4.5 Australia had addressed formatting errors reported in previous SIGMET tests. Australia also initiated an amendment to the regional air navigation plan to remove the requirement for MWO services at Cairns (YBCS) (Agreed action 4/4). Furthermore, Australia was planning to fully automate the processing of test SIGMET messages with the correct sequence number (Z99) to resolve delays in distribution currently due to the manual handling of Z99 messages.

Review SIGMET Guide

4.6 The task force considered the adoption of the Regional SIGMET Guide template provided by the Meteorological Warnings Study Group (METWSG) as the basis for an updated, Fifth Edition of the Asia/Pacific Regional SIGMET Guide. Australia and Hong Kong-China, both members of the METWSG, had contributed to the development of the Regional SIGMET Guide template and provided additional comments and changes based on the adaptation of the template for APAC regional use. The task force appointed an ad-hoc group comprising Australia (Rapporteur), Hong Kong-China, Japan, New Zealand and ICAO to further develop a draft Asia/Pacific Regional SIGMET Guide (5th Edition) for consideration by the MET SG (Agreed action 4/5).

Advisory information

4.7 VAAC Darwin had introduced volcanic activity situational awareness products during 2013 to support aviation users in the collaborative decision making process. The task force noted the METWSG had completed a high-level strategic statement relating to the short- and long-term vision for the provision of information relating to hazardous meteorological conditions, which would be reviewed, and possibly endorsed, by the ICAO Meteorology Divisional Meeting in July 2014.

Other SIGMET/advisory related business

4.8 Australia was developing a system that would produce two versions of the same SIGMET message: (1) international, which would comply with Annex 3; and (2) domestic, which may include the use of PCA[2] locations. The task force cautioned Australia on the potential for confusion if international users unintentionally received the non-compliant, domestic version of SIGMET from such a system.

4.9 The Republic of Korea (ROK) was developing forecast guidance for turbulence used in support of SIGMET issuance. The task force invited the ROK to provide a detailed report on the progress and performance of the system at a future meeting and to provide any useful information on the algorithms used that may help other States in forecasting turbulence.

4.10 The task force noted that States may wish to bring issues raised in the meeting, such as the revised provisions for SIGMET in the proposed draft Amendment 77 to ICAO Annex 3, to the attention of the relevant ICAO groups and meetings.
(End of conjoint session)

5. Guidance material

5.1 Results of a survey of the present capabilities of APAC States to prepare and issue SIGMETs for radioactive clouds (Agreed action 3/1 refers) indicated that States continued to use a variety of sources of information and criteria to issue SIGMET for radioactive cloud and that additional guidance and/or training resources would be beneficial. The task force suggested it would be useful to include specific guidance on SIGMET for radioactive cloud in the Regional SIGMET Guide and agreed to form an ad-hoc group comprising China (Rapporteur), Hong Kong-China and Japan to develop guidance for possible inclusion in the Regional SIGMET Guide on the issuance of SIGMET for radioactive cloud (Agreed action 4/6). Furthermore, the task force requested ICAO to investigate the requirement for guidance and/or training on the use of the information provided in SIGMET for radioactive cloud by end users (Agreed action 4/7).

5.2 Results of a survey of the present capabilities of APAC States to prepare and issue aerodrome warnings for tsunami (Agreed action 3/2 refers) indicated that States generally had the capacity to provide national tsunami warning systems for the public, which could also include aerodromes, but few had implemented aerodrome warnings for tsunami and that guidance and criteria could be more specific. With respect to the proposal (in draft Amendment 77 to Annex 3) where aerodrome warnings related to tsunami would not be required where a national plan for tsunami was in place, the task force noted that some States may require guidance on how to integrate aerodromes into their national tsunami warning systems and agreed to form an ad-hoc group comprising Japan (Rapporteur) and Indonesia to develop regional guidance on the provision of tsunami warning information directly from the relevant tsunami warning centres to the ‘at-risk’ aerodromes (Agreed action 4/8).

5.3 The task force requested ICAO to share the information gathered by the surveys (mentioned above) with other relevant groups (Agreed action 4/9).

[2] Planning Chart Australia

Other necessary guidance

5.4 Japan had not yet implemented the standardized international volcano database for the preparation of volcanic ash advisories (IAVWOPSG Decision 8/10 refers) because the updates it submitted to the review of the database had not yet been implemented. Japan would, however, inform the Regional Office of the date of implementation of the new database in its volcanic ash advisory messages. The ICAO should determine how the changes, when implemented by Japan, should be informed to others (Agreed action 4/10). Implementation of the new database may have implications for the VAAC back-up arrangements so the task force suggested VAAC back-up procedures between Darwin and Tokyo be reviewed and updated if necessary (Agreed action 4/11).

5.5 Proposed updates to realign the SIGMET posters with Amendment 76 to Annex 3 were discussed, which were expected to be published in the near future. The task force proposed that an ad-hoc group consisting of Australia, Hong Kong-China and New Zealand (Rapporteur) review and update the posters again in 2016 to realign with Amendment 77 to Annex 3 (Agreed action 4/12).

6. Review progress on contingency plans

6.1 Input was still required from the task force for the Regional ATM Contingency Planning Task Force (RACP/TF) however the detailed requirements of the RACP/TF were not yet known, which made it difficult to progress with the MET input. To this end, the task force urged the Secretariat to accelerate necessary coordination to obtain a list of requirements from the RACP/TF to guide the task force's work.

7. Aerodrome warnings

7.1 The topic of aerodrome warnings for tsunami was discussed earlier in this summary at 5.2.

8. Future work programme and review of terms of reference

8.1 Cambodia and Philippines agreed to join the task force as core members and Fiji and the Republic of Korea would also consider joining and would advise the Secretariat in due course.

8.2 The task force reviewed and updated the work programme as included in **Appendix C** to this summary.

9. Any other business

Space weather

9.1 Australia and China presented information on space weather services provided in support of international air navigation operations. The task force noted that the ICAO Meteorology Divisional Meeting in July 2014 would consider a draft concept of operations for space weather information services, developed by the relevant global group, and any recommendations adopted by the divisional meeting would set forth global objectives and implementation timelines.

AFTN addresses for VAA

9.2 Japan had compiled a list of 8-letter AFTN addresses for MWO and ACC to which VAA information is required to be distributed by VAAC Tokyo. The list was updated with the assistance of the Secretariat and feedback from States. The task force recommended that similar lists for VAACs Darwin and Wellington be established (Agreed action 4/13).

Next Meeting

9.3 Dates for the next meeting (MET/H TF/5) were tentatively agreed in the week commencing 16 March 2015, back-to-back with ROBEX WG/13, including a conjoint session with ROBEX WG/13.

FOLLOW-UP OF MET/H TF/4
AGREED ACTION

Status on 21 **March 2014**
(√ = completed)

No.	Title/description	Follow-up action (target/completion dates in brackets)
4/1 (ROBEX WG 12/10)	**SIGMET Guide/VAAC back-up test procedures** VAAC back-up test procedures between Wellington and Darwin to be included in the next amendment or edition of the APAC Regional SIGMET Guide	Secretariat to include VAAC back-up test procedures in SIGMET Guide (Target date TBD in 2014, in coordination with ad-hoc group's revision of SIGMET Guide for presentation to MET SG/18)
4/2 (ROBEX WG 12/11)	**SIGMET Guide/SIGMET test procedures** a) List of WMO headings for SIGMET bulletins used by APAC MWOs (to be used for compilation of SIGMET test results) to be updated to reflect the limitations in WC SIGMET issuance from certain MWOs as notified by States in the next amendment or edition of the APAC Regional SIGMET Guide; and b) Specific guidance for the issuance of test WC/WV SIGMET when a test advisory message for tropical cyclone/volcanic ash is not received to be included in the SIGMET test procedures in the next amendment or edition of the APAC Regional SIGMET Guide.	Secretariat to include (a) updated information on WC SIGMET issuance and (b) specific guidance for non-receipt of test advisory messages in SIGMET tests in SIGMET Guide (Target date TBD in 2014, in coordination with ad-hoc group's revision of SIGMET Guide for presentation to MET SG/18)
4/3 (ROBEX WG 12/12)	**SIGMET test results** a) ICAO State letter urging States to resolve the errors identified in the 2013 SIGMET tests (reported by Japan and Singapore and provided in Attachments C3 and C4 to the Report); and b) States to advise ICAO on any issues that cannot be resolved or require further coordination/assistance to address the SIGMET test errors.	(a) Secretariat to issue State letter (April 2014) (b) States respond if necessary (June 2014)

No.	Title/description	Follow-up action (target/completion dates in brackets)
4/4 (ROBEX WG 12/13)	**Proposal for amendment of FASID Table MET 1B – Cairns (YBCS)** Update the regional air navigation plan, FASID Table MET 1B, to remove the requirement for MWO services at Cairns (YBCS) – in line with current requirements.	Secretariat (in coordination with Australia) to prepare and process the PfA (June 2014)
4/5 (ROBEX WG 12/14)	**Draft Asia/Pacific Regional SIGMET Guide (5th Edition)** Comprehensive revision of the draft Asia/Pacific Regional SIGMET Guide (5th Edition) based on the suggested changes in Attachments C5, C6 and C7 to the Report.	Ad-hoc group comprising Australia (Rapporteur), Hong Kong-China, Japan, New Zealand and ICAO to produce the revised draft Asia/Pacific Regional SIGMET Guide (5th Edition) and forward to the Secretariat for inter-regional coordination then to the MET SG for further consideration (June 2014).
4/6	**Guidance on SIGMET for radioactive cloud** Guidance on the issuance of SIGMET for radioactive cloud for possible inclusion in the Regional SIGMET Guide.	Ad-hoc group comprising China (Rapporteur), Hong Kong-China and Japan to develop guidance on the issuance of SIGMET for radioactive cloud and forward to the ad-hoc group revising the draft Regional SIGMET Guide (5th Edition) (June 2014).
4/7	**Guidance on the use of SIGMET for radioactive cloud** Guidance and/or training on the use of the information provided in SIGMET for radioactive cloud.	Secretariat to raise the issue with an appropriate ICAO group or user group (June 2014).
4/8	**Guidance on integration of aerodromes with national tsunami warning systems** Guidance on how to integrate aerodromes into national tsunami warning systems where such systems are in place.	Ad-hoc group comprising Japan (Rapporteur) and Indonesia to review the tsunami survey results and develop regional guidance on the provision of tsunami warning information directly from the relevant tsunami warning centres to the 'at-risk' aerodromes (June 2014).
4/9	**Survey results for radioactive cloud and tsunami** Information gathered by the surveys to be shared with other relevant groups.	Secretariat to forward the information gathered by the surveys to ICAO HQ to be shared with other relevant groups (May 2014).

No.	Title/description	Follow-up action (target/completion dates in brackets)
4/10	**Notification of implementation of the new standardized international volcano database for the preparation of volcanic ash advisories** Notification of the implementation of the new database for volcanic ash advisory (VAA) messages by VAAC Tokyo.	Secretariat to liaise with ICAO HQ to determine whether there are any requirements for notification to others such as the IAVW-related organizations, ATCs and MWOs in the VAAC Tokyo area of responsibility, as well as the EUR/NAT Regional Office (May 2014).
4/11	**Impact of non-implementation of the new volcano database on VAAC back-up arrangements** VAAC back-up procedures between Darwin and Tokyo to be reviewed and updated if necessary to address the interim period before the new database is implemented by VAAC Tokyo.	VAAC Tokyo, in conjunction with VAAC Darwin, to review the impact of VAAC Tokyo not referring to the new volcano database and take necessary actions as required (May 2014).
4/12	**Updates to the SIGMET posters** Revision of SIGMET posters to realign the posters with the SIGMET changes envisaged in Amendment 77 to Annex 3 in 2016.	Ad-hoc group consisting of Australia, Hong Kong-China and New Zealand (Rapporteur) to review and update the SIGMET posters to realign with Amendment 77 to Annex 3 in 2016.
4/13	**MWO and ACC AFTN addresses for VAA information** List of MWO and ACC locations and AFTN addresses for distribution of VAA information from VAACs Darwin and Wellington.	Secretariat to: (a) source the lists of MWO and ACC locations for distribution of VAA information from VAACs Darwin and Wellington; and (b) issue a State Letter requesting updates to the MWO and ACC location information for distribution of VAA information in the APAC Region, including AFTN addresses (May 2014).

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MET/ATM SEMINAR 2013

AND

THIRD MEETING OF THE METEOROLOGICAL REQUIREMENTS TASK FORCE

(MET/R TF/3)

(Bangkok, Thailand, 26 to 29 November 2013)

EXECUTIVE SUMMARY

1. Introduction

1.1 The Meteorology/Air Traffic Management (MET/ATM) Seminar and the Third Meeting of the Meteorological Requirements Task Force (MET/R TF/3) were held back-to-back at the ICAO APAC Regional Office in Bangkok, from 26 to 29 November 2013. The MET/ATM Seminar was conducted from 26 November 2013 until the morning of 28 November 2013, while the MET/R TF/3 Meeting commenced on the morning of 28 November 2013 and closed on 29 November 2013.

1.2 The Seminar and the Meeting were attended by 49 participants from Australia, Bangladesh, China, Hong Kong China, Indonesia, India, Japan, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Russian Federation, Thailand, USA, Viet Nam, IATA and IFATCA. The list of participants is attached at Appendix A to the final report of the meeting.

1.3 Mr. Jun Ryuzaki, of Japan Meteorological Agency, acted as moderator for the Seminar and Chairperson for the Meeting. Mr. Peter Dunda, Regional Officer Aeronautical Meteorology, of the ICAO APAC Office, acted as the Secretary for the Meeting and was assisted by Mr Shane Sumner, Regional Officer Air Traffic Management.

1.4 The final report of the MET/R TF/3 meeting including summary of the outcomes from the MET/ATM Seminar is available at : http://www.icao.int/APAC/Meetings/2013%20METATMMETRTF3/Final%20Report%20of%20MET-R%20TF3v4%201.pdf

2. Discussion

2.1 Through the Seminar and the TF/3 meeting, there were much variety of best practice examples of coordination between MET and ATM, ATM-tailored MET information and services presented by some States, as attached at the Appendix G to the final report. The meeting agreed that the use of “common language” between the two parties must be a key to success of collaborative operations and that it was very important to estimate possible weather impact on Air Traffic Flow with careful consideration of ATM/ATC procedures must be very important in order to provide effective support to ATM.

2.2 The meeting was informed that there had been a successful coordination between Australia and New Zealand for the alignment of each SIGMETs for the cross-boundary phenomena as shown in the Appendix G to the final report. It was acknowledged that there was a need of sharing real-time data between adjacent MWOs and the meeting endorsed the draft conclusion to remind States that there was the end user’s requirement for cross-boundary alignment of SIGMETs including graphical products and to consider development regional guidance material to meet the requirements.

2.3 Considering those progress on ATM-tailored services, the meeting agreed that it would be beneficial to conduct the regional survey on specific ATM requirements in each States through coordination by the Secretariat.

2.4 The Seminar and the meeting were also informed of recent progress of future Air Traffic System developments in two States, such as NextGen in the U.S. and the CARATS in Japan. The meeting acknowledged that those projects were basically along with GANP/ASBUs framework and agreed that it was important for each States in this region to consider how to address the requirement for future improved meteorological information and services, which would be also identified in the APAC Seamless ATM plan. Finally, the meeting endorsed an draft conclusion to develop regional guidance to help States address this future requirement from GANP/ASBUs.

2.5 The meeting also agreed that there was a strong need to develop guidance material to support smooth transition to digital data exchange under future SWIM environment. This work can be done in close coordination with the ROBEX WG.

2.6 The outcomes of the volcanic ash exercise conducted in far-east Europe, called VOLKAM, were explained by the Secretariat. The meeting concurred that the establishment of ATM contingency plan and regular exercise for volcanic ash were necessary in the Region. This work can be done through close coordination with the RACP/TF and the MET/H TF.

2.7 The meeting was apprised of the sub-regional ATFM had been discussed between some States in the South-East Asia, under the ATFM/SG. It was agreed that further collaboration with the ATFM/SG should be beneficial for the success of sub-regional ATFM and that the Secretariat would report the outcomes of this Seminar and Meeting to the ATFM/SG/3 meeting to seek for further collaboration.

2.8 The meeting evaluated the outcomes of the Seminar and agreed that it was a useful opportunity to share information on current activity and progress on operational collaboration between MET and ATM. Finally, it was decided that the next Seminar will be scheduled possibly in 2014, through coordination between the Secretariat and the Chairperson.

2.9 The meeting reviewed the composition of the task force and updated the terms of reference and work plan of the MET/R TF. The updated TOR and work plan is included in Appendix C and D of the final report.

Follow-up MET/R TF/3
ACTION AGREED

✓ = completed

MET/R TF/3		
No.	**Title/Action**	**Follow-up action** (target/completion dates in brackets)
3/1	**Draft Decision 3/1: Revised Terms of Reference** That, the revised Terms of Reference for the MET/R TF provided in **Appendix C** to this Report be adopted.	Secretariat WP for MET SG/18 (2 June 2014)
3/2	**Decision 3/2: Revised ATFM/SG Terms of Reference** That, the Secretariat report the revised MET/R TF Terms of Reference and the rationale behind them to ATFM/SG/3 and propose a corresponding revision of ATFM/SG Terms of Reference for consideration by ATM/SG.	Secretariat WP for ATFM SG/3 (10 March 2014)
3/3	**Decision 3/3: Capacity building for (digital) MET information exchange** That, an ad-hoc group, consisting of Australia, Hong Kong, China, New Zealand and Singapore, in close collaboration with the ROBEX WG and assisted by the Secretariat, develop a proposal for capacity building activities in the APAC Region to foster the implementation of (digital) aeronautical meteorological information exchange, and report to MET SG/18.	Ad-hoc group and Secretariat WP for MET SG/18 (2 June 2014)
3/4	**Draft Conclusion 3/4: Cross-boundary alignment of graphical SIGMET information** That, ICAO be invited to: a) remind States of the end users' requirement for cross-boundary alignment of (meteorological) phenomena included in SIGMET information, including graphical products, by meteorological watch offices in the APAC Region; and b) consider providing guidance to assist States in meeting the end users' requirement in a).	Secretariat WP for MET SG/18 (2 June 2014)
3/5	**Decision 3/5: MET in the APAC Seamless ATM Plan** That, an ad-hoc group, consisting of Australia, China, Hong Kong, China, and Japan, develops a list to guide States on the aeronautical meteorological information or services necessary to support implementation of each element of the APAC Seamless ATM Plan, where applicable, and report to the next meeting of the MET/R TF. *Notes: a) development of the list should*	Ad-hoc group and Secretariat IP for ATFM SG/3 and MET SG/18 (10 March 2014 and 2 June 2014) WP for MET/R TF/3 (TBD 2014)

MET/R TF/3		
No.	**Title/Action**	**Follow-up action** (target/completion dates in brackets)
	take into account end users' requirements and current scientific capabilities; and b) the guidance should also include requirements for aircraft reporting.	
3/6	**Decision 3/6: MET/ATM requirements survey** That, the ICAO conducts a survey of region-specific ATM requirements for aeronautical meteorological services/products in 2014, which could assist APAC Seamless ATM Planning.	Secretariat Survey; WP for ATFM SG/3 and MET/R TF/3 (10 March 2014 and TBD 2014)
3/7	**Decision 3/7: Volcanic ash exercise in the APAC region** That, the ICAO forwards the relevant discussion outcomes from the MET/ATM Seminar and MET/R TF/3 Meeting to the Meteorological Hazards Task Force (MET/H TF) to assist the development of a volcanic ash contingency exercise elsewhere in the APAC Region, involving MET, ATM and operators, based on the VOLKAM experience and volcanic ash exercises in other parts of the world.	Secretariat WP for MET/H TF/4 (19 March 2014)
3/8	**Decision 3/8: Future MET/ATM Seminar** That, a steering committee, consisting of Japan and the Secretariat, develops a proposal for the next MET/ATM Seminar, including recommended timing and a draft programme, and report to MET SG/18.	Japan and Secretariat WP for MET SG/18 (2 June 2014)

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TWELFTH MEETING OF THE REGIONAL OPERATIONAL METEOROLOGICAL BULLETIN EXCHANGE WORKING GROUP

(ROBEX WG/12)

(Beijing, China, 17 to 19 March 2014)

EXECUTIVE SUMMARY

1. Introduction

1.1 The Twelfth Meeting of the Regional Operational Meteorological (OPMET) Bulletin Exchange Working Group (ROBEX WG/12) was held in Beijing, China from 17 to 19 March 2014. A conjoint session was held on 19 March 2014 with the Fourth Meeting of the Meteorological Hazards Task Force (MET/H TF/4) to address issues common to both groups related to the implementation of SIGMET and advisory information.

1.2 Ms. Sujin Promduang presided over the meeting in the role as chairperson and was assisted by Mr. Peter Dunda, ICAO RO Met, as secretariat and during the conjoint session on 19 March 2014 by Mr. Chan Pak Wai, chairperson of the MET/H TF.

1.3 The full report of the ROBEX WG/12 can be accessed at the following website: http://www.icao.int/APAC/Meetings/Pages/2014-ROBEX-WG12.aspx. Agreed actions for ROBEX WG/12 and the conjoint session are contained in **Appendix B** of this paper.

2. Follow-up of ROBEX WG/11 agreed action

2.1 With regard to follow-up of ROBEX WG/11 agreed actions, the working group considered that action was completed against three (3) items and was still in progress against the remaining six (6) items. A table of the follow-up of ROBEX WG/11 agreed action is in **Appendix A** to this paper.

3. OPMET information

3.1 **OPMET Availability:** The International Air Transport Association (IATA) monitored the availability of OPMET data from the APAC Region on the SADIS and WIFS over a 9-week period commencing 26 December 2013. The results showed that the availability of OPMET for AOP [non-AOP] aerodromes had satisfied the IATA's criteria with 90% [83%] of METAR (SA bulletins) and 92% [97%] of TAF (FT bulletins) being available. The IATA observed a significant improvement in OPMET availability in recent years however there were numerous locations where OPMET availability during the monitoring period did not meet its requirements.

3.2 The IATA monitoring also indicated unavailability of OPMET in WIFS that was available in SADIS, which requires further investigation. The task force agreed it would be useful for the Secretariat to liaise with the SADIS and WIFS Provider States to ensure that adequate contingencies are built into the ROBEX system to ensure consistency of APAC OPMET availability on the two systems.

3.3 **OPMET Data Performance Indices:** Regional OPMET Data Banks (RODBs) Singapore, Tokyo and Bangkok monitored the performance of OPMET data between 1 and 31 January 2014. Overall, the monitoring indicated reasonably good compliance, regularity and availability for TAF (95% to 98%), however the results were comparatively low (84%) for compliance of METAR which was attributable to a small number of locations with significantly low

compliance indices. ROBEX WG targets were 95% and 90% for AOP and non-AOP aerodromes, respectively. Poor results from OPMET monitoring at a number of locations in recent years were indicative of systemic problems, which would require urgent attention.

3.4 The working group agreed that the Secretariat should coordinate with States to address the poor results of OPMET monitoring for the specific locations (Agreed action 12/1).

3.5 Results of OPMET monitoring also showed significant differences in performance indices between reception at RODBs Bangkok, Brisbane, Singapore and Tokyo indicating possible differences in the application of the monitoring procedures (likely related to half-hourly vs hourly METARs), which needs to be resolved. The group agreed that the RODBs should utilise a set of test data to verify and validate the exchange of OPMET and ensure the consistency of reporting by RODBs (Agreed action 12/3).

3.6 RODB Nadi agreed to participate in future regional OPMET monitoring activities as required with support from the other RODBs.

4. OPMET exchange

4.1 **IROG Back-up tests:** Back-up testing between IROG Singapore and IROG Bangkok conducted on 7 February 2014 indicated successful reception (477 out of 497 (96%) expected METAR bulletins) and successful transmission (585 out of 605 (97%) expected METAR and TAF bulletins) received by RODB Bangkok with an average transit time of 1 minute. A number of missing METAR bulletins were confirmed by Indonesia to be due to local communication issues at the time of the test.

4.2 **Exchange of OPMET in a digital format:** Singapore reported progress with respect to the implementation of extensible markup language (XML) for OPMET messages using the AvXML Version 1. Australia advised that it had commenced a research project to investigate, develop and test a XML based OPMET exchange system. A comprehensive report of the activities, plans and identified implementation issues with respect to the exchange of OPMET in a digital form should be provided to the MET SG for further consideration (Agreed action 12/2).

4.3 **IROG Changes:** Thailand proposed the use of RODB Brisbane's direct connection to the Africa and Indian Ocean (AFI) Region for APAC-AFI inter-regional exchange to improve the reliability, efficiency and accessibility of OPMET distributed by IROGs in the APAC Region. The working group agreed the proposal should provide the basis for the review of the structure of our ROBEX scheme.

5. Guidance material

5.1 The OPMET guidance material published by the ICAO Regional Office Bangkok includes the ROBEX Handbook, OPMET Interface Control Document (ICD) and the OPMET related FASID tables. The meeting suggested a number of additions and improvements to each of the documents. All States are urged to review each of the documents and provide amendments to the APAC Regional MET Officer (Actions 12/4, 12/5, 12/6, 12/7, 12/8 and 12/9 refers). All documents are available on the ICAO Bangkok website at: http://www.icao.int/APAC/Pages/edocs.aspx

6. VAAC back-up tests

6.1 Volcanic Ash Advisory Centres (VAACs) Wellington and Darwin have developed back-up test procedures. Japan and Australia have endorsed a Scheme of Cooperation (SoC) for VAACs Tokyo and Darwin, effective 1 March 2014. The task force suggested minor editorial adjustments and requested the Secretariat to include the VAAC back-up test procedures in the regional SIGMET Guide (Agreed action 4/1).

7. SIGMET and advisory information

7.1 **SIGMET Tests:** APAC SIGMET tests were conducted on 12, 19 and 26 November 2013 to test the issuance and reception of SIGMET messages for tropical cyclones (WC SIGMET), volcanic ash (WV SIGMET) and for phenomena other than tropical cyclones and volcanic ash (WS SIGMET).

7.2 Results from the WC and WV SIGMET tests were similar to those in 2012, though in some cases multiple test bulletins were received from meteorological watch offices (MWOs), which could cause confusion and affect the results of the SIGMET tests. Participation from ASAIA/PAC States in SIGMET tests was as follows:

- WC SIGMETs: was 72% up from 70% in 2012.
- WV SIGMET was 66% down from 72% in 2012.

The meeting suggested the SIGMET Guide and SIGMET test procedures should be reviewed and updated, accordingly (Agreed action 12/11).

7.3 Results from the WS SIGMET test showed overall participation by States and MWOs had increased on the previous year (66% up from 55% in 2012), mainly due to the participation by Bangladesh and Nepal.

7.4 The working group agreed that the annual State letter notifying details of the 2013 SIGMET test results should urge States to resolve the errors identified in the tests and to report back to ICAO on any issues that cannot be resolved so as to enable the Secretariat to provide, or coordinate the provision of, targeted assistance to States to address the SIGMET test errors where necessary (Agreed action 12/12).

7.5 Australia had addressed formatting errors reported in previous SIGMET tests. Australia also initiated an amendment to the regional air navigation plan to remove the requirement for MWO services at Cairns (YBCS) (Agreed action 12/13). Furthermore, Australia advised it was planning to fully automate the processing of test SIGMET messages with the correct sequence number (Z99) to resolve delays in distribution currently due to the manual handling of Z99 messages.

7.6 **SIGMET Guide:** A new format of the Regional SIGMET Guide template provided by the Meteorological Warnings Study Group (METWSG) was the basis for an updated, Fifth Edition of the Asia/Pacific Regional SIGMET Guide. A large number of issues remained and an ad-hoc group comprising Australia (Rapporteur), Hong Kong-China, Japan, New Zealand and ICAO to further develop a draft Asia/Pacific Regional SIGMET Guide (5th Edition) for consideration by the MET SG (Agreed action 12/14).

7.7 **Compliance to Annex 3 -** Australia advised that it had addressed a number of formatting issues with SIGMETs and was now considering developing a system that would produce two versions of the same SIGMET message: (1) international, which would comply with Annex 3; and (2) domestic, which may include the use of domestic aviation locations. The task force cautioned Australia on the potential for confusion if international users unintentionally received the non-compliant, domestic version of SIGMET from such a system.

7.8 **Turbulence Guidance:** The Republic of Korea (ROK) was developing forecast guidance for turbulence used in support of SIGMET issuance. The task force invited the ROK to provide a detailed report on the progress and performance of the system at a future meeting and to provide any useful information on the algorithms used that may help other States in forecasting turbulence.

8. Review of Work Program

8.1 **Review of the Work Programme:** The TORs, Work Programme and composition of the Task Force were reviewed and updated as detailed in the Appendix C. The changes included:

- The members of the working group had their representation clearly stated, so it was clear who should participate in which tasks;
- The role and provision of data to the WAFS Provider States was strengthened;
- Compliance was added to performance metrics;
- Brisbane RODB to assist Nadi RODB with capturing performance metric information;
- RODBs' to develop a common dataset and assess the consistency of the performance metrics between the different RODBs;
- RODB's to consider options and strategies to deal with digital data exchange of OPMET data in its area of responsibility, including non-compliance of OPMET products with requirements of WMO TT-AvXML schema;
- All members to increase awareness of the requirement of digital exchange of OPMET data and the impact; and
- Updates to the timing of various tasks.

9. Other Business

9.1 **Chair:** Ms. Sujin Promduang advised that due to a promotion to Director, Aeronautical Information and Flight Data Management Centre, within Aeronautical Radio of Thailand Ltd, and will be unable to continue as Chair of ROBEX WG. Subsequently, Tim Hailes of the Australia was elected Chair of ROBEX WG.

FOLLOW-UP OF ROBEX WG/12
AGREED ACTION

Status on **19 March 2014**
(✓ = completed)

No.	Title/description	Follow-up action (target/completion dates in brackets)
12/1	**Improvement of OPMET availability on SADIS and WIFS** Identify and address issues where OPMET availability on SADIS and WIFS did not meet the requirements of IATA.	RODBs in coordination with the Secretariat to investigate the results of IATA OPMET monitoring (on SADIS and WIFS) and address issues such as incorrect distribution lists or misalignment of requirements in the FASID Table MET 2A. Secretariat to coordinate with States to address the issues related to specific locations (June 2014).
12/2	**Facilitating the implementation of digital exchange in the APAC Region** Report on the activities, plans and identified implementation issues with respect to the exchange of OPMET in a digital form.	Secretariat to coordinate with States a comprehensive report of the activities, plans and identified implementation issues with respect to the exchange of OPMET in a digital form for the next meeting of the MET SG (June 2014).
12/3	**Verification and validation of the exchange of OPMET** Verify and validate the exchange of OPMET in the APAC Region using a set of test data.	RODBs to construct a test dataset, perform calculations, compare results and to standardize (report to next meeting).
12/4	**ROBEX Handbook updates** Develop and publish updates to the ROBEX Handbook.	Ad-hoc group comprising RODB experts to progress the required ROBEX Handbook updates as discussed under agenda item 5 of the Report; Secretariat to publish the updates (June 2014).
12/5	**ICD updates** Develop and publish updates to the ICD.	RODBs to provide updates for their respective appendices in the ICD; Secretariat to publish the updates (June 2014).
12/6	**Requirement for aerodrome forecasts in TAF code in FASID Tables MET 1A and MET 2A** Verify the inclusion of TAF with validity 9 hours and 18 hours in the explanation of the FASID Tables MET 1A and MET 2A.	Secretariat to determine whether an appropriate amendment proposal would be required to remove references to 9 hours and 18 hours validity TAF in the FASID Tables MET 1A and MET 2A (June 2014).
12/7	**Review of FASID Table MET 6** Review FASID Table MET 6 for possible inconsistencies in the requirements specified for Malaysia.	Secretariat to ensure the latest version of FASID Table MET 6 reflects current requirements (June 2014).

No.	Title/description	Follow-up action (target/completion dates in brackets)
12/8	**Updates to ROBEX Handbook** Update the ROBEX Handbook to realign with amendments to FASID Tables MET 1A and MET 2A with respect to locations in Indonesia.	Secretariat to include updates to realign the ROBEX Handbook with amendments to FASID Tables MET 1A and MET 2A with respect to locations in Indonesia are included in the ROBEX Handbook updates (Agreed Action 12/4 refers) (June 2014).
12/9	**Amendment to FASID Tables MET 1B, MET 3A and MET 3B** Amendment to FASID Tables MET 1B, MET 3A and MET 3B concerning MWOs Cairns and Townville.	Secretariat in coordination with Australia to develop and process an amendment proposal to FASID Tables MET 1B, MET 3A and MET 3B concerning MWOs Cairns and Townville (June 2014).
12/10 (MET/HTF 4/1)	**SIGMET Guide/VAAC back-up test procedures** VAAC back-up test procedures between Wellington and Darwin to be included in the next amendment or edition of the APAC Regional SIGMET Guide	Secretariat to include VAAC back-up test procedures in SIGMET Guide (Target date TBD in 2014, in coordination with ad-hoc group's revision of SIGMET Guide for presentation to MET SG/18)
12/11 (MET/HTF 4/2)	**SIGMET Guide/SIGMET test procedures** a) List of WMO headings for SIGMET bulletins used by APAC MWOs (to be used for compilation of SIGMET test results) to be updated to reflect the limitations in WC SIGMET issuance from certain MWOs as notified by States in the next amendment or edition of the APAC Regional SIGMET Guide; and b) Specific guidance for the issuance of test WC/WV SIGMET when a test advisory message for tropical cyclone/volcanic ash is not received to be included in the SIGMET test procedures in the next amendment or edition of the APAC Regional SIGMET Guide.	Secretariat to include (a) updated information on WC SIGMET issuance and (b) specific guidance for non-receipt of test advisory messages in SIGMET tests in SIGMET Guide (Target date TBD in 2014, in coordination with ad-hoc group's revision of SIGMET Guide for presentation to MET SG/18)
12/12 (MET/HTF 4/3)	**SIGMET test results** a) ICAO State letter urging States to resolve the errors identified in the 2013 SIGMET tests (reported by Japan and Singapore and provided in Attachments C3 and C4 to the Report); and b) States to advise ICAO on any issues that cannot be resolved or require further coordination/assistance to address the SIGMET test errors.	(a) Secretariat to issue State letter (April 2014) (b) States respond if necessary (June 2014)

No.	Title/description	Follow-up action (target/completion dates in brackets)
12/13 (MET/HTF 4/4)	**Proposal for amendment of FASID Table MET 1B – Cairns (YBCS)** Update the regional air navigation plan, FASID Table MET 1B, to remove the requirement for MWO services at Cairns (YBCS) – in line with current requirements.	Secretariat (in coordination with Australia) to prepare and process the PfA (June 2014)
12/14 (MET/HTF 4/5)	**Draft Asia/Pacific Regional SIGMET Guide (5th Edition)** Comprehensive revision of the draft Asia/Pacific Regional SIGMET Guide (5th Edition) based on the suggested changes in Attachments C5, C6 and C7 to the Report.	Ad-hoc group comprising Australia (Rapporteur), Hong Kong-China, Japan, New Zealand and ICAO to produce the revised draft Asia/Pacific Regional SIGMET Guide (5th Edition) and forward to the Secretariat for inter-regional coordination then to the MET SG for further consideration (June 2014).

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ICAO APANPIRG /MET
WAFS TASK FORCE (WAFS TF)

1. TASK TEAM

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2. DESCRIPTION	
Objective	*Facilitate effective utilization of World Area Forecast System (WAFS) and associated services and products in the Asia Pacific Region in support of the Global Air Navigation Plan framework and the Aviation System Block Upgrades (ASBU) methodology.*
Benefits	*Improve the regional utilization of WAFS weather forecasts (including SIGWX forecasts, upper winds and upper-air temperatures, humidity, direction, speed and height of maximum winds and tropopause heights, as well as turbulence, icing, cumulonimbus clouds) used by airlines and ATM to optimize flight routes, which will enhance efficiency and reduce carbon emissions.*
Terms of Reference	*Under guidance from ICAO Secretariat:* *a) Facilitate the operational use of the WAFS in the Asia and Pacific Region;* *b) Promote awareness of current and future capabilities with respect to WAFS;* *c) Maintain awareness of the status of implementation of WAFS within the Asia and Pacific Region and any user State deficiencies;* *d) Monitor and evaluate the operational effectiveness of the use of WAFS datasets and products generated from those datasets; and* *e) Provide advice to the MET Sub-group on the above.*
Work Program	*The work to be addressed by the ASIA/PAC WAFS Task Force (WAFS TF) includes:* *a) Monitoring the operational use of GRIB2 WAFS forecasts;* *b) Facilitating the utilization of gridded global forecasts of icing, turbulence and CB clouds and providing user's feedback on the use of the gridded forecasts;* *c) Establishing training requirements for WAFS products;* *d) Consolidating guidance and information related to the implementation of WAFS and updates to WAFS services and products for easy reference by user States in the Asia and Pacific Region;* *e) Providing inputs (via the MET SG) to APANPIRG on the regional planning and development of WAFS for coordination with the WAFSOPSG[1]; and* *f) Keeping the WAFS TF Work Plan up to date.*

3. COMMUNICATION STRATEGIES				
Description	*Target Audience*	*Delivery Method*	*Frequency / Date*	*Responsibility*
Work Plan	*Task Force Members*	*Document via email*	*As required but reviewed at least yearly*	*Chair*
General correspondence	*Task Force Members*	*Email*	*As required*	*Task Force Members*
Task Force Meeting	*Task Force Members*	*Meeting*	*As required, supplemented by teleconference*	*Chair*
Status & Milestone Reports	*ICAO Secretariat and Task Force Members*	*Report via email*	*At least yearly*	*Chair*
Task Force Report	*MET SG*	*Working/ Information Paper*	*Yearly*	*Chair*
Task Force Report	*APANPIRG WAFSOPSG*	*Working Paper*	*As required*	*Secretariat*

[1] ***Pending the decision of ANC and the ICAO Council on the establishment of a new MET Panel and the restructuring of the MET-related expert groups, the coordination work with the WAFSOPSG (or its replacement group) in this Work Plan may have to be revised.***

4. PERFORMANCE FRAMEWORK FORM (PFF)				
Tasks	*Time Frame*	*Responsibility*	*Status*	*Milestone*
Task 1 : Monitor the operational use of GRIB2 WAFS forecasts in the ASIA/PAC Region.	*2014-2019*	*WAFS TF*	*In progress*	*4*
Task 2 : Facilitate the implementation and utilization of gridded forecasts for icing, turbulence and CB clouds in the ASIA/PAC Region.	*2014-2019*	*WAFS TF*	*In progress*	*1, 3, 4*
Task 3 : Establish training requirements in WAFS products in the ASIA/PAC Region and provide this information to the WAFSOPSG.	*2014-2014*	*WAFS TF*	*In progress*	*2, 4*
Task 4: Maintain and distribute WAFS service reference document to ASIA/PAC States	*2014-2019*	*WAFS TF*	*In progress*	*3*
Task 5: Monitor the implementation and utilization of WAFS (including SADIS/Secure SADIS FTP/WIFS services) and training needs within the ASIA/PAC Region, and report to MET SG	*2014-2019*	*WAFS TF*	*In progress*	*4, 5*

5. MILESTONES			
Milestone	*Accountability*	*Dates*	*Status*
Milestone 1: Monitor the performance and utilization of gridded forecasts for icing, turbulence and CB clouds	*WAFS TF Chair*	*1 Jul 15 Annual*	*In progress*
Milestone 2: Report WAFS training needs	*WAFS TF Chair*	*1 Jul 15 Annual*	*In progress*
Milestone 3: Maintain and distribute WAFS service reference document to ASIA/PAC States	*WAFS TF Chair*	*31 Nov 15 Annual*	*In progress*
Milestone 4: Conduct survey on the implementation and utilization of WAFS (including SADIS 2G/Secure SADIS FTP/WIFS services) and training needs within the ASIA/PAC Region and report to MET SG	WAFS TF Chair	*1 Jul 15 Annual*	*In progress*
Milestone 5: Update WAFS TF Work Plan	WAFS TF Chair	*1 Jul 15 Annual*	*In progress*

6. WORK PLAN				
Activity / Milestone	*Accountability*	*Predecessors*	*Date*	*Status*
Activity 1: Monitoring of the performance and utilization of gridded forecasts for icing, turbulence and CB clouds				
Activity 1.1: Monitor the performance of gridded forecasts for icing, turbulence and CB clouds	WAFS TF	-	May 15 Annual	In progress
Activity 1.2: Provide summary on performance of gridded forecasts for icing, turbulence and CB clouds for inclusion in MET SG working/information paper	WAFS TF Chair	1.1	Jun 15 Annual	In progress
Activity 1.3: Analyse any survey results on the utilization of gridded forecasts for icing, turbulence and CB clouds	WAFS TF	4.3	Jun 15 Annual	In progress
Activity 1.4: Present findings to MET SG	WAFS TF Chair	1.2-1.3	Jul 15 Annual	In progress
Activity 1.5: When necessary, prepare WAFSOPSG working/information paper on WAFS training needs	WAFS TF	1.2-1.4	Mar 15 18 mthly	In progress
Activity 1.6: When necessary, present paper to WAFSOPSG	WAFS TF via WAFSOPSG member	1.5	Mar 15 18 mthly	In progress
Milestone 1: Monitor the performance and utilization of gridded forecasts for icing, turbulence and CB clouds	*WAFS TF Chair*	*1.1-1.6*	*Jul 15 Annual*	*In progress*
Activity 2: Reporting of WAFS training needs				
Activity 2.1: Analyse survey returns on WAFS training needs	WAFS TF Chair	4.3	May 15	In progress
Activity 2.2: Present survey finding to MET SG	WAFS TF Chair	2.1	Jul 15 Annual	In progress
Activity 2.3: When necessary, prepare WAFSOPSG working/information paper on WAFS training needs	WAFS TF Chair	2.1-2.2	Mar 15 18 mthly	In progress
Activity 2.4: When necessary, present paper to WAFSOPSG	WAFS TF via WAFSOPSG members	2.3	Mar 15 18 mthly	In progress
Milestone 2: Report WAFS training needs	*WAFS TF Chair*	*2.2-2.4*	*Jul 15 Annual*	*In progress*
Activity 3: Maintenance and distribution of WAFS service reference document to ASIA/PAC States				
Activity 3.1: WAFS TF to provide input on revising WAFS service reference document	WAFS TF	-	Sep 15	In progress
Activity 3.2: Update of WAFS service reference document	WAFS TF Chair	3.1	Sep 15	In progress
Activity 3.3: Upload WAFS service reference document (e-Document) to APAC web-site	ICAO Secretariat	3.2	Nov 15	In progress

Milestone 3: Maintain and distribute WAFS service reference document to ASIA/PAC States	*WAFS TF Chair*	*3.2, 4.4*	*Nov 15*	*In progress*
Activity 4: Conduct survey on implementation and utilization of WAFS (including SADIS/Secure SADIS FTP/WIFS services) and training needs within the ASIA/PAC Region and report to MET SG				
Activity 4.1: Develop a survey on the current and future implementation of WAFS (including SADIS/Secure SADIS FTP/WIFS services), the utilization of WAFS forecasts and WAFS training needs	WAFS TF	-	Nov 14 Update annually, if necessary	In progress
Activity 4.2: Distribute the survey to States	WAFS TF Chair	4.1	Dec 14 Annual	In progress
Activity 4.3: States to respond to survey	States	4.2	Feb 15 Annual	In progress
Activity 4.4: Analyse survey results	WAFS TF Chair	4.3	May 15 Annual	In progress
Activity 4.5: Present findings to MET SG	WAFS TF Chair	1.3, 2.1, 4.4	Jul 15 Annual	In progress
Activity 4.6: When necessary, prepare WAFSOPSG working/information paper	WAFS TF Chair	1.3, 2.1, 4.4-4.5	Mar 15 18 mthly	In progress
Activity 4.7: When necessary, present paper to WAFSOPSG	WAFS TF via WAFSOPSG Members	4.6	Mar 15 18 mthly	In progress
Milestone 4: Conduct survey on implementation and utilization of WAFS (including SADIS/Secure SADIS FTP/WIFS services) and training needs within the ASIA/PAC Region and report to MET SG	*WAFS TF Chair*	*4.1-4.7*	*Jul 15 Annual*	*In progress*
Activity 5: Updating of WAFS TF Work Plan				
Activity 5.1: Update the WAFS TF Work Plan (including the “Indicative Timetable for Implementation of WAFS” in Attachment I) before MET SG meeting	WAFS TF Chair	-	Jun 15 Annual	In progress
Activity 5.2: Report updated WAFS TF Work Plan at MET SG meeting	WAFS TF Chair	5.1	Jul 15 Annual	In progress
Milestone 5: Update WAFS TF Work Plan	*WAFS TF Chair*	*5.2*	*Jul 15 Annual*	*In progress*

Attachment I

Indicative Timetable for Implementation of WAFS

Item	Task/Stage of Implementation of WAFS	Anticipated Date
1	WAFC London products on access controlled internet site.	Completed
2	The establishment of back-up distribution arrangements for WAFS products.	Completed
3	Training in the operational conversion of GRIB forecasts to Wind / Temp charts.	Completed
4	All states that receive GRIB products capable of converting GRIB forecasts to Wind / Temp charts.	Completed
5	Removal of T4 Facsimile Wind / Temp charts from the satellite broadcast.	Completed
6	Training in the operational conversion of BUFR to SIGWX charts.	Completed
7	States having the ability to operate the decoding software to convert BUFR SIGWX messages into graphical format.	Completed
8	The satellite distribution by the two WAFCs of global SWH and of SWM for limited geographical areas in BUFR format.	Completed
9	Launch of SADIS 2G service.	Completed
10	SADIS 2G seminar for ASIA/PAC States.	Completed
11	Removal of T4 Facsimile SIGWX products from the satellite broadcast.	Completed
12	Procurement of SADIS 2G hardware by SADIS user States.	Completed
13	Termination of the SADIS 1G service.	Completed
14	Launch of trial gridded forecasts of icing, turbulence and convective clouds.	Completed
15	Implementation of WAFS Internet File Service (WIFS).	Completed

Item	Task/Stage of Implementation of WAFS	Anticipated Date
16	Workshop on gridded forecasts of icing, turbulence and convective clouds.	Completed
17	WAFCs begin provision of WAFS forecasts in the GRIB2 code form via internet based services (SADIS FTP/ Secure SADIS FTP /WIFS).	Completed
18	WAFCs begin broadcast of WAFS forecasts in the GRIB2 code form (excluding gridded forecasts of icing, turbulence and CB clouds) via satellite services (SADIS/ISCS).	Completed
19	WAFCs provide web-based gridded forecasts of icing, turbulence and CB clouds.	Suspended until further notice
20	Regional training on the use of the gridded forecasts.	Completed
21	WAFS end-user workstations upgraded to accept the GRIB2 code form.	May 2011 – November 2013
22	Termination of the ISCS-G2 service.	Completed
23	Planned cessation of WAFS upper air forecasts in GRIB 1 format. GRIB2 will be the sole format provided.	Completed
24	Implementation of Secure SADIS FTP Service.	Completed
25	Re-prioritisation of GRIB2 over GRIB1.	Completed
26	SADIS FTP will be ceased. Secure SADIS FTP will be the sole Internet based service provided by the UK.	Completed
27	The GRIB2 maximum icing potential deemed operational for Extended Division Time Operation (EDTO) purposes.	Completed
28	The GRIB2 forecasts for icing, turbulence and CB clouds expected to be endorsed for operational use with Amendment 76 to ICAO Annex 3.	Completed
29	Implementation of WAFS re-issuance policy for WAFS GRIB2 and WAFS SIGWX forecasts.	November 2014

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WORK PROGRAMME OF THE METEOROLOGICAL REQUIREMENTS TASK FORCE (MET/R TF)

1. TASK TEAM		
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2. DESCRIPTION	
Objective	Improve safety, efficiency and sustainability of ATM and operators by providing MET information needed to meet current and future requirements.
Benefits	Increase efficiency – save time and fuel as well as reduce carbon emissions
Terms of Reference	Under guidance from ICAO Secretariat: a) Obtain and evaluate the current and future requirements for MET (including space weather) in support of ATM (includes ATFM), as well as ATM in support of MET, in the ASIA/PAC Region and update Regional Air Navigation Plan accordingly and provide guidance material to assist States to develop MET services to meet these requirements; b) Assess aeronautical meteorological services, systems and architecture in the region and how they can integrate weather information into ATM, airspace user systems and decision support tools; c) Investigate sub-regional exchange of MET information (including digital) and associated agreements that facilitate ATM operations particularly over busy routes that overlap different FIRs; d) Promote coordination between MET and ATM communities in the ASIA/PAC Region to enhance the level of understanding of MET requirements and capabilities in support of ATM; e) To study the successful involvement of MET in the development of CDM/ATFM in other regions with a view to future application in ASIA/PAC; f) Monitor regional implementation of global policies associated with source data and delivery of MET information for ATM; g) Coordinate with MET/H TF on framework for ATM contingency plan for specific phenomenon including volcanic ash, radioactive cloud, tropical cyclone and Tsunami with reference to developments made by the global ICAO groups and WMO developments; h) Coordinate with the ATFM/SG to provide expertise on MET services and information to assist the establishment of sub-regional ATFM and to identify what kind of MET services/information can be considered as the most important for it; i) Enhance regional implementation of MET services in support of ATM 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); and j) Report to the MET Sub-group of APANPIRG for further co-ordination through the ICAO Secretariat with other relevant bodies (ATM/SG, APSAPG, CNS/SG).

3. COMMUNICATION STRATEGIES				
Description	**Target Audience**	**Delivery Method**	**Frequency / Date**	**Responsibility**
Work Plan	Task Force Members	Document via email	As required but reviewed at least quarterly	Chair
General correspondence	Task Force Members	Email	As required	Task Force Members
Task Force Meeting	Task Team Members	Meeting	As required, supplemented by teleconference	Chair
Status & Milestone Reports	ICAO Secretariat and Task Team Members	Report via email	At least half-yearly	Chair
Task Force Report	MET SG	Working Paper	Yearly	Chair

4. PERFORMANCE FRAMEWORK FORM (PFF)				
Tasks	**Time Frame**	**Responsibility**	**Status**	**Milestone**
Task 1: Conduct MET/R TF meeting to obtain regional MET requirements to support ATM	2013 (Nov)	MET/R TF	✔	1
Task 2: Conduct survey on regional ATM requirements for MET information	2014	MET/R TF secretariat	to commence	1
Task 3: Conduct MET/ATM seminar in coordination with WMO in 2013 to further develop list of possible regional MET requirements to support ATM	2013 (Nov)	MET/R TF	✔	1
Task 4: Assess aviation meteorological services, systems and architecture in the region and how they can integrate weather information into ATS/aircraft operator decision support tools	2013-2016	MET/R TF ATFM/SG	In progress	2
Task 5: Investigate sub-regional exchange of MET information and associated agreements that facilitate ATM operations particularly over busy routes that overlap different FIRs	2013-2016	MET/R TF ATFM/SG	In progress	3
Task 6: Facilitate implementation of Meteorological Services for the Terminal Area in coordination with ICAO expert groups and WMO ET-ISA	2013-2016	MET/R TF	In progress	4
Task 7: Monitor regional implementation of global policies associated with source data and delivery of MET information for ATM	2013-2016	MET/R TF	future	5

5. MILESTONES			
Milestone	**Accountability**	**Dates**	**Status**
Milestone 1: Determine regional MET requirements for ATM	MET/R TF	MET SG/19	To begin
Milestone 2: Develop guidance material on how to provide/use weather information in support of ATM decision making tools	MET/R TF	MET SG/20	To begin
Milestone 3: Implement sub-regional exchange of MET information to facilitate ATM operations in busy routes	MET/R TF	TBD	To begin
Milestone 4: Develop regional implementation plan for the Meteorological Services for the Terminal Area	MET/R TF	TBD	future
Milestone 5: Implement global policies associated with source data and delivery of MET products for ATM	MET/R TF	TBD	To begin

6. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 1: Develop regional MET requirements for ATM				
Activity 1.1: Conduct MET/R TF meetings and MET/ATM seminars to contribute in developing MET requirements for ATM	MET/R TF	-	Nov 13-completed (at least every 18 months)	In progress
Activity 1.2: Analyse existing surveys (e.g. ATFM survey) and develop new surveys, when necessary, to determine regional ATM requirements for MET	MET/R TF	-	2014	In progress
Activity 1.4: Recommend regional MET requirements for ATM to MET SG and AMOFSG (through direct membership) meetings	MET/R TF	-	Annual (AMOFSG – 18 months)	To begin
Milestone 1: Determine regional MET requirements for ATM				
Activity 2: Developing methods to use weather information in decision support tools				
Activity 2.1: Develop a list to guide States on the MET information or services necessary to support implementation of each element of the APAC Seamless ATM Plan, and report to the next meeting of the MET/R TF. Note: this should include requirements for aircraft reporting	Ad hoc group (Australia, China, Hong Kong, China, and Japan)	-	2015	To begin
Activity 2.2:		-		
Activity 2.3:		-		
Milestone 2: Develop methods to use weather information in decision support tools				

Activity 3: Developing sub-regional exchange of MET information to facilitate ATM operations				
Activity 3.1: develop a proposal in close collaboration with the ROBEX WG and assisted by the Secretariat, for capacity building activities in the APAC region to foster the implementation of digital MET information exchange, and report to MET SG/18	Ad hoc group (Australia, Hong Kong, China, New Zealand and Singapore) ROBEX WG	-	July 2015	To begin
Activity 3.2: States develop agreements on the exchange of MET information that provides benefits to ATM operations on sub-regional level	States ATFM/SG	-		To begin In progress
Activity 3.3: States report developments to MET/R TF and MET SG meetings	States/ MET/R TF	3.2		To begin
Milestone 3: Develop sub-regional exchange of MET information to facilitate ATM operations in busy routes				To begin
Activity 4: Developing regional implementation plan for Meteorological Services for the Terminal Area				
Activity 4.1: Monitor developments of Meteorological Services for the Terminal Area	MET/R TF	-	Annual	In progress
Activity 4.2: Monitor Annex 3relevant ICAO provisions developments	MET/R TF	4.1		future
Activity 4.3: Develop regional implementation plan for Meteorological Services for the Terminal Area	MET/R TF	4.2		future
Activity 4.4: Monitor regional implementation of Meteorological Services for the Terminal Area	MET/R TF	4.3		future
Activity 4.5: Report implementation progress to MET SG	MET/R TF	4.4		future
Milestone 4: Develop regional implementation plan for Meteorological Services for the Terminal Area				future
Activity 5: Implementing global policies associated with source data and delivery of MET products for ATM				
Activity 5.1: Implement global policies associated with source data and delivery of MET products for ATM	MET/R TF	-		To begin
Activity 5.2: Report results to MET/R TF and MET SG meetings	MET/R TF	5.1		future
Milestone 5: Monitor global policies associated with source data and delivery of MET products for ATM				

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ICAO APAC METEOROLOGICAL HAZARDS TASK FORCE (MET/H TF) WORKPLAN

(Updated August 2014)

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2.DESCRIPTION	
Objective	Improve the quality of meteorological advisories and warnings and implement the International Airways Volcano Watch (IAVW) and International Tropical Cyclone Watch (ITCW) in support of the Global Air Navigation Plan framework and the aviation system block upgrade (ASBUs) methodology.
Benefits	• Improve in-flight safety by providing information on volcanic ash, tropical cyclone and other hazardous weather. • Improve pre-flight planning by optimizing flight routes with respect to volcanic ash, tropical cyclone and other hazardous weather phenomena.
Terms of Reference	Under guidance from ICAO Secretariat: • Maintain awareness of current and future requirements with respect to the issuance of meteorological advisories and warnings in support of the aviation system block upgrades (ASBUs); • Maintain awareness of the implementation of meteorological advisories and warnings within the ASIA/PAC Region and any deficiencies; • Continually seek ways to improve the operational effectiveness of the meteorological advisory and warning system; and • Provide advice to the MET Sub-group on the above issues.
Work Program	The work to be addressed by the ASIA/PAC MET/H TF includes: • Review procedures for the issuance of meteorological advisories and warnings in the region and propose actions for their improvement to related performance objectives; • In conjunction with ROBEX WG, investigate the deficiencies in the format and dissemination of meteorological advisories and warnings and propose remediation plans; • Respond to the needs of the States for guidance and/or training related to the implementation of meteorological advisories and warnings and inform ROBEX WG of changes required to the SIGMET guide; • In conjunction with MET/R TF and in support of the ASBUs, provide meteorological input for operational planning for specific phenomenon including Volcanic Ash, Radioactive Cloud, Tropical Cyclone, Tsunami and Space Weather; • Follow the developments in the States related to the improvement of meteorological advisories and warnings and provide regional input on these matters to relevant ICAO and WMO groups and to gather user requirements from ANSPs, IATA, IFATCA and IFALPA; • Investigate options for removal of SIGMET deficiencies in APAC States; • Provide support for the APAC Volcanic Ash Exercises; • Report on its work to the MET Sub-group of APANPIRG; and • Maintain a link to the Regional ATM Contingency Plan Task Force (RACP/TF).

3. COMMUNICATION STRATEGIES				
Description	**Target Audience**	**Delivery Method**	**Frequency/ Date**	**Responsibility**
Work Plan	Task Force Members	Document via email and posted on ICAO Bangkok website	As required but reviewed at least quarterly	Chair
General correspondence	Task Force Members	Email	As required	Task Force Members
Task Force Meeting	Task Team Members	Meeting in conjunction with ROBEX WG	Yearly in March	Chair
Status& Milestone Reports	ICAO Secretariat and Task Team Members	Report via email	Quarterly	Chair

Task Force Report	MET/H TF and ROBEX WG	Working Paper	Yearly	Chair
Task Force Report	MET SG	Working Paper	Yearly	Secretariat

4. PERFORMANCE FRAMEWORK FORM (PFF)				
Tasks	**Time Frame**	**Responsibility**	**Status**	**Milestone**
Task 1: Monitor and provide assistance to the regional implementation of meteorological warnings and advisories that include volcanic ash (VA) and tropical cyclone (TC) advisories and meteorological warnings and advisories based on current and future requirements	2014-2019	MET/H TF	In progress	1
Task 2: Track and investigate deficiencies in the format and dissemination of meteorological advisories and warnings and propose remediation plans and provide information to ICAO and WMO groups for possible assistance	2014-2018	MET/H TF and ROBEX WG	In progress	1,2
Task 3: Review WC, WV & WS SIGMET test results and implement improvements.	2014-2018	MET/H TF	In progress	1
Task 4: Provide guidance and/or training related to the implementation of meteorological advisories and warnings, including input to the Regional SIGMET Guide as they relate to the Annex 3 amendment cycle.	2014, 2016	R/O, MET/H TF and ROBEX WG	In progress	1,3
Task 5: Provide input into regional-operational plans as required for specific phenomenon, including VA, radioactive cloud, TC, Tsunami and Space Weather, with consideration to global ICAO groups and WMO developments.	2014-2018	MET/H TF and MET/R TF	In progress	3
Task 6: Investigate, and implement as appropriate, options to assist States in resolving SIGMET deficiencies.	2014-2016	MET/H TF		

5. MILESTONES			
Milestone	**Accountability**	**Dates**	**Status**
Milestone 1: Report on SIGMET test results and regional performance-MET SG	*Chair*	*Annually*	
Milestone 2: Guidance and educational material available	*Chair*	*Mar 2015*	
Milestone 3: MET input provided for ASIA/PAC Regional ATM Contingency Plans	*ad-hoc group*	*Next meeting*	
Milestone 4: Reduction in SIGMET deficiencies.	*States*	*2015*	

6. WORK PLAN				
Task / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 1: SIGMET TESTS				
Task 1.1: Review SIGMET tests (conjoint session with ROBEX WG)	Chair	-	Annually	
Task 1.2: Develop action plan to fix identified deficiencies	Chair in conjunction with the Task Force	conjoint session with ROBEX WG	During meeting	
Task 1.3 Report back to MET SG on regional performance and action plan	Chair		Annually	
Milestone 1: Report on SIGMET test results and regional performance to MET SG	Chair	-	*Annually*	
Activity 2: GUIDANCE AND EDUCATIONAL MATERIAL				
Task 2.1: a) Review current SIGMET poster information b) Publish information in pamphlet form c) Review with future Annex 3 amendments	Australia, Hong Kong, China and New Zealand (Rapporteur) in conjunction with ICAO HQ and WMO	-	a) Sep 2014 b) Dec 2014 c) following Annex 3 amendments	
Task 2.2: Review radioactive cloud survey results and develop guidance for inclusion in the SIGMET Guide	China (Rapporteur), Hong Kong, China, Japan	-	Next meeting	
Task 2.3: Review tsunami survey results and develop guidance in line with proposal for Amendment 77 to Annex 3	Japan (rapporteur), Indonesia		Next meeting	
Task 2.4: Propose amendments to the SIGMET Guide template to ICAO HQ in co-ordination with EUR R/O	Australia (rapporteur), Hong Kong, China, Japan, New Zealand		Nov 2014	
Task 2.5: Consider the requirement for seminars/workshops	Task Force		Next meeting	
Milestone 2: Guidance and educational material available	Chair		*Next Meeting*	
Activity 3: REGIONAL CONTINGENCY PLANS				
Task 3.1: Get a list of requirements from RACP/TF	Secretariat	-	TBD	
Task 3.2: Provide information on hazardous meteorological phenomena to ATM group for inclusion in the ATM contingency plan, if required	ad-hoc group	-	Next meeting	
Milestone 3:MET input provided for ASIA/PAC Regional ATM Contingency Plans	*ad-hoc group*	*3.1-3.2*	*Next meeting*	
Activity 4 – SIGMET Deficiencies				
Task 4.1: Investigation options to eliminate SIGMET deficiencies.	ad hoc group New Zealand		Oct 2014	

6. WORK PLAN				
Task / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
	(rapporteur), Australia, New Zealand, China, Japan, Indonesia			
Task 4.2: Assist the ICAO Secretariat in the facilitation of discussion of viable options with relevant States.	ad hoc group	4.1	2015	
Task 4.3: Monitor the implementation of the solution/s to remove deficiencies.	ad hoc group	4.2	Ongoing	
Task 4.4: Monitor global development on the establishment of a regional advisory system for hazardous weather.	ad hoc group		Ongoing	
Task 4.5: Report progress to MET SG	Ad hoc group rapporteur	4.3	May 2015	
Milestone 4: Reduction in SIGMET deficiencies.	*States*		*2015*	

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ICAO APAC REGIONAL OPMET BULLETIN EXCHANGE WORKING GROUP (ROBEX WG)

1. COMPOSITION

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

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2. DESCRIPTION		
Objective	Increase OPMET availability and reliability needed for flight planning (efficiency) and in-flight re-planning (safety) in support of the Global Air Navigation Plan framework and the aviation system block upgrade (ASBUs) methodology.	
Benefits	Increase in safety and efficiency (time and fuel savings).	
Terms of Reference	Under guidance from the ICAO Secretariat: - Review the OPMET exchange schemes in the APAC, MID and neighbouring Regions and develop proposals for their optimization, taking into account the requirements by the aviation users and the current trends for global OPMET exchange; - Develop standardized quality control, monitoring and management procedures	

Members	Address	Contact
	related to ROBEX and other exchange schemes for OPMET information; - Review the regional guidance material related to OPMET exchange; - Liaise with other groups dealing with communication and/or management aspects of the OPMET exchange in APAC, other ICAO Regions and the WAFS Provider States.	
Work Programme	The work to be addressed by the ROBEX WG includes: - Examine new and existing requirements for OPMET exchange in APAC, MID and other neighbouring regions along with the WAFS Provider States and assess the feasibility of satisfying these requirements, taking into account the availability of the data; - Keep the ROBEX scheme and other OPMET exchange schemes under review and prepare proposals for updating and optimizing the schemes; - Review and update of the procedures for inter-regional OPMET exchange and ensure the availability of the required APAC and MID OPMET data for SADIS and WIFS; - Review the regional guidance material on OPMET exchange to ensure procedures are provided for the exchange of all required OPMET data types: SA, SP, FT, WS, WC, WV, FK, FV and UA; - Conduct trials and develop procedures for quality control, monitoring and management of the OPMET exchange to foster implementation of quality management of OPMET data by the ROBEX centres and the RODBs; - Report on deficiencies in the format and dissemination of OPMET messages; - Participate in the testing, implementation and awareness of the transition to digital exchange of OPMET using a code form based on XML/GML; - Conduct regular regional VAAC back-up and SIGMET tests; - Provide support for the APAC Volcanic Ash Exercises; - Develop quality control guidance material and promote implementation of quality control for OPMET management.	

3. COMMUNICATION STRATEGIES				
Description	**Target Audience**	**Delivery Method**	**Frequency / Date**	**Responsibility**
Work Plan	ROBEX WG Members	Document via email & ROBEX WG Meeting	As required but reviewed at the ROBEX WG Meeting and the MET SG	Chair
General correspondence	ROBEX WG Members	Email	As required	ROBEX WG Members
Task Force Meeting	ROBEX WG Members	Meeting	Annually	Chair
Status & Milestone Reports	ICAO Secretariat and ROBEX WG Members	Report via email & WP at ROBEX WG Meeting	Annually	Chair
Task Force Report	All APAC States	Working Paper at MET SG	Annually	Chair

4. PERFORMANCE FRAMEWORK FORM (PFF)				
Tasks	**Time Frame**	**Responsibility**	**Status**	**Milestone**
Task 1: Improve the availability of OPMET data	Ongoing	ROBEX WG		1

Task 2: Improve timeliness, compliance and regularity of OPMET exchange	Ongoing	ROBEX WG		2
Task 3: Identify gaps in processes, procedures and OPMET exchange	Ongoing	ROBEX WG		3, 4, 5
Task 4: Review regional guidance material related to OPMET data	Ongoing	ROBEX WG		3, 4, 5, 6
Task 5: Facilitate and monitor the migration to AIM and new MET codes (e.g. XML)	2013-2016	ROBEX WG		7
Task 6: Review the RODB structure	TBC	ROBEX WG		8

5. MILESTONES			
Milestone	**Accountability**	**Dates**	**Status**
Milestone 1: Achieve 95% (90%) or greater OPMET availability for AOP (non-AOP) aerodromes at RODBs and WAFCs.	ROBEX WG	Annually Jun	
Milestone 2: Achieve OPMET timeliness, compliance and regularity index of 0.95 (0.90) for AOP (non-AOP) aerodromes at RODBs and WAFCs.	ROBEX WG	Annually Jun	
Milestone 3: Improved issuance and compliance of test SIGMETs Tests.	ROBEX WG	Annually Jun	
Milestone 4: VAAC Back-up Tests conducted, analysed and report complete.	VAAC Back-up Focal Points	Annually Jun	
Milestone 5: IROG Back-up Tests conducted, analysed and report complete.	Bangkok RODB	Annually Mar	
Milestone 6: RODB Monitoring procedures updated in ROBEX Handbook	Secretariat	Jun 2014	
Milestone 7: Report to ROBEX WG & MET SG on digital OPMET exchange (i.e. XML) & testing.	Secretariat & Chair	Annually Mar & May	
Milestone 8: RODB structure review complete.	ROBEX WG	TBC	

6. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 1: Increasing OPMET availability at RODBs & WAFCs (95 and 90% for AOP and non-AOP aerodromes)				
Activity 1.1: Assist Nadi RODB in conducting OPMET availability testing	Brisbane RODB	-	Nov 2014	
Activity 1.2: Perform real time monitoring if required	RODBs & IATA	-	If required	

6. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 1.3: Monitor RODB OPMET reception in Jan and use Dec as PI threshold.	RODBs	-	Annually Dec/Jan	
Activity 1.4: Monitor SADIS/WIFS OPMET reception.	IATA	-	Annually Jan	
Activity 1.5: Score against FASID Table MET 1A and 2A.	Singapore, Tokyo, Bangkok RODBs & IATA	1.3 & 1.4	Annually Feb	
Activity 1.6: Report results and deficiencies to ROBEX WG meeting.	Bangkok RODB & IATA	1.5	Annually Mar	
Activity 1.7: Report summary of OPMET availability results to MET SG	Secretariat & Chair	1.6	Annually May	
Activity 1.8: Advise States of OPMET deficiencies.	Secretariat	1.7	Annually Jun	
Activity 1.9: Provide support for States to rectify deficiencies if requested.	RODBs	1.8	As required	
Activity 1.10: Develop a common dataset and assess the consistency between RODBs of the 'availability' calculation and standardise.	Singapore, Tokyo, Bangkok RODBs	-	Jul 2014	
Milestone 1: Achieve 95% (90%) or greater OPMET availability for AOP (non-AOP) aerodromes at RODBs & WAFCs.	ROBEX WG	1.9	Annually Jun	
Activity 2: Improving OPMET timeliness, compliance and regularity				
Activity 2.1: Assist Nadi RODB to collect the data for conducting OPMET testing	Brisbane RODB	-	Nov 2014	
Activity 2.2: Monitor OPMET timeliness, compliance and regularity in Jan and use Dec as PI threshold.	RODBs & IATA	-	Annually Dec/Jan	
Activity 2.3: Collate and analyse data	Singapore, Tokyo, Bangkok RODBs & IATA	2.2	Annually Feb	
Activity 2.4: Report State irregularities to ROBEX WG meeting	Bangkok RODB & IATA	2.3	Annually Mar	
Activity 2.5: Report summary of OPMET timeliness, compliance and regularity results to METSG	Chair	2.4	Annually May	
Activity 2.6: Inform States of compliance	Secretariat	2.5	Annually Jun	

6. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 2.7: Provide support for States to rectify deficiencies if requested.	RODBs	2.6	As required	
Activity 2.8: Develop a common METAR dataset and assess the consistency between RODBs of the 'compliance' and 'regularity' calculation and standardise.	Singapore, Tokyo, Bangkok RODBs	-	Sep 2014	
Activity 2.9: Correct identified issues relating to inconsistencies identified.	Singapore, Tokyo, Bangkok RODBs	2.8	Nov 2014	
Milestone 2: Achieve 95% (90%) or greater OPMET timeliness, compliance and regularity for AOP (non-AOP) aerodromes at RODBs & WAFCs.	ROBEX WG	2.9	Annually Jun	
Activity 3: SIGMET Tests				
Activity 3.1: Review SIGMET Test procedures	ROBEX WG	-	Annually Aug	
Activity 3.2: State Letter regarding SIGMET Tests	Secretariat	3.1	Annually Sep	
Activity 3.3: Conduct WC SIGMET Tests	RODBs	3.2	Annually 1st Wed in Nov	To be conducted on 5 Nov 2014
Activity 3.4: Conduct WV SIGMET Tests	RODBs	3.2	Annually 2nd Wed in Nov	To be conducted on 12 Nov 2014
Activity 3.5: Conduct WS SIGMET Tests	RODBs	3.2	Annually 3rd Wed in Nov	To be conducted on 19 Nov 2014
Activity 3.6: Collate and analyse test data	RODBs	3.3 - 3.5	Annually Jan	
Activity 3.7: Report to ROBEX WG	SIGMET Focal Points	3.6	Annually Mar	
Activity 3.8: Report on SIGMET Test Results to MET SG.	Chair	3.7	Annually May	
Activity 3.9: Advise States of SIGMET deficiencies	Secretariat	3.8	Annually Jun	
Milestone 3: Improved issuance and compliance of test SIGMETs	ROBEX WG	3.9	Annually Jun	
Activity 4: VAAC Back-up Tests				

6. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 4.1: Review VAAC Back-up Test procedures	ROBEX WG and VAACs		May 2014 and then annually Jan	
Activity 4.2: Update VAAC Back-up Procedures	Secretariat	4.1	Annually May	
Activity 4.3: State Letter regarding VAAC Back-up Tests	Secretariat	4.1	Annually Aug	
Activity 4.4: Conduct VAAC Back-up Test between Darwin and Tokyo	VAACs	4.3	Annually Oct – TBC	
Activity 4.5: Conduct VAAC Back-up Test between Darwin and Wellington	VAACs	4.3	Annually Oct – TBC	
Activity 4.6: Collect test results and send to VAAC Provider State members	RODBs	4.4	Annually Oct – TBC	
Activity 4.7: Analyse Test results	VAAC Back-up Focal Points Members	4.5	Annually Nov	
Activity 4.8: Report to ROBEX WG	VAAC Back-up Focal Points Members	4.6	Annually Feb	
Activity 4.9: Report to MET SG.	Chair	4.8	Annually May	
Activity 4.10: Advise relevant States, VAACs and RODBs of any deficiencies.	Secretariat	4.7	Annually Jun	
Milestone 4: VAAC Back-up Tests conducted, analysed and report complete.	VAAC Back-up Focal Points Members	4.8	Annually Jun	
Activity 5: IROG Back-up Tests				
Activity 5.1: Investigate back-up arrangements of IROG Tokyo & Brisbane	Secretariat	-	Oct 2014	
Activity 5.2: Review IROG Back-up Test procedures to include all IROG.	All IROGs	-	Annually Feb	
Activity 5.3: Updated IROG Back-up Procedures in ROBEX Handbook.	Secretariat	5.2	Annually May	

6. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 5.4: Identify list of MET Bulletins to monitor.	All IROGs	-	Annually Jan/Feb	
Activity 5.5: Conduct IROG Back-up Tests	All IROGs	5.4	Annually Jan/Feb	
Activity 5.6: Collect & analyse test results	All IROGs	5.5	Annually Feb	
Activity 5.7: Report to ROBEX WG	Bangkok RODB	5.6	Annually Mar	
Milestone 5: IROG Back-up Tests conducted, analysed and report complete.	Bangkok RODB	5.7	Annually Mar	
Activity 6: APAC RODB Monitoring procedures				
Activity 6.1: Letter to ROBEX Centres requesting confirmation that ROBEX Handbook Appendix A, B & C has the correct information regarding the Bulletins. Also ask for Hours of Operation and Issue Times of METAR and TAF.	Secretariat	-	Annually May	
Activity 6.2: Review ROBEX Handbook Appendix A & B table structure to include columns for Hours of Operation and Issue Times.	Chair	6.1	Annually Jul	
Activity 6.3: Review monitoring procedure in ROBEX Handbook.	All RODBs	-	Annually Aug	
Activity 6.4: RODBs to indicate differences in procedures and resolve these differences.	All RODBs	6.3	Annually Aug	
Activity 6.5: Any changes to RODB monitoring procedures and updates to Appendix A, B and C in ROBEX Handbook.	Secretariat	6.2 & 6.4	Annually Sep	
Milestone 6: RODB Monitoring procedures updated in ROBEX Handbook	Secretariat	6.5	Annually Sep	
Activity 7: New OPMET Exchange Formats				
Activity 7.1: Monitor migration to AIM and new OPMET codes (i.e. XML/GML).	Secretariat	-	As required	
Activity 7.2: Review documentation relating to the XML schema. Feedback through Secretariat.	RODBs		May 2014	

6. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 7.3: Report to MET SG on plans for implementation of XML schema at APAC RODBs.	Secretariat		Next meeting MET SG	
Activity 7.4: Conduct a trial of the new XML schema developed by WMO TT-AvXML.	Singapore RODB	-	Oct 2014	
Activity 7.5: Consider options and strategies to deal with digital data exchange of OPMET data in its area of responsibility, including non-compliance of OPMET products with requirements of WMO TT-AvXML schema.	RODBs		Feb 2015	
Activity 7.6: Increase awareness of the requirement of digital exchange of OPMET data and the impact.	RODBs & Secretariat		As required	
Activity 7.7: Report on the status of the testing and implementation of digital OPMET exchange.	RODBs		Annually Mar	
Activity 7.8: Report to ROBEX WG regarding testing and implementation of digital OPMET exchange in APAC.	Secretariat	7.1-7.7	Annually Mar	
Milestone 7: Report to ROBEX WG & MET SG on digital OPMET exchange (i.e. XML) & testing.	Secretariat	7.8	Annually May	
Activity 8: Review RODB Structure				
Activity 8.1: Review optimum inter-regional exchange of APAC OPMET data. In particular consolidate data sent to AFI from either Bangkok or Brisbane.	Bangkok & Brisbane RODBs	-	Dec 2014	
Activity 8.2: Implement optimum inter-regional exchange to AFI	Bangkok or Brisbane RODBs		Jan 2015	
Activity 8.3: Review ROBEX Scheme diagram vs Table in 11.1 of ROBEX Handbook.	All RODBs	8.2	Oct 2014 May 2015	
Activity 8.4: Review AFTN network diagram and add an AMHS diagram in the ROBEX Handbook.	Secretariat	-	Oct 2014	

6. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 8.5: Review RODB structure taking into account: o Capability; o Message structure (XML) readiness; o Delivery methods (internet, AMHS); o New Products (i.e. ATM requirements).	ROBEX WG	-	2017	
Milestone 8: RODB structure review complete.	ROBEX WG	-	2017	

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1. AIR NAVIGATION REPORT FORM (ANRF)

APAC Regional planning for ASBU Modules

2. REGIONAL PERFORMANCE OBJECTIVE – ASBU B0-AMET: Meteorological Information Supporting Enhanced Operational Efficiency and Safety Performance Improvement Area 2: Globally Interoperable Systems and Data					
3. ASBU B0-AMET: Impact on Main Key Performance Areas					
	Access & Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	Y	Y	Y	Y	Y

4. ASBU B0-AMET: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and implementation progress (Ground and Air)**
1. WAFS	Systems implemented to receive WAFS information and to make 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. IAVW	Implementation of VAACs to support IAVW. Agreements in place between Volcano Observatories and VAACs.
3. Tropical cyclone watch	Implementation of TCACs to support tropical cyclone watch.
4. Aerodrome warnings	Aerodromes identified that require Aerodrome Warnings.
5. Wind shear warnings and alerts	Aerodromes identified that require wind shear warnings and/or alerts.
6. OPMET	OPMET data available as per the requirements in the Regional Air Navigation Plan.

7. ASBU B0-AMET: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. WAFS	WAFS data reception system, either via satellite or internet	Nil	Operations manuals. Contingency plans.	N/A
2. IAVW	AFTN/AMHS AFS	Nil	Operations manuals. Contingency plans.	N/A
3. Tropical cyclone watch	AFTN/AMHS AFS	Nil	Operations manuals. Contingency plans.	N/A
4. Aerodrome warnings	AFTN/AMHS AFS	Nil	Operations manuals. Contingency plans.	N/A
5. Wind shear warnings and alerts	AFTN/AMHS AFS ATIS Local networks	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**
6. OPMET	AFTN/AMHS AFS	Nil	Operations manuals. Contingency plans.	N/A

8. ASBU B0-AMET Performance Monitoring and Measurement 8A. ASBU B0-AMET: Implementation Monitoring	
Elements	**Performance Indicators/Supporting Metrics**
1. WAFS	% of required States receiving WAFS and making this available to users.
2. IAVW	% of designated VAACs implemented. % of designated volcano observatories implemented.
3. Tropical cyclone watch	% of designated TCACs implemented.
4. Aerodrome warnings	% of the required aerodromes providing Aerodrome Warnings.
5. Wind shear warnings and alerts	% of the required aerodromes providing Wind Shear Warnings and/or Alerts.
6. OPMET	% availability, reliability and compliance of METAR/SPECI and TAF. Number of FIRs covered by SIGMET.

8. ASBU B0-AMET. Performance Monitoring and Measurement 8 B. 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.

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TEMPLATE APPROVED BY THE COUNCIL
on 18 June 2014

(*NAME*) AIR NAVIGATION PLAN

VOLUME I

(*NAME*) AIR NAVIGATION PLAN

VOLUME I

TABLE OF CONTENTS

(*NAME*) ANP, VOLUME I
PART 0 – INTRODUCTION

1. GENERAL

1.1 On ***18 June 2014***, the ICAO Council decided that the regional air navigation plans (ANPs) should be published in three volumes.

1.2 ANP Volume I contains stable plan elements whose amendment necessitates approval by the Council such as the assignment of responsibilities to States for the provision of aerodrome and air navigation facilities and services in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300); and the current to medium term mandatory regional requirements related to aerodrome and air navigation facilities and services to be implemented by States in accordance with regional air navigation agreements and requirements specific to the region which are not covered in the ICAO Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS). The material to be included in Volume I should minimise the requirement for frequent amendment. The following is a non-exhaustive list of such elements:

- Flight Information Regions (FIR) boundaries (Table and Charts);
- Search and Rescue Regions (SRR) boundaries (Table and Charts);
- Volcanic Ash Advisory Centres (VAAC);
- Tropical Cyclone Advisory Centres (TCAC); and
- Volcano Observatories (VO).

1.3 ANP Volume II contains dynamic plan elements material related to the assignment of responsibilities to States for the provision of aerodrome and air navigation facilities and services and the current to medium term mandatory regional requirements related to aerodrome and air navigation facilities and services to be implemented by States in accordance with regional air navigation agreements involving the relevant PIRG. The amendment of these elements does not require approval by the Council. The following is a non-exhaustive list of such elements:

- Major traffic flows;
- ATS route network;
- Meteorological Watch Offices (MWO);
- Secondary Surveillance Radar (SSR) codes;
- Five-letter name-codes; and
- VOLMET Broadcasts.

1.4 ANP Volume III contains dynamic/flexible plan elements providing implementation planning guidance for air navigation systems and their modernization taking into consideration emerging programmes such as the ICAO Aviation System Block Upgrades (ASBUs) and associated technology roadmaps described in the *Global Air Navigation Plan* (GANP) (Doc 9750). The ANP Volume III would also include appropriate additional guidance, particularly with regard to implementation, to complement the material contained in the ANP Volumes I and II. The amendment of Volume III would not require approval by the Council (approval of Part II is under the responsibility of the relevant PIRG).

Note 1: The ANP does not list all facilities in the region(s) but only those required for international civil aviation operations. Documents from the Integrated Aeronautical Information Package and other States publications should be consulted for information on additional facilities and for operational information in general.

Note 2: The general structure of the regional plans for the parts which concern an air navigation field in Volumes I and II consists of an "Introduction", "General Regional Requirements" and "Specific Regional Requirements". Only Tables shown under "General Regional Requirements" are harmonized for all Regions. Should a Region require a Table for a specific field, this should be reflected under "Specific Regional Requirements" of the subject concerned. The naming convention for such tables

consists of the technical field concerned (AOP, CNS, ATM, MET, SAR and AIM), the ANP Volume number (I or II), the Region (APAC, AFI, CAR/SAM, EUR, MID, NAM and NAT) and the consecutive number of the table. Examples are as follows: Table ATM I-EUR-1, Table CNS II-MID-1 or Table MET I-AFI-2.

1.5 Guidance material on the detail of programmes or concepts should be contained in supplementary material referenced appropriately or adopted as (***NAME***) Documents.

2. RELATIONSHIP BETWEEN THE GLOBAL AND REGIONAL AIR NAVIGATION PLANS

2.1 The ANPs represent the bridge between, on one side, the global provisions in the ICAO SARPs and the GANP, and on the other side, the States' air navigation plans and implementation status.

2.2 The GANP represents a rolling, 15-year strategic methodology which leverages existing technologies and anticipates future developments based on State/industry-agreed operational objectives. The GANP is an overarching framework that includes key aviation policy principles to assist ICAO Regions, sub-regions and States with the preparation of their regional and State air navigation plans and to support the establishment of air navigation priorities.

3. OBJECTIVE AND PURPOSE OF REGIONAL AIR NAVIGATION PLANS

3.1 The ANPs provide for the planning and implementation of air navigation systems within a specified area, in accordance with the agreed global and regional planning framework. They are developed to meet those needs of specific areas not covered in the worldwide provisions. The development and maintenance of the ANPs is undertaken by ICAO PIRGs with the assistance of the ICAO Secretariat.

3.2 The ANPs are used as a repository Document for the assignment of responsibilities to States for the provision of air navigation facilities and services within a specified area in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300).

3.3 The ANPs contain requirements related to the facilities and services to be implemented by States in accordance with regional air navigation agreements. The procedural parts of ANPs are published in the *ICAO Regional Supplementary Procedures* (SUPPs) (Doc 7030).

3.4 The ANPs contain provisions that States can follow in the planning of aerodrome and air navigation facilities and services activities, with the assurance that facilities and services furnished in accordance with the plan will form with those of other States an integrated system adequate for the foreseeable future.

3.5 The ANPs may serve as a legal basis for air navigation services charges which are levied for services provided or made available to users, in accordance with ICAO's *Policies on Charges for Airports and Air Navigation Services* (Doc 9082) and *ICAO Manual on Air Navigation Services Economics* (Doc 9161).

3.6 The ANPs support the performance-based approach to planning adopted by ICAO to measure the efforts made by States in implementing the agreed requirements.

4. MANAGEMENT AND AMENDMENT OF REGIONAL AIR NAVIGATION PLANS

4.1 The elements of the existing planning system and the planning principles, operational requirements and planning criteria as developed for the (***NAME***) Region(s) are kept under constant review by the (***name of PIRG***) in accordance with its schedule of meetings, in consultation with provider and user States and with the assistance of the ICAO Regional Office(s) concerned.

4.2 The detailed amendment procedure of the three ANP Volumes is described in paragraph 5 below.

5. PROCEDURE FOR THE AMENDMENT OF REGIONAL AIR NAVIGATION PLANS

5.1 The procedure for the amendment of regional air navigation plans in three Volumes as approved by the Council is shown in **Appendix A**.

6. ABBREVIATIONS

6.1 The abbreviations used in this document are contained in the *Procedures for Air Navigation Services — ICAO Abbreviations and Codes (PANS-ABC)* (Doc 8400), with the exception of those used in the explanations of any tables appearing herein, which also give their meaning.

7. ESTABLISHMENT AND PROVISION OF A MULTINATIONAL ICAO AIR NAVIGATION FACILITY/SERVICE (*If applicable*)

7.1 The operation of multinational air navigation services is well established within the (***NAME***) Region(s). The ICAO *Manual on Air Navigation Services Economics* (Doc 9161) details the ICAO policies on charges for air navigation services and provides additional information on the various models adopted globally. The introduction of multinational air navigation services does not dilute the principle that a State has the responsibility of overseeing the provision of air navigation services and that it shall maintain that responsibility within its sovereign airspace as well as within the airspace over the high seas for which it has accepted the responsibility for the provision of services. Where there is no intention to change or modify the FIR boundaries nor the facilities and services currently listed in the ANP there is not a requirement to amend the ANP. However, should changes to the FIR boundaries or to the facilities and services provided be required, such changes are likely to be subject to the ANP amendment procedure and should therefore be examined on a case-by-case basis. Advice on this issue can be obtained from the ICAO Regional Office(s). Any multinational arrangements for the provision of air navigation services should be registered with ICAO (Article 83 of the Convention (Doc 7300) and *Rules for Registration with ICAO of Aeronautical Agreements and Arrangements* (Doc 6685)).

APPENDIX A - PROCEDURE FOR THE AMENDMENT OF REGIONAL AIR NAVIGATION PLANS

*(Approved by Council on **18 June 2014**)*

1. Introduction

1.1. The procedure outlined below has been evolved to provide a means of maintaining the regional air navigation plans using an ANP web based platform.

2. General criteria

2.1. The Assembly has resolved that regional plans should be revised when it becomes apparent that they are no longer consistent with current and foreseen requirements of international civil aviation and that, when the nature of a required change permits, the associated amendment of the regional plan should be undertaken by correspondence between the Organization and the States and international organizations concerned.

2.2. When a State cannot immediately implement a particular part or a specific detail of a regional plan although it intends to do so, when practicable, this in itself should not lead to the State proposing an amendment to the plan.

2.3. The general structure of the regional plans for the parts which concern an air navigation field in Volumes I and II consists of an “Introduction”, “General Regional Requirements” and “Specific Regional Requirements”. As the section “General Regional Requirements” is harmonized for all regions, an amendment of the provisions (text) in “General Regional Requirements” will lead to amendment of Volumes I and II of the regional plans of all regions.

2.4. The amendment process of Volume III is under the responsibility of the relevant Planning and Implementation Regional Group (PIRG). The Parts 0 (Introduction) and I (General Planning Aspects) of Volume III are harmonized for all regions and the amendment of these parts should be made following inter-regional coordination.

3. User rights

3.1. Access to the ANP web based platform to develop and submit amendment proposals to the regional plan and to comment on an officially issued amendment proposal should be provided through controlled access by the State’s or international organization’s designated Focal Points. The State or international organization should officially inform their respective Regional Office of the registration of their designated Focal Points.

4. States and international organizations to be consulted

4.1. The Secretary General, through the relevant Regional Office, will determine the States and international organizations to be consulted on the amendment proposal. These will generally only include the provider and user States and international organizations that have a direct and obvious interest in the amendment in question.

PART A — AIR NAVIGATION PLANS, VOLUME I

5. Procedure for amendment of Volume I

5.1. If, in the light of the above general criteria, any State (or group of States) of a region wishes to effect a change in the approved air navigation plan for that region, it should propose to the Secretary General, through the Regional Office accredited to that State, an appropriate amendment to the plan, adequately documented; the proposal should include the facts that lead the State (or group of States) to the conclusion that the amendment is necessary. Such amendments may include additions, modifications or deletions. (This procedure does not preclude a State having previous consultation with other States before submitting an amendment proposal to the Regional Office.) This proposed amendment should be submitted via the web based tool and/or by correspondence to the Regional Office.

5.2. Upon studying the proposal, if the Secretary General considers that the proposed amendment requires further coordination through the relevant Planning and Implementation Regional Group (PIRG), the proposal will be presented, adequately documented, to the PIRG. The views of the PIRG will be coordinated with the originating State and the proposed amendment will be uploaded via the ANP web based platform for processing proposals for amendment for approval by the Council.

5.3. If the proposal concerns an amendment of the provisions (text) in "General Regional Requirements", the Secretary General will coordinate and circulate, through all Regional Offices, an amendment of all the regional plans.

5.4. If the Secretary General considers that the proposed amendment conflicts with established ICAO policy, or that it raises questions which the Secretary General considers should be brought to the attention of the Air Navigation Commission, the proposal will be presented, adequately documented, to the Commission. In such cases, the Commission will decide the action to be taken on the proposal.

5.5. The Secretary General, through the Regional Office, will circulate the proposal, adequately documented, with a request for comments to all provider and user States of the region considered affected as well as to user States outside the region and international organizations which may be invited to attend suitable ICAO meetings and which may be concerned with the proposal. The States and international organizations concerned should either send their comments/agreement/objection via the ANP web based platform and/or by correspondence to the Regional Office. Any comment or objection should be adequately supported by reasons for the comment or objection.

5.6. If, in reply to the Secretary General's inquiry, no objection is raised to the proposal by a specified date, the proposal should be submitted to the President of the Council, who is authorized to approve the amendment on behalf of the Council. The approved amendment should be incorporated into Volume I of the regional plan.

5.7. If, in reply to the Secretary General's inquiry, any objection is raised, and if objection remains after further consultation, the matter will be documented for discussion by the respective planning and implementation regional group (PIRG) and, ultimately for formal consideration by the Air Navigation Commission, if it remains unresolved. If the Commission concludes that the amendment is acceptable in its original or other form, it will present appropriate recommendations to the Council.

5.8. Proposals for the amendment of Volume I of the regional plan submitted by international organizations directly concerned with the operation of aircraft, which may be invited to attend suitable ICAO meetings and which attended the meeting(s) where the relevant regional plan is managed, will be dealt with in the same manner as those received from States, except that, before circulating a proposal to States and selected international organizations, the Secretary General will ascertain whether it has adequate support from the State or States whose facilities will be affected. If such support is not forthcoming, the proposal will be presented to the Commission, and the Commission will decide on the action to be taken on the proposal.

5.9. Proposals for the amendment of Volume I of the regional plan may also be initiated by the Secretary General, through the Regional Office accredited to that State, provided that the State or States whose facilities will be affected have expressed their concurrence with the proposal.

5.10. Amendments to Volume I of the regional plan which have been approved in accordance with the above procedure will be published in the ANP web based platform at convenient intervals.

PART B — AIR NAVIGATION PLANS, VOLUME II

6. Procedure for amendment of Volume II

6.1. Amendments of Volume II of the regional plan should be effected on the basis of an adequately documented proposal submitted by a State (or a group of States) or the relevant PIRG to the Secretary General, through the Regional Office accredited to that State. The proposal should include the facts that lead to the conclusion that the amendment is necessary. Such amendments may include additions, modifications or deletions to Volume II of the regional plan. (This procedure does not preclude a State having previous consultation with other States before submitting an amendment proposal to the Regional Office.) This proposed amendment should be submitted via the ANP web based platform and/or by correspondence to the Regional Office.

6.2. If the proposal concerns an amendment of the provisions (text) in "General Regional Requirements", the Secretary General will coordinate and circulate, through all Regional Offices, an amendment of all the regional plans.

6.3. The ICAO Regional Office will circulate the proposal, adequately documented, with a request for comments to all provider and user States of the region considered affected as well as to user States outside the region and international organizations which may be invited to attend suitable ICAO meetings and which may be concerned with the proposal. The States and international organizations concerned should either send their comments/agreement/objection via the ANP web based platform and/or by correspondence to the Regional Office. Any comment or objection should be adequately supported by reasons for the comment or objection.

6.4. If, in reply to the ICAO Regional Office's inquiry, no objection is raised to the proposal by a specified date, it will be deemed that a regional agreement (involving the relevant PIRG) on the subject has been reached and the proposed amendment should be incorporated into Volume II of the regional plan.

6.5. If, in reply to the ICAO Regional Office's inquiry, any objection is raised, and if objection remains after further consultation, the matter will be documented for discussion by the respective planning and implementation regional group (PIRG) and, ultimately for formal consideration by the Air Navigation Commission, if it remains unresolved. If the Commission concludes that the amendment is acceptable in its original or other form, it will present appropriate recommendations to the Council.

6.6. Proposals for the amendment of Volume II of the regional plan submitted by international organizations directly concerned with the operation of aircraft, which may be invited to attend suitable ICAO meetings, where the relevant regional plan is managed, will be dealt with in the same manner as those received from States, except that, before circulating a proposal to States and selected international organizations, the Secretary General will ascertain whether the proposal has adequate support from the State or States whose facilities or services will be affected. If such support is not forthcoming, the proposal will not be pursued.

6.7. Proposals for the amendment of Volume II of the regional plan may also be initiated by the Secretary General, through the Regional Office accredited to that State, provided that the State or States whose facilities or services will be affected have expressed their concurrence with the proposal.

6.8. Amendments to Volume II of the regional plan which have been approved in accordance with the above procedure will be published in the ANP web based platform at convenient intervals.

PART C — AIR NAVIGATION PLANS, VOLUME III

7. Procedure for amendment of Volume III

7.1. Amendments of Volume III of the regional plan are under the responsibility of the relevant Planning and Implementation Regional Group (PIRG) and not subject to a formal application of the procedure for amendment of the ANP described in Parts A and B above. However, the amendment of the provisions of Part 0 - "Introduction" and Part I - "General Planning Aspects" needs special coordination, as specified in 7.4 below. Since these two Parts are harmonized for all regions, an amendment of the provisions contained there-in will lead to amendment of Parts 0 and I of Volume III of the regional plans of all regions.

7.2. Amendments of Volume III of the regional plan should be effected on the basis of an adequately documented proposal submitted to the ICAO Regional Office concerned by:

- a State (or a group of States); or
- the relevant Planning and Implementation Regional Group (PIRG) of the region(s); or
- the ICAO Secretariat; or
- international organisations directly concerned with the operation of aircraft, which may be invited to attend suitable ICAO meetings and/or which attended the meeting(s) where the relevant Volume III amendments were agreed.

7.3. This procedure does not preclude a State (or group of States) having previous consultation with other States before submitting an amendment proposal to the Regional Office. Such amendments may include additions, modifications or deletions to Volume III of the regional plan. In addition, the facts that led to the conclusion that the amendment should be included.

7.4. If the proposal concerns an amendment of the provisions in Part 0 - "Introduction" or Part I - "General Planning Aspects", the ICAO Regional Office concerned will submit the proposal to ICAO Headquarters (Air Navigation Bureau) for coordination with all ICAO Regional Offices. The views of the ICAO Regional Offices will be taken into consideration in the consolidation/approval of the amendment by the ANB. The approved amendment will be published in Volume III of all regional plans at convenient intervals.

7.5. The mechanism for the amendment of Part II of Volume III of the regional plan should be developed, agreed by the relevant PIRG and reflected in the corresponding PIRG Handbook.

(*NAME*) ANP, VOLUME I

PART I – GENERAL PLANNING ASPECTS (GEN)

1. GEOGRAPHICAL SCOPE

1.1 The (*NAME*) ANP is related to the ICAO (*NAME*) air navigation region(s). The ANP may call for the provision of basic facilities and services beyond the charted boundaries of a region where such facilities and services are necessary to meet the requirements of international air navigation within that region.

1.2 A number of States within the ICAO (*NAME*) Region(s) are members of one or more sub-regional groupings which have development plans to improve air navigation services; such plans contribute to the regional implementation of the ICAO *Global Air Navigation Plan* (GANP) (Doc 9750). Regional subgroups include the:

- ***(include appropriate regional subgroups names if applicable)***
- ***Note: Diagram or list of regional sub groupings to be inserted in the Volume II or database. (If applicable)***

2. FLIGHT INFORMATION REGIONS

2.1 **Table GEN I-1** shows the current Flight Information Regions (FIR)/Upper Information Regions (UIR) which are part of the ICAO (*NAME*) Region(s). More details of the FIRs and UIRs within the (*NAME*) air navigation region(s) are contained in **Table ATM I-1** and **Charts ATM I-1** and **ATM I-2**.

3. STATES' RESPONSIBILITIES

3.1 Each Contracting State is responsible for the provision of facilities and services in its territory under Article 28 of the Convention as well as within the airspace over the high seas for which it has accepted the responsibility for the provision of services. The Council has recommended that these facilities and services include those specified in the ANPs.

3.2 The inclusion of the basic facilities and services provided by non-Contracting States and territories in regional ANPs is simply recognition that they are needed by or likely to affect international civil aircraft operations of Contracting States or the facilities and services of these States.

Note. — Non-Contracting States in the (NAME) region are: **(include names as applicable)**

4. (*NAME*) REGIONAL PLANNING

4.1 The regional planning and implementation process is the principal engine of ICAO's planning framework. It is here that the top-down approach comprising global guidance and regional harmonization measures converges with the bottom-up approach constituted by national planning by States.

4.2 PERFORMANCE BASED APPROACH

4.2.1 Global Approach

4.2.1.1 In an effort to assist planners in weighing outcomes and making appropriate decisions, the *Manual on Global Performance of the Air Navigation System* (Doc 9883) has been developed. In this respect ICAO has defined 11 Key Performance Areas (KPA), one for each of the *Global ATM Operational Concept* (Doc 9854) expectations outlined below.

4.2.1.2 These general expectations are relative to the effective operation of the ATM system. The ICAO planning objective is to achieve a performance based global air traffic management (ATM) system through the implementation of air navigation systems and procedures in a safe, progressive, cost-effective and cooperative manner.

5. RELATIONSHIP BETWEEN GLOBAL, REGIONAL AND NATIONAL PLANNING

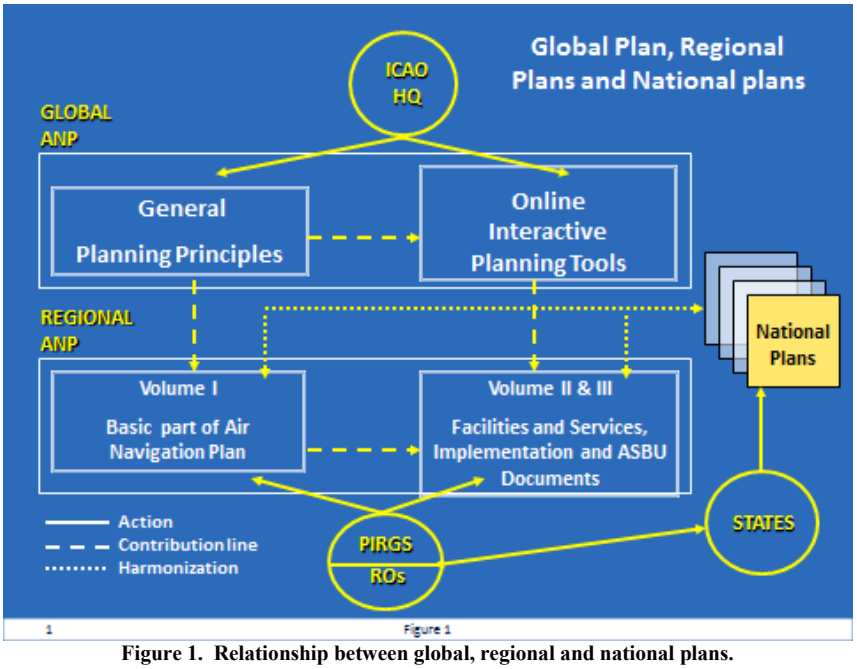

Figure 1. Relationship between global, regional and national plans.

5.1 Planning takes place at global, regional and national levels. Planning is accomplished with the help of planning tools and methodologies that are used primarily at the regional and national levels, conditioned by guidance from the global level. The basis for effective planning is the GANP (Doc 9750), which should guide the development of regional and national implementation plans that will support system architectures.

6. HUMAN RESOURCE PLANNING

6.1 Human resource planning can be considered "*the systematic and continuing process of analysing an organisation's human resource needs under changing conditions and developing personnel policies appropriate to the longer-term effectiveness of the organisation. It is an integral part of corporate planning and budgeting procedures since human resource costs and forecasts both affect and are affected by longer-term corporate plans.*"[1]

6.2 Estimating current and future requirements for civil aviation personnel and training capacity is essential for human resource planning, institutional capacity building, and related funding and policy measures. Such planning will need to take into account the interdependencies for supply and demand of qualified personnel at national, regional and global levels.

6.3 Human Performance

6.3.1 The high level of automation and interdependencies across aviation disciplines will only increase with evolving air navigation systems. To maximise potential safety and efficiency benefits that these offer, the development of human-driven, rather than engineering-driven interfaces is required, making it easier for the human operator to make sound decisions and take correct actions. Similarly, as part of a safety management systems approach, procedures need to be identified for the use of current and new

[1] Defined by the UK Institute of Personnel and Development

technologies that take into account human capabilities and manage the risk associated with human limitations.

6.3.2 States should:

a) Identify a certification process that requires at the design stage:

i) recognition of the potential human performance issues that the proposed new technology attempts to address; and

ii) consideration of the potential human performance issues, including changes in roles and the effects on individual and team behaviours, that may be introduced by the proposed new technology.

b) Identify processes for the implementation of new technologies, systems and procedures that describes the means by which human performance considerations can be addressed within operational contexts.

c) Consider the management of human performance-related risks as a necessary and essential aspect of the oversight of safety management systems.

d) Ensure that their technical personnel have exposure to training in human factors.

6.4 Training

6.4.1 A major goal of CNS/ATM systems is to create a seamless air navigation system. A seamless air navigation environment will require adequately qualified personnel prepared to perform their jobs in an evolving environment. At the same time, shortcomings in human resource planning and training are frequently mentioned as one of the reasons for the lack of implementation of regional ANPs. Human resource development challenges will be compounded during the transition period to CNS/ATM systems. As the existing and emerging air navigation technologies will co-exist in parallel for a period of time, civil aviation personnel will need to learn new skills, whilst retaining those needed to operate and maintain existing systems. To meet this challenge, a cooperative approach should be used in civil aviation training within the region. This approach should:

a) ensure that the training needs for the region are identified, documented and kept up to date;

b) facilitate the access to specialized types of training needed within the region or sub-regions that individual States cannot justify based on their national training needs alone;

c) ensure that a balanced market exists to support the development and on-going implementation of high-quality training in one or more training centres within the region or sub-regions;

d) endeavour to distribute equitably regional training activities among the training centres established within the region or sub-regions.

e) take advantage of readily available training materials including those available through the TRAINAIR Plus sharing system.

6.4.2 Appropriate bodies should be established to facilitate regional and sub-regional training planning. A quantitative approach should be used to determine the training capabilities needed within a region or sub-region. Decisions concerning required training capabilities should be based on an aggregate of training needs for existing air navigation technologies, as well as emerging technologies. A State consultation process should be used to formulate a plan for the establishment of specific regional training centres.

6.5 Training of technical personnel

6.5.1 States should develop and implement comprehensive training programmes and periodic training plans for all technical staff, including initial, on-the-job, recurrent and specialized training.

7. SAFETY CONSIDERATIONS

7.1 Safety fundamentally contributes to the sustainable growth of a sound and economically viable civil aviation system that continues to foster economic prosperity and social development. With air traffic projected to double in the next 15 years, safety risks must be addressed proactively to ensure that this significant capacity expansion is carefully managed and supported through strategic regulatory and infrastructure developments. It is imperative therefore that States and regions remain focused on their safety priorities as they continue to encourage expansion of their air transport sectors.

7.2 Acceptable safety levels are related to the establishment of State safety programmes (SSPs) that are able to anticipate and effectively respond to safety-related occurrences, resulting in continual improvements to an already low global accident rate. The *Global Aviation Safety Plan* (GASP) specifically establishes targeted safety objectives and initiatives that support SSP implementation while ensuring the efficient and effective coordination of complementary safety activities between all stakeholders.

7.3 PIRGs should harmonize activities undertaken to address aviation safety issues on a regional basis with the Regional Aviation Safety Groups (RASGs). In addition, PIRGs should coordinate relevant safety matters with RASGs to ensure consistency and avoid overlap.

7.4 PIRGs should ensure that air navigation services development programmes are consistent with the GASP safety objectives and initiatives. States are responsible for the prompt elimination of their air navigation deficiencies. Detailed information on the process of identifying and managing air navigation deficiencies is contained in the (***name of PIRG***) Handbook.

7.5 Adherence to the ICAO SARPs will significantly contribute to aviation safety. States should therefore ensure that they have the necessary regulatory framework in place to reinforce the adoption of the ICAO SARPs within their national regulations. States should also ensure that any differences to the ICAO SARPs have been assessed in respect of safety and are notified in accordance with ICAO requirements.

7.6 Unsatisfactory Conditions Reporting

7.6.1 States should act on any serious problems encountered due to the lack of implementation or prolonged unavailability of air navigation facilities or services required by the ANPs as reported by users of air navigation facilities and services.

8. ENVIRONMENT CONSIDERATIONS

8.1 It is an ICAO Strategic Objective to minimize the adverse effects of global civil aviation on the environment. PIRGs should ensure that environmental factors are taken into consideration when performance based systems implementation plans are developed and may wish to coordinate their plans with the State Action Plans on CO_2 Emissions Reduction. The results of environmental analysis can be useful in providing national decision-makers within the various sub-regions with information upon which to base airspace architecture decisions and in providing information on what the aviation industry is doing now to protect the environment in the future. Tools such as the ICAO Fuel Savings Estimation Tool (IFSET) are available from the ICAO public website to help quantify the environmental benefits from operational improvements. Environmental considerations should, however, not compromise acceptable levels of safety and be balanced against operational and economic considerations.

9. AIR TRAFFIC FORECASTS

9.1 Regional traffic forecasting supports the regional air navigation system planning. All States generally prepare individual forecasts, taking account of the regional information, for national planning purposes. A uniform strategy has been adopted by ICAO for the purpose of preparing traffic forecasts and other planning parameters in support of the regional planning process. This information should be shared through at least the sub-regional groupings to enable effective regional planning development.

10. CONTINGENCY PLANNING

10.1 Contingency plans may constitute a temporary deviation from the approved ANPs; such deviations are approved, as necessary, by the President of the ICAO Council on behalf of the Council.

10.2 The effects of disruption of services in particular portions of airspace are likely to affect significantly the services in adjacent airspace. States should co-ordinate with neighbouring States in the development and implementation of contingency plans, which in some cases may be developed on a sub-regional basis.

10.3 ICAO will initiate and coordinate appropriate contingency action in the event of disruption of air traffic services and related supporting services affecting international civil aviation operations provided by a State in the event that the authorities cannot adequately discharge their responsibility for the provision of such services to ensure the safety of international civil aviation operations. In such circumstances, ICAO will work in coordination with States responsible for airspace adjacent to that affected by the disruption and in close consultation with international organizations concerned.

10.4 Regional contingency plans will be developed, approved and maintained by (***name of PIRG***) with the support of ICAO and other organizations.

10.5 States should prepare their contingency plans in advance and ensure their availability or accessibility to the ICAO Regional Office. The plans should be reviewed at regular intervals and updated as required.

TABLE GEN I-1 - FLIGHT INFORMATION REGIONS (FIR)/UPPER INFORMATION REGIONS (UIR) OF THE ICAO (*NAME*) REGION(S)

EXPLANATION OF TABLE

Column		
1	State	Name of State
2	FIR/UIR	Name of FIR/UIR

STATE	FIR/UIR
1	2

(*NAME*) ANP, VOLUME I

PART II – AERODROMES / AERODROME OPERATIONS (AOP)

1. INTRODUCTION

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

1.2 The dynamic plan elements related to the assignment of responsibilities to States for the provision of the aerodrome facilities and services including the mandatory requirements based on regional air navigation agreements related to the AOP are contained in the (*NAME*) ANP Volume II Part II - AOP.

1.3 The (*NAME*) 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 ASBU 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 and Recommended Practices and Procedures for Air Navigation Services

1.4 The SARPs and PANS and associated guidance material applicable to the provision of AOP are contained in:

a) Annex 14 — *Aerodromes*, Volumes I and II;

b) *Procedures for Air Navigation Services – Aerodromes* (PANS-Aerodromes) (Doc 9981) *(pending final approval)*;

c) *Airport Planning Manual* (Doc 9184);

d) *Aerodrome Design Manual* (Doc 9157);

e) *Airport Services Manual* (Doc 9137);

f) *Manual on Certification of Aerodromes* (Doc 9774);

g) *Assessment, Measurement and Reporting of Runway Surface Conditions* (Cir 329);

h) *Operation of New Larger Aeroplanes at existing aerodromes* (Cir 305);

i) *Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual* (Doc 9830);

j) *Manual of Surface Movement Guidance and Control Systems (SMGCS)* (Doc 9476);

k) *Heliport Manual* (Doc 9261);

l) *Manual on the prevention of runway incursions* (Doc 9870);

m) *Stolport Manual* (Doc 9150);

n) *ICAO Bird Strike Information System Manual* (Doc 9332); and

o) *Manual on Civil Aviation Jet Fuel Supply* (Doc 9977).

2. GENERAL REGIONAL REQUIREMENTS

2.1 Regular aerodromes and their alternates required for international commercial air transport operations should be determined through regional agreements, based on the list of international aerodromes designated by States and the needs of the international commercial flights. Consideration should also be given to the needs of international general aviation flights as identified by user requirements. The alternate aerodromes should be planned/selected, to the greatest practicable extent, from the list of existing regular aerodromes used for international aircraft operations. However, where in specific cases the designation of another aerodrome in close proximity to a regular aerodrome would result in appreciable fuel conservation or other operational advantages, this aerodrome may be designated for use as an alternate aerodrome only. Planning of alternate aerodromes should be made on the basis of the following objectives:

a) to ensure that at least one suitable alternate is available for each international aircraft operation; and

b) to ensure that the facilities at the designated alternate aerodrome(s) are appropriate for the alternate aircraft operations.

2.2 The list of regular and alternate aerodromes (including their designations) required in the Region(s) to serve international civil aviation operations (international scheduled air transport, non-scheduled air transport and general aviation operations) is given in **Table AOP I-1**. Each Contracting State should ensure the provision of aerodrome facilities and services at the international aerodromes under its jurisdiction.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1 TBD (if necessary)

Table AOP I-1
INTERNATIONAL AERODROMES REQUIRED IN THE (*NAME*) REGION(S)

EXPLANATION OF THE TABLE

City/Aerodrome: Name of the city and aerodrome, preceded by the location indicator.
Designation: Designation of the aerodrome as:
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.

Note 1 — when an aerodrome is needed for more than one type of use, normally only the use highest on the above list is shown.
[Example — an aerodrome required for both RS and AS use would only be shown as RS in the list.]
Note 2 — when the aerodrome is located on an island and no particular city or town is served by the aerodrome, the name of the island is included instead of the name of a city.

Table AOP I-1

Location Indicator	Name of City/Aerodrome	Designation

Location Indicator	Name of City/Aerodrome	Designation

(*NAME*) ANP, VOLUME I

PART III – COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS)

1. INTRODUCTION

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

1.2 The dynamic plan elements related to the assignment of responsibilities to States for the provision of CNS facilities and services and the mandatory requirements based on regional air navigation agreements related to CNS are contained in the (*NAME*) ANP Volume II, Part III – CNS.

1.3 The (*NAME*) 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 ASBU 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.

1.4 In planning for these elements, economy and efficiency should be taken into account in order to ensure that the requirements for the provision of CNS facilities and services can be kept to a minimum. CNS facilities and services should fulfil multiple functions whenever this is feasible.

Standards and Recommended Practices and Procedures for Air Navigation Services

1.5 The SARPs and PANS and related guidance material applicable to the provision of CNS are contained in:

a) Annex 10 – *Aeronautical Telecommunications*, Volumes I, II, III, IV and V;

b) Annex 2 – Rules of the Air;

c) Annex 3 – Meteorological Service for international air navigation;

d) Annex 6 – Operation of Aircraft, Parts I (Chapter 7), II (Chapter 7) and III (Chapter 5);

e) Annex 11 – Air Traffic Services;

f) Annex 12 – Search and Rescue;

g) Annex 15 – Aeronautical Information Services;

h) Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) (Doc 4444);

i) Regional Supplementary Procedures (Doc 7030);

j) GNSS Manual (Doc 9849);

k) Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols (Doc 9880);

l) ICAO Aeronautical Telecommunication Network (ATN) Manual for the ATN using IPS Standards and Protocols (Doc 9896);

m) *Manual of Testing of Radio Navigation Aids* (Doc 8071);

n) *Manual on the Planning and Engineering of the Aeronautical Fixed Telecommunications Network* (Doc 8259);

o) *Manual on Required Communication Performance (RCP)* (Doc 9869);

p) *Training Manual* (Doc 7192);

q) *Performance-based Navigation Manual* (Doc 9613);

r) *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* (Doc 9718);

s) *ICAO Manual on the Secondary Surveillance Radar (SSR) Systems* (Doc 9684);

t) *Manual on Airborne Surveillance Applications* (Doc 9994); and

u) *Manual of Air Traffic Services Data Link Applications* (Doc 9694).

2. GENERAL REGIONAL REQUIREMENTS

Communications

Aeronautical Fixed Service (AFS)

2.1 The aeronautical fixed service (AFS) should satisfy the communication requirements of ATS, AIS/AIM, MET and SAR, including specific requirements in terms of system reliability, message integrity and transit times, with respect to printed as well as digital data and speech communications. If need be, it should, following agreement between individual States and aircraft operators, satisfy the requirements for airline operational control.

The Aeronautical Telecommunication Network (ATN)

2.2 The ATN of the Region(s) should have sufficient capacity to meet the minimum requirements for data communications for the services mentioned in paragraph 2.1 above.

Aeronautical Mobile Service (AMS)

2.3 Air-ground communications facilities should meet the agreed communication requirements of the air traffic services, as well as all other types of communications which are acceptable on the AMS to the extent that the latter types of communications can be accommodated.

Air-ground communications for ATS

2.4 Air-ground communications for ATS purposes should be so designed to require the least number of frequency and channel changes for aircraft in flight compatible with the provision of the required service. They should also provide for the minimum amount of coordination between ATS units and provide for optimum economy in the frequency spectrum used for this purpose.

Air-ground data link communications

2.5 Air-ground data link communications should be implemented in such a way that they are regionally and globally harmonised and make efficient use of available communication means and ensure optimum economy in frequency spectrum use and system automation.

Navigation

2.6 Planning of aeronautical radio navigation services should be done on a total system basis, taking full account of the navigation capabilities as well as cost effectiveness. The total system composed of station-referenced navigation aids, satellite-based navigation systems and airborne capabilities should meet the performance based navigation (PBN) requirements for all aircraft using the system and should form an adequate basis for the provision of positioning, guidance and air traffic services.

2.7 Account should be taken of the fact that certain aircraft may be able to meet their navigation needs by means of self-contained or satellite-based aids, thus eliminating the need for the provision of station-referenced aids along the ATS routes used by such aircraft, as well as the need to carry on board excessive redundancies.

Surveillance

2.8 Planning of aeronautical surveillance systems should be made based on a system approach concept, where collaboration and sharing of data sources should be considered in support of an efficient use of the airspace.

Frequency Management

2.9 Frequency assignment planning in the Region(s) should be carried out in accordance with the provisions of Annex 10 and *ICAO Handbook on Radio Frequency spectrum for Civil Aviation* (Doc 9718), supplemented, as necessary, by regional recommendations and technical criteria developed for this purpose.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1 TBD (if necessary).

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(*NAME*) ANP, VOLUME I

PART IV - AIR TRAFFIC MANAGEMENT (ATM)

1. INTRODUCTION

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

1.2 The dynamic plan elements related to the assignment of States' responsibilities for the implementation of the ATM system and the mandatory requirements based on regional air navigation agreements related to ATM are contained in (*NAME*) ANP Volume II, Part IV - ATM.

1.3 The (*NAME*) 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 ASBU 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 and Recommended Practices and Procedures for Air Navigation Services

1.4 The SARPs and PANS and related guidance material applicable to the provision of ATM are contained in:

a) Annex 2 — *Rules of the Air*;

b) Annex 6 — *Operation of Aircraft*;

c) Annex 11 — *Air Traffic Services*;

d) *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM) (Doc 4444);

e) *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS) (Doc 8168); and

f) *Regional Supplementary Procedures* (Doc 7030).

2. GENERAL REGIONAL REQUIREMENTS

2.1 The description of the current Flight Information Regions (FIR)/Upper Information Regions (UIR), as approved by the ICAO Council, are contained in **Table ATM I-1** and depicted in the **Charts ATM I-1** and **ATM I-2**, respectively.

2.2 States should ensure that the provision of air traffic services (ATS) covers its own territory and those areas over the high seas for which it is responsible for the provision of those services, in accordance with **Charts ATM I-1** and **ATM I- 2**.

Regional ATS Routes and organized track structures

2.3 PIRGs are responsible for the optimization of the traffic flows through the continuous improvement of the regional ATS route network and organized track systems and implementation of random routing areas and free route airspace in the Region(s). Where applicable, details of the ATS routes within the Region(s) are contained in Volume II.

ICARD Global Database

2.4 The five-letter name-codes assigned to significant points should be coordinated through the ICAO Regional Office(s) and obtained from the ICAO International Codes and Routes Designators (ICARD) Global Database.

Aircraft Identification - SSR Code Assignments

2.5 The management of Secondary Surveillance Radar (SSR) codes is a key element of ATM in order to ensure continuous and unambiguous aircraft identification. The requirements related to the SSR code assignment system used in the Region(s) is contained in Volume II.

Performance-based Navigation (PBN)

2.6 PIRGs are responsible for the development of the Regional PBN Plan. States' PBN Plans should be consistent with the Regional PBN Plan.

Flexible Use of Airspace

2.7 States should implement civil/military cooperation and coordination mechanisms to enhance the application of the Flexible Use of Airspace concept, which will contribute to more direct routing with a commensurate saving in fuel and associated emissions. States should arrange for close liaison and coordination between civil ATS units and relevant military operational control and/or air defence units in order to ensure integration of civil and military air traffic or its segregation, if required. Such arrangements would also contribute to increasing airspace capacity and to improving the efficiency and flexibility of aircraft operations.

Reduced Vertical Separation Minimum (RVSM)/Regional Monitoring Agencies

2.8 The (***NAME***) Regional Monitoring Agency(ies) is (are) the designated Regional Monitoring Agency(ies) (RMA) responsible for monitoring the height-keeping performance and approval status of aircraft operating at these levels, in order to ensure that the continued application of RVSM meets the agreed regional safety objectives as set out by the (***NAME***) PIRG.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1 TBD (if necessary)

Table ATM I-1

FLIGHT INFORMATION REGIONS (FIR)/UPPER INFORMATION REGIONS (UIR) IN THE (*NAME*) REGION(S)

EXPLANATION OF THE TABLE

Column:

1 Name of the FIR/UIR / Location Indicator according to Doc 7910

2 Description of FIR/UIR lateral limits;

a. Describe separately in the table the limits of the UIRs if they are not similar to the FIRs limits.

3 Remarks — additional information, if necessary.

a. Describe vertical limits if necessary.

FIR/UIR Location Indicator	Lateral limits coordinates	Remarks
1	2	3
AMSWELL (example)	**FIR AMSWELL** 5705N 04000W- 5640N 02108W 4331N 02108W- 4124N 03003W 4044N 03711W- 4236N 03700W 4402N 04000W- 4228N 04120W 5251N 04147W- 5705N 04000W Then along the national borders between State X and State Y.	
	UIR AMSWELL 5705N 04000W- 5640N 02108W 4200N 03000W- 4800N 02500W 4331N 02108W- 4124N 03003W 4044N 03711W- 4236N 03700W 4402N 04000W- 4228N 04120W 5251N 04147W- 5705N 04000W Then along the national borders between State X and State Y.	

(*NAME*) ANP, VOLUME I

PART V – METEOROLOGY (MET)

1. INTRODUCTION

1.1 This part of the **(*NAME*)** 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 **(*NAME*)** Region(s) and complements the provisions of the 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 **(*NAME*)** 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 **(*NAME*)** ANP Volume II, Part V - MET.

1.3 The **(*NAME*)** 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 ASBU 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 and Recommended Practices and Procedures for Air Navigation Services

1.4 The SARPs and PANS and related guidance material applicable to the provision of MET are contained in:

a) Annex 3 — *Meteorological Service for International Air Navigation*;

b) *Regional Supplementary Procedures* (Doc 7030)*;*

c) *Handbook on the IAVW* (Doc 9766);

d) *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691); and

e) *Manual of Aeronautical Meteorological Practice* (Doc 8896).

2. GENERAL REGIONAL REQUIREMENTS

World area forecast system (WAFS) and meteorological offices

2.1 In the **(*NAME*)** Region(s), WAFC **(*NAME of WAFC)*** has been designated as the centre for the operation of the aeronautical fixed service satellite distribution system / WAFS Internet File Service (SADIS and/or WIFS) and the Internet-based Secure SADIS FTP service. The status of implementation of SADIS/WIFS by States in the **(*NAME*)** Region(s) is detailed in Volume III.

2.2 In the ***(NAME)*** Region(s), WAFS products in digital form should be disseminated by WAFC ***(NAME of WAFC)*** using the SADIS 2G satellite broadcast and the Secure SADIS FTP service and/or WIFS.

Volcanic Ash

2.3 Volcanic ash advisory centres (VAACs) ***(NAME of VAAC)*** have been designated to prepare volcanic ash advisory information for the ***(NAME)*** Region(s), as indicated below. The status of implementation of volcanic ash advisory information is detailed in Volume III.

- [list VAACs]

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 ***(NAME)*** 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 centre (TCAC) ***(NAME(s) of TCAC)*** has been designated to prepare tropical cyclone advisory information for the ***(NAME)*** Region(s), as indicated below. The status of implementation of tropical cyclone advisory information is detailed in Volume III. ***[if applicable]***

- [list TCACs] or [specify that there is no requirement]

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

State	Volcano observatory
1	**2**
Iceland	Icelandic Meteorological Office
…	…

_____

(*NAME*) ANP, VOLUME I

PART VI - SEARCH AND RESCUE (SAR)

1. INTRODUCTION

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

1.2 The dynamic plan elements related to the assignment of States' responsibilities for the provision of SAR facilities and services and the mandatory requirements based on regional air navigation agreements related to SAR are contained in the **(*NAME*)** Volume II, Part VI – SAR.

Standards and Recommended Practices and Procedures for Air Navigation Services

1.3 The SARPs and PANS and related guidance material applicable to the provision of SAR are contained in:

a) Annex 12 — *Search and Rescue*;

b) Annex 6 — *Operation of Aircraft*;

c) *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM) (Doc 4444);

d) *Regional Supplementary Procedures* (Doc 7030); and

e) *International Aeronautical and Maritime Search and Rescue Manual* (Doc 9731-AN/958).

2. GENERAL REGIONAL REQUIREMENTS

2.1 Each Contracting State should ensure that the provision of search and rescue services covers its own territory and those areas over the high seas for which it is responsible for the provision of those services. The description of the current Search and Rescue Regions (SRRs), as approved by the ICAO Council, are contained in **Table SAR I-1** and depicted in the **Chart SAR I-1**. The list of Rescue Coordination Centres (RCCs) and Rescue Sub-centres (RSCs) in the Region(s) are detailed in Volume II.

2.2 The three volumes of the *IAMSAR Manual* (Doc 9731) provide guidance for a common aviation and maritime approach to organizing and providing SAR services. States are invited to use the *IAMSAR Manual* to ensure the availability of effective aeronautical SAR services and to cooperate with neighbouring States.

2.3 States which rely on military authorities and/or other sources for the provision of SAR facilities should ensure that adequate arrangements are in place for coordination of SAR activities between all entities involved.

2.4 Arrangements should be made to permit a call on any national services likely to be able to render assistance on an ad-hoc basis, in those cases when the scope of SAR operations requires such assistance.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1 TBD (if necessary).

TABLE SAR I-1 – SEARCH AND RESCUE REGIONS (SRR) OF THE (*NAME*) REGION(S)

EXPLANATION OF THE TABLE

Column:

1 Name of the SRR
2 Description of SRR lateral limits;
3 Remarks — additional information, if necessary.

SRR	Lateral limits coordinates	Remarks
1	**2**	**3**
AMSWELL (example)	SRR AMSWELL 5705N 04000W- 5640N 02108W 4331N 02108W- 4124N 03003W 4044N 03711W- 4236N 03700W 4402N 04000W- 4228N 04120W 5251N 04147W- 5705N 04000W Then along the national borders between State X and State Y.	

(*NAME*) ANP, VOLUME I

PART VII - AERONAUTICAL INFORMATION MANAGEMENT (AIM)

1. INTRODUCTION

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

1.2 The dynamic plan elements related to the assignment of responsibilities to States for the provision of AIS/AIM facilities and services and the mandatory requirements based on regional air navigation agreements related to the AIS/AIM facilities and services are contained in the **(*NAME*)** ANP Volume II, Part VII – AIM.

1.3 The **(*NAME*)** 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 ASBU 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, which include service improvement through digital aeronautical information management and interoperability and data through globally interoperable system wide information management (SWIM).

Standards and Recommended Practices and Procedures for Air Navigation Services

1.4 The SARPs and PANS and related guidance material applicable to the provision of AIS, and ultimately AIM, are contained in:

a) Annex 4 — *Aeronautical Charts*;

b) Annex 15 — *Aeronautical Information Services*;

c) *Regional Supplementary Procedures* (Doc 7030);

d) *Aeronautical Information Services Provided by States* (Doc 7383);

e) *Location Indicators* (Doc 7910);

f) *Aeronautical Information Services Manual* (Doc 8126);

g) *Procedures for Air Navigation Services – Aircraft Operations – Construction of Visual and Instrument Flight Procedures* (PANS-OPS, Volume I and Volume II) (Doc 8168);

h) *ICAO Abbreviations and Codes* (PANS-ABC) (Doc 8168);

i) *Aeronautical Charts Manual* (Doc 8697);

j) *Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services* (Doc 9377);

k) *World Geodetic System (1984) Manual* (Doc 9674);

l) *Guidelines on the Use of the Public Internet for Aeronautical Applications* (Doc 9855);

m) *Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information* (Doc 9881);

n) *Flight Procedure Design Quality Assurance System*, Volume I (Doc 9906);

o) "*AIM QMS Manual*" (Doc 9839) (Draft); and

p) "*Training Manual for AIM*" (Doc 9991) (Draft).

2. GENERAL REGIONAL REQUIREMENTS

2.1 States should ensure that the provision of aeronautical data and aeronautical information covers its own territory and those areas over the high seas for which it is responsible for the provision of air traffic services, in accordance with **Charts ATM I-1 and ATM I-2**.

2.2 States are responsible for the aeronautical information/data published by its aeronautical information service or by another State or a non-governmental agency on its behalf.

2.3 Aeronautical information published for and on behalf of a State should clearly indicate that it is published under the authority of that State.

2.4 The responsibility for the provision of AIS/AIM facilities and services in the ***(NAME)*** Region(s) is reflected in the Volume II.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1 TBD (if necessary)

———————

TEMPLATE APPROVED BY THE COUNCIL
on 18 June 2014

(*NAME*) AIR NAVIGATION PLAN

VOLUME II

(*NAME*) AIR NAVIGATION PLAN

VOLUME II

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(*NAME*) ANP, VOLUME II
PART 0 – INTRODUCTION

1. GENERAL

1.1 The background to the publication of ANPs in three volumes is explained in the Introduction in Volume I. The procedure for amendment of Volume II is also described in Volume I.

1.2 Volume II contains dynamic plan elements related to:

a) the assignment of responsibilities to States for the provision of aerodrome and air navigation facilities and services; and

b) the mandatory requirements related to aerodrome and air navigation facilities and services to be implemented by States in accordance with regional air navigation agreements.

1.3 Volume II does not list all facilities in the region(s) but only those required for international civil aviation operations in accordance with regional air navigation agreements. A regional air navigation agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified. Documents from the Integrated Aeronautical Information Package and other publications should be consulted for information on additional facilities and for operational information in general. Detailed guidance material or concepts, complementary to the material in Volumes I, II and III are contained in documents that are referenced as **(*NAME*)** Documents.

2. MANAGEMENT OF REGIONAL AIR NAVIGATION PLANS

2.1 The elements in Volume II are reviewed by the (***NAME of PIRG)*** in accordance with its schedule of meetings, in consultation with provider and user States, and with the assistance of the ICAO **(*NAME*)** Regional Office(s).

2.2 The information on States' facilities and services included in Volume II, should be updated following the process of regional air navigation agreements.

2.3 The development and maintenance of region-specific documents that provide detailed guidance material or concepts that are complementary to the material in Volumes I, II and III is the responsibility of the (***NAME of PIRG)***.

(*NAME*) ANP, VOLUME II

PART I – GENERAL PLANNING ASPECTS (GEN)

1. INTRODUCTION

1.1. The material in this part of Volume II of ANP is applicable to one or more parts of the ANP. It should be taken into consideration in the overall planning process for the (*NAME*) Region(s).

2. GENERAL REGIONAL REQUIREMENTS

2.1. To facilitate air navigation systems planning and implementation, homogenous ATM areas and/or major traffic flows/routing areas have been defined for the Region(s). While these areas of routing do not encompass all movements in the Region(s), they include the major routes. This includes the domestic flights in that particular area of routing.

Homogeneous ATM area

2.2. A homogeneous ATM area is an airspace with a common ATM interest, based on similar characteristics of traffic density, complexity, air navigation system infrastructure requirements or other specified considerations. In such an ATM area a common detailed plan will foster the implementation of interoperable ATM systems. Homogeneous ATM areas may extend over States, specific portions of States, or groupings of States. They may also extend over large oceanic and continental areas. They are considered areas of shared interest and requirements.

2.3. The method of identifying homogeneous ATM areas involves consideration of the varying degrees of complexity and diversity of the worldwide air navigation infrastructure. Based on these considerations, planning could best be achieved at the global level if it was organized based on ATM areas of common requirements and interest, taking into account traffic density and the level of sophistication required.

Major traffic flows/routing areas

2.4. A major traffic flow refers to a concentration of significant volumes of air traffic on the same or proximate flight trajectories. Major traffic flows may cross several homogeneous ATM areas with different characteristics.

2.5. A routing area encompasses one or more major traffic flows, defined for the purpose of developing a detailed plan for the implementation of ATM systems and procedures. A routing area may cross several homogeneous ATM areas with different characteristics. A routing area specifies common interests and requirements of underlying homogeneous areas, for which a detailed plan for the implementation of ATM systems and procedures either for airspace or aircraft will be specified.

2.6. The homogeneous ATM areas and major traffic flows/routing areas identified are given in **Table GEN II-1**.

TABLE GEN II-1 - HOMOGENEOUS ATM AREAS AND/OR MAJOR TRAFFIC FLOWS IDENTIFIED IN THE (*NAME*) REGION(S)

EXPLANATION OF TABLE

Column		
1	Area of routing (AR)	Sequential number of area of routing
2	Homogeneous Areas and/or Traffic flows	Brief description and/or name
3	FIRs involved	List of FIRs concerned
4	Type of area covered	Brief description of type of area, examples: Oceanic or Continental High or low density Oceanic en-route or Continental en-route
5	Remarks	Homogeneous ATM Area and/or Major Traffic Flow and Region(s) concerned

Area of routing (AR)	Homogeneous Areas and/or Traffic flows	FIRs involved	Type of area covered	Remarks
1	**2**	**3**	**4**	**5**

(*NAME*) ANP, VOLUME II

PART II – AERODROMES / AERODROME OPERATIONS (AOP)

1. INTRODUCTION

1.1 This part of the (*NAME*) ANP, Volume II, complements the provisions in ICAO SARPs and PANS related to aerodrome design and operations (AOP). It contains dynamic plan elements related to the assignment of responsibilities to States for the provision of AOP 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 AOP 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 State(s) concerned to implement the requirement(s) specified.

2. GENERAL REGIONAL REQUIREMENTS

2.1 **Table AOP II-1** contains the list of facilities and services to be provided by the State concerned at each aerodrome that is listed in **Table AOP I-1** in Volume I. Table AOP II-1 shows the operational requirements at each aerodrome to be considered in planning the facilities and services for safe and efficient aircraft operations.

Visual aids for low visibility aerodrome operations

2.2 At aerodromes where there is a requirement to conduct low visibility operations, the appropriate visual and non-visual aids should be provided.

Non-precision approach aids

2.3 Where required by the topographic and/or environmental situation of an aerodrome, improved track guidance during departure and/or approach by specific non-visual and/or visual aids should be provided even if such aids would not normally be required in accordance with the SARPs.

Reduced runway declared distances for take-off

Note. — In the following operational requirements the term "intersection" is used to cover both intersection and junction concepts.

2.4 The reduced runway declared distances for take-off, as for those used for full runway declared distances, should consist of take-off run available (TORA), take-off distance available (TODA) and accelerate-stop distance available (ASDA).

2.5 The datum-line from which the reduced runway declared distances for take-off should be determined is defined by the intersection of the downwind edge of the specific taxiway with the runway edge. The loss, if any, of runway length due to alignment of the aircraft prior to take-off should be taken into account by the operators for the calculation of the aircraft's take-off weight.

2.6 Intersections used as intermediate take-off positions should be identified by the "taxiway designator" to which the datum-line of the associated reduced runway declared distance for take-off refers.

2.7 At each international aerodrome, specific minima visibility for take-off should be established, regulating the use of intersection take-off positions. These minima should permit the appropriate ATC unit to maintain a permanent surveillance of the ground movement operations, and the flight crews to constantly secure their position on the manoeuvring area, so as to exclude any potential risk of confusion as

to the identification of the aircraft and intersections used for take-off. The minima should be consistent with the surface movement guidance and control system (SMGCS) provided at the aerodrome concerned.

2.8 The provision of marking and lighting aids together with signs should ensure the safe control and guidance of aircraft towards and at take-off intersections appropriate to the minima visibility criteria retained. At the runway holding position of the associated intersection take-off position, such signs should indicate the runway heading and the remaining TORA in metres.

2.9 At aerodromes regularly used by international commercial air transport, take-offs from runway/taxiway intersections may be justified for the following reasons:

a) runway capacity improvement;
b) taxi routes distances reduction;
c) noise alleviation; and
d) air pollution reduction.

2.10 The appropriate authorities should, upon prior consultation with aircraft operators, agree on the selection of suitable intermediate intersection take-off positions along the runway(s). Accordingly, authorities should determine the reduced runway declared distances for take-off associated with each selected intersection take-off position and establish the specific ATC rules and operational procedures/limitations. Such provisions should be published in the State aeronautical information publications (AIP).

Aerodrome capacity management

2.11 As an integral part of the air navigation system, the aerodrome should provide the needed ground infrastructure including, *inter alia*, lighting; taxiways; runway, including exits; aprons and precise surface guidance to improve safety and to maximize aerodrome capacity in all weather conditions. An efficient aerodrome capacity planning and management should include:

a) reduction of runway occupancy time;
b) the capability to safely manoeuvre in all weather conditions whilst maintaining capacity;
c) precise surface guidance to and from a runway required in all conditions; and
d) availability of information on the position (to an appropriate level of accuracy) and intent of all vehicles and aircraft operating on the movement area for the appropriate ATM community members.

2.12 States should ensure that adequate consultation and, where appropriate, cooperation between airport authorities and users/other involved parties are implemented at all international aerodromes to satisfy the provisions of aerodrome capacity assessment and requirement.

2.13 When international aerodromes are reaching designed operational capacity, a better and more efficient utilization of existing runways, taxiways and aprons is required. Runway selection procedures and standard taxi routes at aerodromes should ensure an optimum flow of air traffic with a minimum of delay and a maximum use of available capacity. They should also, if possible, take account of the need to keep taxiing times for arriving and departing aircraft as well as apron occupancy time to a minimum. The airport collaborative decision making (A-CDM) concept should be implemented to improve airport capacity as early as possible.

Aerodrome capacity assessment and requirement

2.14 The declared capacity/demand condition at aerodromes should be periodically reviewed in terms of a qualitative analysis for each system component and, when applicable, the result of the qualitative assessment upon mutual agreement be used for information.

2.15 The future capacity/demand, based on a forecast for the next five years, should be agreed upon after close cooperation between aerodrome authorities and affected users.

2.16 Operators should consult with aerodrome authorities when future plans indicate a significant increased requirement for capacity resulting in one of the elements reaching a limiting condition.

2.17 Aerodrome capacity should be assessed by aerodrome authorities in consultation with the parties involved for each component (terminal/apron/aircraft operations) using agreed methods and criteria for level of delays.

2.18 Where restrictions in aerodrome capacity are identified, a full range of options for their reduction or removal should be evaluated by the aerodrome authority, in close cooperation with the operators and other involved parties. Such options should include technical/operational/procedural and environmental improvements and facility expansion.

2.19 At many aerodromes, airspace capacity has influence on the aerodrome capacity. If the declared capacity of a specified airspace has influence on aerodrome operations, this should be indicated and action undertaken to reach a capacity in this airspace corresponding to the aerodrome capacity.

2.20 The possibility of overcoming capacity limitations should also take the use of other aerodromes in the vicinity into consideration.

Closure of regular aerodromes

2.21 When a regular aerodrome is to be closed, States should ensure that sufficient alternate aerodromes remain open to provide for the safety and efficiency of aircraft approaching the regular aerodrome that may be required to divert to an alternate.

Scheduling aerodrome maintenance

2.22 States, when planning major aerodrome maintenance work that would affect the regularity of international aircraft operations, should consider the need to notify aircraft operators sufficiently in advance prior to undertaking the scheduled work.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1 TBD (if required).

Table AOP II-1 – REQUIREMENTS AND CAPACITY ASSESSMENT

EXPLANATION OF THE TABLE

Note: Columns 3 to 5 for physical characteristics relate to runways and taxiways. The physical characteristics of taxiways and aprons should be compatible with the aerodrome reference code (Column 3) and appropriate for the runways with which they are related.

Column

1 Name of the city and aerodrome, preceded by the location indicator.

Note 1— When the aerodrome is located on an island and no particular city or town is served by the aerodrome, the name of the island is included instead of a city.

Designation of the aerodrome as:
RS — international scheduled air transport, regular use;
RNS — international non-scheduled air transport, regular use;
AS — international scheduled air transport, alternate use; and
ANS — international non-scheduled air transport, alternate use.

2 Required rescue and firefighting service (RFF). The required level of protection expressed by means of an aerodrome RFF category number, in accordance with Annex 14, Volume I, 9.2.

3 Aerodrome reference code (RC). The aerodrome reference code for aerodrome characteristics expressed in accordance with Annex 14, Volume I, chapter 1. The code letter or number within an element selected for design purposes is related to the critical aeroplane characteristics for which the facilities are provided.

4 Runway Designation numbers

5 Type of each of the runways to be provided. The types of runways, as defined in Annex 14, Volume I, Chapter 1, are:
NINST — non-instrument runway;
NPA — non-precision approach runway;
PA1 — precision approach runway, Category I;
PA2 — precision approach runway, Category II;
PA3 — precision approach runway, Category III.

6 Remarks. Additional information including critical design aircraft selected for determining RC, critical aircraft selected for determining the RFF category and critical aircraft for pavement strength. Only one critical aircraft type is shown if it is used to determine all the above three elements: otherwise different critical aircraft types need to be shown for different elements.

City/Aerodrome/Designation	RFF category	Physical characteristics			Remarks
		RC	RWY No.	RWY type	
1	2	3	4	5	6

(NAME) ANP, VOLUME II

PART III – COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS)

1. INTRODUCTION

1.1 This part of the *(NAME)* ANP, Volume II, complements the provisions in ICAO SARPs and PANS related to communication, navigation and surveillance (CNS). It contains dynamic plan elements related to the assignment of responsibilities to States for the provision of CNS 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 CNS 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 State(s) concerned to implement the requirement(s) specified.

2. GENERAL REGIONAL REQUIREMENTS

Communications

Aeronautical Fixed Service (AFS)

2.1 The aeronautical fixed service should comprise the following systems and applications that are used for ground-ground (i.e. point-to-point and/or point-to-multipoint) communications in the international aeronautical telecommunication service:

a) ATS direct speech circuits and networks;
b) meteorological operational circuits, networks and broadcast systems, including World Area Forecast System – Internet File Service (WIFS) and/or Satellite Distribution System for Information Relating to Air Navigation (SADIS);
c) the aeronautical fixed telecommunications network (AFTN);
d) the common ICAO data interchange network (CIDIN);
e) the air traffic services (ATS) message handling services (AMHS); and
f) the inter-centre communications (ICC).

2.2 To meet the data communication requirements, a uniform high-grade aeronautical network should be provided, based on the aeronautical telecommunication network (ATN), taking into account the existence and continuation of current networks.

2.3 Contingency procedures should be in place to ensure that, in case of a communication centre breakdown, all the parties concerned are promptly informed of the prevailing situation. All possible arrangements should be made to ensure that, in case of breakdown of a communications centre or circuit, at least high-priority traffic continues to be handled by appropriate means.

2.4 AFS planning should permit flexibility in detailed development and implementation. The required AFTN Stations and Centres are listed in the AFTN Plan in **Table CNS II-1**.

The Aeronautical Telecommunication Network (ATN)

2.5 The ATN should be able to:

a) support applications carried by the existing networks;
b) support gateways enabling inter-operation with existing networks; and
c) support ground-ground communications traffic associated with air-ground data link applications.

2.6 The ATN should make optimum use of dedicated bilateral/multilateral aeronautical links and other communication means commensurate with the operational Quality of Service (QoS) requirements.

2.7 The implementation of the ATN should take into account the need for cost-effective evolution in terms of network capacity, requirements and time-frame and allow for a progressive transition from existing communication networks and services to a uniform, harmonised and integrated communications infrastructure, capable of supporting the implementation of future aeronautical services such as Flight and Flow Information in a Collaborative Environment (F-FICE), System-Wide Information Management (SWIM) applications, etc.

2.8 In case means other than dedicated bilateral links are used by the ATN, States should ensure that service level agreements (SLA) are met in terms of implementation priority, high availability, priority in restoration of service and appropriate levels of security.

2.9 The ATN should provide for interregional connections to support data exchange and mobile routing within the global ATN.

2.10 In planning the ATN, provisions should be made, where required, for interfacing with other international networks. The Required ATN Infrastructure Routing Plan is described under **Table CNS II-2**.

Network services

2.11 The Internet Society (ISOC) communications standards for the Internet Protocol Suite (IPS) should be used for the implementation of AMHS.

2.12 The migration from legacy bit-oriented protocols such as X.25 Protocol suite to IPS should be planned.

2.13 The migration of international or sub-regional ground networks to the ATN based on Internet Protocol (IP) to support AFS communication requirements, while reducing costs, should be planned.

2.14 States should ensure that the solutions provided for the implementation of the ATN meet the air traffic management and aeronautical fixed service requirements. Such requirements should consist of:

a) Performance requirements: availability, continuity, integrity, monitoring and alerting criteria per data flow. In the case where a required communication performance (RCP) is globally prescribed, requirements derived from RCP should be stated;
b) Interoperability requirements;
c) Safety and security requirements, duly derived after the identification of operational hazards and threats, and allocation of objectives; and
d) Implementation process requirements (creation, test, migration, upgrades, priority in restoration of service, termination).

Network management

2.15 An ICAO centralised off-line network management service is provided to participating AFTN/ AMHS centres in the ***(NAME)*** Region(s) under the ATS Messaging Centre (AMC).

2.16 In the case of integrated communications services procured and shared by several States, organizational provisions should allow for the planning and performing of the management of technical performance, network configuration, fault, security, cost division/allocation, contract, orders and payment.

Specific air traffic management (ATM) requirements

2.17 Where ATS speech and data communication links between any two points are provided, the engineering arrangements should be such as to avoid the simultaneous loss of both circuits. The required ATS direct speech circuits plan is detailed under **Table CNS II-3**.

2.18 Special provisions should be made to ensure a rapid restoration of ATS speech circuits in case of outage, as derived from the performance and safety requirements.

2.19 Data circuits between ATS systems should provide for both high capacity and message integrity.

2.20 The Inter-Centre Communication (ICC), consisting of ATS Inter-facility Data Communication (AIDC) application and the Online Data Interchange (OLDI) application, should be used for automated exchange of flight data between ATS units to enhance the overall safety of the ATM operation and increase airspace capacity.

2.21 Where Voice over IP is planned or implemented between ATS units for voice communications, it should meet the ATS requirements. When data and voice are multiplexed, particular attention should be paid to the achievement of the ATM performance and safety requirements.

Specific meteorological (MET) requirements

2.22 The increasing use of the GRIB (Gridded Binary or General Regularly-distributed Information in Binary form) and BUFR (Binary Universal Form for the Representation of meteorological data) code forms for the dissemination of the upper wind and temperature and significant weather forecasts and the planned transition to digital form using extensible markup language (XML)/geography markup language (GML) for the dissemination of OPMET data should be taken into account in the planning process of the ATN.

2.23 In planning the ATN, account should be taken of changes in the current pattern of distribution of meteorological information resulting from the increasing number of long-range direct flights and the trend towards centralized flight planning.

Specific aeronautical information management (AIM) requirements

2.24 The aeronautical fixed service should meet the requirements to support efficient provision of aeronautical information services through appropriate connections to area control centres (ACCs), flight information centres (FICs), aerodromes and heliports at which an information service is established.

Aeronautical Mobile Service (AMS)

2.25 To meet the air-ground data communication requirements, a high-grade aeronautical network should be provided based on the ATN, recognising that other technologies may be used as part of the transition. The network needs to integrate the various data links in a seamless fashion and provide for end-to-end communications between airborne and ground-based facilities.

2.26 Whenever required, use of suitable techniques on VHF or higher frequencies should be made. The required HF network designators applicable for the ***(NAME)*** Region(s) are listed in **Table CNS II-4**.

2.27 Aerodromes having a significant volume of International General Aviation (IGA) traffic should also be provided with appropriate air-ground communication channels.

Air-Ground Data Link Communications

2.28 A Strategy for the harmonised implementation of the data link communications in the ***(NAME)*** Region(s) should be developed based on the Global Operational Data Link Document (GOLD) adopted by ICAO Regions and the Aviation System Block Upgrade (ASBU) methodology.

2.29 Where applicable, controller-pilot data link communications (CPDLC), based on ATN VDL data link Mode 2 (VDL2) and/or FANS-1/A, should be implemented for air-ground data link communications.

2.30 Partial or divergent aircraft data link evolutions that result in excluding messages from aircraft systems should not be pursued. Interim steps or phases toward full implementation of the common technical definition in ground systems should only be pursued on a regional basis, after coordination between all States concerned.

2.31 Harmonization of operational procedures for implementation of the above packages is essential. States, Planning and Implementation Regional Groups (PIRGs) and air navigation services providers should adopt common procedures to support seamless ATS provision across FIR boundaries, rather than each State or Region developing and promulgating unique procedures for common functions.

Required Communication Performance (RCP)

2.32 The Required Communication Performance (RCP) concept characterizing the performance required for communication capabilities that support ATM functions without reference to any specific technology should be applied wherever possible.

2.33 States should determine, prescribe and monitor the implementation of the RCP in line with the provisions laid down in the *ICAO Manual on Required Communication Performance* (Doc 9869).

Navigation

Navigation Infrastructure

2.34 The navigation infrastructure should meet the requirements for all phases of flight from take-off to final approach and landing.

Note: Annex 10 to the Convention on International Civil Aviation—Aeronautical Telecommunications, Volume I — Radio Navigation Aids, Attachment B, provides the strategy for introduction and application of non-visual aids to approach and landing.

2.35 The ***(NAME)*** PBN Regional Roadmap/Plan provides guidance to air navigation service providers, airspace operators and users, regulators, and international organizations, on the expected evolution of the regional air navigation system in order to allow planning of airspace changes, enabling ATM systems and aircraft equipage. It takes due account of the operational environment of the ***(NAME)*** Region(s).

PBN Transition Strategy

2.36 During transition to performance-based navigation (PBN), sufficient ground infrastructure for conventional navigation systems should remain available. Before existing ground infrastructure is considered for removal, users should be given reasonable transition time to allow them to equip appropriately to attain a performance level equivalent to PBN. States should approach removal of existing ground infrastructure with caution to ensure that safety is not compromised. This should be guaranteed by conducting safety assessments and consultations with the users.

Use of specific navigation aids

2.37 Where, within a given airspace, specific groups of users have been authorized by the competent authorities to use special aids for navigation. The respective ground facilities should be located and aligned so as to provide for full compatibility of navigational guidance with that derived from the SARPs.

2.38 States should ensure and oversee that service providers take appropriate corrective measures promptly whenever required by a significant degradation in the accuracy of navigation aids (either space based or ground based or both) is detected.

Surveillance

2.40 An important element of modern air navigation infrastructure required to manage safely increasing levels and complexity of air traffic is aeronautical surveillance systems.

2.41 When operating Mode S radars, States should coordinate with their respective ICAO Regional Office the assignment of their corresponding interrogator identifier (II) codes and surveillance identifier (SI) codes, particularly where areas of overlapping coverage will occur.

Frequency Management

Aeronautical Mobile Service (AMS)

2.42 Frequencies should be assigned to all VHF aeronautical mobile service (AMS) facilities in accordance with the principles laid out in Annex 10, Volume V and *ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* (Doc 9718) Volumes I and II, and take into account:

a) agreed geographical separation criteria based on 25 kHz or 8.33 kHz interleaving between channels;
b) agreed geographical separation criteria for the implementation of VDL services;

c) the need for maximum economy in frequency demands and in radio spectrum utilization; and
d) a deployment of frequencies which ensures that international services are planned to be free of interference from other services using the same band.

2.43 The priority order to be followed in the assignment of frequencies to service is:
a) ATS channels serving international services (ACC, APP, TWR, FIS);
b) ATS channels serving national purposes;
c) channels serving international VOLMET services;
d) channels serving ATIS and PAR; and
e) channels used for other than ATS purposes.

2.44 The criteria used for frequency assignment planning for VHF AMS facilities serving international requirements should, to the extent practicable, also be used to satisfy the need for national VHF AMS facilities.

2.45 Special provisions should be made, by agreement between the States concerned, for the sharing and the application of reduced protection of non-ATS frequencies in the national sub-bands, so as to obtain a more economical use of the available frequency spectrum consistent with operational requirements.

2.46 States should ensure that no air/ground frequency is utilized outside its designated operational coverage and that the stated operational requirements for coverage of a given frequency can be met for the transmission sites concerned, taking into account terrain configuration.

Radio navigation aids for Aeronautical Radio Navigation Services (ARNS)

2.47 Frequencies should be assigned to all radio navigation facilities taking into account agreed geographical separation criteria to ILS localizer, VOR and GBAS, X and Y channels to DME, in accordance with the principles laid out in Annex 10, Volume V and *ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* (Doc 9718) Volumes I and II. Also, the need for maximum economy in frequency demands and in radio spectrum utilization and a deployment of frequencies which ensures that international services are planned to be free of interference from other services using the same band, need to be considered.

2.48 The principles used for frequency assignment planning for radio navigation aids serving international requirements should, to the extent possible, also be used to satisfy the needs for national radio aids to navigation.

Support to ICAO Positions for ITU World Radiocommunication Conferences (WRCs)

2.49 Considering the importance and continuous demand of the radio frequency spectrum and for the protection of the current aeronautical spectrum and the allocation of new spectrum for the new services and system to be implemented in civil air navigation, States and international organizations are to support ICAO's position at ITU World Radiocommunication Conferences (WRCs) and in regional and other international activities conducted in preparation for ITU WRCs.

Note: The Handbook on Radio Frequency Spectrum Requirements for Civil Aviation *(Doc 9718) Volume I, contains ICAO policy statements relevant to the aviation requirements for radio frequency spectrum. The handbook is intended to assist States and ICAO in preparing for ITU WRCs.*

3. SPECIFIC REGIONAL REQUIREMENTS

EXAMPLES

*3.1 The surveillance systems to be used in the **(NAME)** Region(s) are:*

a) Secondary Surveillance Radars (SSR) Mode A, C and S in terminal and en-route continental airspace;

b) Primary Surveillance Radars (PSR) mainly in terminal airspace;

c) Automatic Dependent Surveillance – Broadcast (ADS-B) and Multilateration (MLAT) in terminal areas;

d) ADS-B and Wide Area Multilateration (WAM) in most of the airspace;

e) Automatic Dependent Surveillance – Contract (ADS-C) in some parts of the oceanic and remote continental airspace.

(as appropriate)

*3.2 List of assigned frequencies…**(as appropriate)***

*3.3 Where implemented, the criteria for MLS frequency planning in the **(NAME)** Region(s) should be applied, aimed at allowing the maximum number of MLS-associated DME frequencies on X and Y channels so as to minimize the possible use of W and Z channels. **(as appropriate)***

TABLE CNS II-1 - AERONAUTICAL FIXED TELECOMMUNICATIONS NETWORK (AFTN) PLAN
EXPLANATION OF THE TABLE

Column

1 The AFTN Centres/Stations of each State are listed alphabetically. Each circuit appears twice in the table. The categories of these facilities are as follows:
M - Main AFTN COM Centre
T - Tributary AFTN COM Centre
S - AFTN Station

2 Category of circuit:
M - Main trunk circuit connecting Main AFTN communication centres.
T - Tributary circuit connecting Main AFTN communication centre and Tributary AFTN Communications Centre.
S - AFTN circuit connecting an AFTN Station to an AFTN Communication Centre.

3 Type of circuit provided:
LTT/a - Landline teletypewriter, analogue (e.g. cable, microwave)
LTT/d - Landline teletypewriter, digital (e.g. cable, microwave)
LDD/a - Landline data circuit, analogue (e.g. cable, microwave)
LDD/d - Landline data circuit, digital (e.g. cable, microwave)
SAT/a/d - Satellite link, with /a for analogue or /d for digital

4 Circuit signalling speed in bits/s.

5 Circuit protocols

6 Data transfer code (syntax):
ITA-2 - International Telegraph Alphabet No. 2 (5-unit Baudot code).
IA-5 - International Alphabet No. 5 (ICAO 7-unit code).
CBI - Code and Byte Independency (ATN compliant).

7 Remarks

State/Station		Requirement				Remarks
	Category	Type	Signalling speed	Procotol	Code	
1	2	3	4	5	6	7

TABLE CNS II-2 - REQUIRED ATN INFRASTRUCTURE ROUTING PLAN

Chapter 1 EXPLANATION OF THE TABLE

Column

1 Name of the Administration and Location of the ATN Router
2 Type of Router (in end systems (ES) of the Administration shown in column 1)
3 Type of Interconnection:
Inter Regional: Connection between different Regions/ domains
Intra Regional: Connection within a Region/ domain.
4 Connected Router: List of the Administration and location of the ATN routers to be connected with the router shown in column 1.
5 Bandwidth: Link Speed expressed in bits per second (bps)
6 Network Protocol: If Internet Protocol Suite is used, indicate version of IP (IPv4 or IPv6)
7 Via: The media used to implement the interconnection of the routers. (in case of IP service bought from a service provider, indicate VPN)
8 Remarks

Administration and Location	**Type of Router**	**Type of Interconnection**	**Connected Router**	**Bandwidth**	**Network Protocol**	**Via**	**Remarks**
1	2	3	4	5	6	7	8

TABLE CNS II-3 - ATS DIRECT SPEECH CIRCUITS PLAN
EXPLANATION OF THE TABLE

Column

1 and 2 Circuit terminal stations are listed alphabetically by the Terminal I.

3 A — indicates ATS requirement for the establishment of voice communication within 15 seconds.
D — indicates requirements for instantaneous communications.

4 Type of service specified:
LTF — landline telephone (landline, cable, UHF, VHF, satellite).
RTF — radiotelephone.

5 Type of circuits; Direct (DIR) or Switched (SW).
D — indicates a direct circuit connecting Terminals I and II.
S — indicates that a direct circuit does not exist and that the connection is established via switching at the switching centre(s) indicated in column 6.
IDD — International direct dialling by public switch telephone network

Note 1.— Number of D and/or S circuits between Terminals I and II are indicated by numerical prefix, i.e. 2 D/S means 2 direct circuits and one switched circuit.

Note 2.— Pending the implementation of proper ATS voice circuits, and provided that aeronautical operational requirements are met, IDD services may be used for the ATS voice communications in low traffic areas.

6 Location of switching centre(s). Alternate routing location, if available, is indicated in brackets.

7 Remarks

ATS requirements for speech communications			Circuit			
Terminal I	Terminal II	Type	Service	D/S	To be switched via/	Remarks
1	2	3	4	5	6	7

TABLE CNS II-4 - HF NETWORK DESIGNATORS
EXPLANATION OF THE TABLE

Column

1 Name of station, preceded by its location indicator.

2 Network designators assigned to the facility providing HF radiotelephony en-route communications (selected from the provisions of the allotment plan in Appendix S27 to the ITU Radio Regulations).

NOTES

*The ICAO designators for HF MWARA and VOLMET networks in the **(NAME)** region(s) are derived from the ITU allotment area abbreviations as contained in Appendix S27 to the ITU Radio Regulations.*

ITU allotment area:

*Two- and three-letter alpha entries indicate major world air route areas (MWARA): **TBD***

*Four-letter alpha entries indicate VOLMET areas: **TBD***

Location Indicator and Name of location	HF en-route family
1	2

HF FREQUENCIES AND THEIR ICAO NETWORK DESIGNATORS BASED ON ITU APPENDIX S27 ALLOTMENT AREAS

Frequency (kHz)	ITU allotment area	***[NAME]*** ***xxx***	***[NAME]*** ***xxy***			Remarks
1	**2**	**3**	**4**	**5**	**6….**	**8**

_____

(*NAME*) ANP, VOLUME II

PART IV - AIR TRAFFIC MANAGEMENT (ATM)

1. INTRODUCTION

1.1 This part of the (*NAME*) ANP, Volume II, complements the provisions in ICAO SARPs and PANS related to air traffic management (ATM). It contains dynamic plan elements related to the assignment of responsibilities to States for the provision of ATM 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 ATM 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 State(s) concerned to implement the requirement(s) specified.

2. GENERAL REGIONAL REQUIREMENTS

Optimization of traffic flows

2.1 The Planning and Implementation Regional Groups (PIRG), through regional air navigation agreement, are responsible for the optimization of the traffic flows through the continuous improvement of the regional ATS route network and organized track systems and implementation of random routing areas and free route airspace in the Region(s) through the set-up of appropriate mechanisms for regional and inter-regional planning and coordination.

2.2 Whenever practicable, States should, in close coordination with operators, establish the most efficient routings.

2.3 The requirements for regional ATS route network, in particular, for ATS routes over the high seas and airspace of undetermined sovereignty, should be agreed upon through regional air navigation agreement.

Note: States' AIPs and other States publications should be consulted for information on the implemented ATS routes.

Aircraft Identification-SSR Code Management

2.4 Within the context of air traffic management (ATM) and the provision of air traffic services (ATS), SSR code management is a key element of ATM to ensure continuous, unambiguous aircraft identification. The number of secondary surveillance radar (SSR) codes is limited and poor management of the assignment of SSR codes results in capacity constraints and aircraft delays. States and air navigation service providers (ANSP) should apply the SSR Code Allocation Plan approved by the ***(NAME)*** PIRG. The SSR Codes Allocation Plan of the ***(NAME)*** Region(s) is addressed in the Specific Regional Requirements of Volume II.

3. SPECIFIC REGIONAL REQUIREMENTS

EXAMPLE

Optimization of traffic flows

3.1 The ATS routes agreed through regional air navigation agreement, or the ATS routes agreed through regional air navigation agreement but not implemented for specific reasons (Exact text to be specified by the Regions, as appropriate), are listed in ***Table ATM II-XX****/electronic database and reflected in the* ***Chart ATM II-XX****.*

Aircraft Identification-SSR Code Management

3.2 The SSR Codes Allocation Plan of the (NAME) Region is in ***Table ATM II-XX*** *(Exact text to be specified by the Regions, as appropriate).*

EXAMPLES FOR SPECIFIC REGIONAL REQUIREMENTS

Table ATM II-AFI-XX - SSR Code Allocation Plan

State/FIR	Domestic Codes	Domestic Codes	Transit Codes	Transit Codes
AAAA	2200-2277	2501-2577	6701-6777	0401-0477
BBBB	2100-2177	-	3300-3377	

EXAMPLE FOR SPECIFIC REGIONAL REQUIREMENTS

Table ATM II-AFI-XX (NAME) Region ATS Routes

EXPLANATION OF THE TABLE

Column

1 *Designator of ATS route and Type (Conventional, RNAV5 or RNAV1 etc.)*

2 *Significant points defining the ATS routes. Only prominent locations have been listed. Additional points where facilities are provided to complete navigational guidance along a route, but not otherwise marking significant characteristics of the route (change of heading of centre line, intersection with other routes, etc.), have normally not been included. Locations shown in parentheses indicate significant points outside the Region.*

Note 1. *Not representing the operator's requirements. Operator's required route and/or navaids are shown in square brackets ([ ]).*

Note 2. *Subject to further study. Including associated navigation aid coverage.*

Note 3 *Subject to military agreement*

Note 4. *Not acceptable at present*

Note 5. *At present, implementation possible only during specific periods (e.g. weekends, nights, etc., as published).*

Note 6. *At present, implementation of the RNAV route only possible above FL 300, or as published.*

Note 7. *Unidirectional use.*

Note 8. *For ATS route or part thereof is RNAV 1*

Whenever reference to name of points is made in Table ATM II-XX in connection with the above notes, the following abbreviations, based on those indicated in Location Indicators (Doc 7910), are used:

HE Egypt

HL Libyan Arab Jamahiriya

HS Sudan

OB Bahrain

LOWER AIRSPACE		UPPER AIRSPACE	
Designator Type	Significant Points	Designator Type	Significant Points
1	2	1	2
A1	METRU 340000N 0250900E SOKAL 323601N 0273706E KATEX 320701N 0282436E BOPED 312939N 0292655E ALEXANDRIA (NOZ) 311113N 0295701E MENKU 310531N 0301806E CAIRO (CVO) 300532N 0312318E	UA1	METRU 340000N 0250900E SOKAL 323601N 0273706E KATEX 320701N 0282436E BOPED 312939N 0292655E ALEXANDRIA (NOZ) 311113N 0295701E MENKU 310531N 0301806E CAIRO (CVO) 300532N 0312318E
A16	RASDA 330600N 0305700E MELDO 320201N 03104406E BALTIM (BLT) 313144N 0311035E DEGDI 311429N 0311035E CAIRO (CVO) 300532N 0312318E	UA16	RASDA 330600N 0305700E MELDO 320201N 03104406E BALTIM (BLT) 313144N 0311035E DEGDI 311429N 0311035E CAIRO (CVO) 300532N 0312318E
A408	(ADDIS ABABA) GWZ SALEH 140000N 0420000E ORNIS 1416.2N04236.9E HODEIDAH 1446.4N 04259.2E	UA408	(ADDIS ABABA) GWZ SALEH 140000N 0420000E ORNIS 1416.2N04236.9E HODEIDAH 1446.4N 04259.2E
A411	BNINA (BNA) 3207.28N 0201513E NASER 3151.2N 2355.3E LOSUL 314100N 250800E SIDI BARANI (BRN) 313532N 260020E	UA411	BNINA (BNA) 3207.28N 0201513E NASER 3151.2N 2355.3E LOSUL 314100N 250800E SIDI BARANI (BRN) 313532N 260020E

(*NAME*) ANP, VOLUME II

PART V – METEOROLOGY (MET)

1. INTRODUCTION

1.1 This part of the (*NAME*) 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 ***(NAME)*** 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 ***(NAME)*** 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 aerodromes[1], 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. ***(at intervals of one half-hour)*** ***[if applicable]***.

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 ***(NAME)*** Region(s).

Forecasts

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

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

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

[1] Refer to Table AOP II-1

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 ***(NAME)*** Region(s) (namely ***NAME*** of OPMET databank) and to the centre designated for the operation of the aeronautical fixed service satellite distribution system (SADIS) and the Internet-based service (Secure SADIS FTP) and/or WIFS in the ***(NAME)*** Region(s).

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

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

2.12 In the ***(NAME)*** 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 For 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-X (Former MET 1C Offshore structures). [if applicable]*

*3.4 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-X (MET 1C Offshore structures). [if applicable]*

*3.5 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]*

*3.6 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

*3.7 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

3.8 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

*3.9 In the **(NAME)** Region, meteorological information for pre-flight planning by operators of helicopters flying to offshore structures as indicated in Table MET II-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]*

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

3.11 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

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
Albania	TIRANA FIR/ACC	LAAA	TIRANA	LATI	Y	Y		N
…	…	…	…	…	…	…		…

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 18/24-hour validity aerodrome forecasts in TAF code (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					
	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
1	2	3	4	5	6	7	8	9	10	11	12
Algeria	ADRAR/TOUAT-CHEIKH SIDI MOHAMED BELKEBIR	DAUA	RS	ADRAR/TOUAT-CHEIKH SIDI MOHAMED BELKEBIR	DAUA	Y	N	N	N	N	F
…	…	…	…	…	…	…	…	…	…	…	…

TABLE MET II-3 – VOLMET BROADCASTS [FORMER ATS 2]

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.

Example:

Tokyo	Hong Kong	Auckland	
10–15 40–45	15–20 45–50	20–25	50–55
Tokyo (Narita) Tokyo (Haneda) Sapporo Nagoya (Chubu Centrair) Osaka (Kansai) Fukuoka Incheon	Hong Kong Naha Taibei Gaoxiong Manila Mactan Guangzhou	Auckland Christchurch Wellington Nadi Faleolo* Nouméa Rarotonga* Tahiti	Auckland Christchurch Wellington Nadi Faleolo* Nouméa Pago Pago* Tahiti
SIGMET	SIGMET	SIGMET	SIGMET
TOKYO (NARITA) OSAKA (KANSAI)	HONG KONG	NADI NOUMÉA	AUCKLAND CHRISTCHURCH

* No TREND available

EXAMPLE FOR SPECIFIC REGIONAL REQUIREMENTS

TABLE MET II-EUR-1 -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 o.

8 Availability of information on the sea surface temperature 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 sea 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

EUR REGION ONLY

State	Offshore structure where meteorological service is to be provided				Responsible meteorological office		Availability of supplementary information in METAR/SPECI		Availability of forecasts
		ICAO Location Indicator	Latitude	Longitude	Name	ICAO Location Indicator	Sea surface temperature	State of the sea or significant wave height	
1	2	3	4	5	6	7	8	9	10
Norway	EKOFISK	ENEK	N5632	E00312	…	…	Y	Y	Y
…	…	…		…	…	…	…	…	…

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:

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);

c) 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 structures 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. Categories 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.

(NAME) ANP, VOLUME II

PART VI - SEARCH AND RESCUE (SAR)

1. INTRODUCTION

1.1 This part of the ***(NAME)*** ANP, Volume II, complements the provisions in ICAO SARPs and PANS related to search and rescue (SAR). It contains dynamic plan elements related to the assignment of responsibilities to States for the provision of SAR 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 SAR 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 State(s) concerned to implement the requirement(s) specified.

2. GENERAL REGIONAL REQUIREMENTS

2.1 The Rescue Coordination Centres (RCCs) and Rescue Sub-Centres (RSCs) for the (***NAME***) Region(s) are listed in **Table SAR II-1** and depicted in **Chart SAR II-1**.

2.2 In cases where the minimum SAR facilities are temporarily unavailable, alternative suitable means should be made available.

2.3 In cases where a SAR alert is proximate to a search and rescue region (SRR) boundary (e.g. 50 NM or less), or it is unclear if the alert corresponds to a position entirely contained within an SRR, the adjacent RCC or RSC should be notified of the alert immediately.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1. *The details of the facilities and/or services to be provided to fulfil the basic requirements of the plan could be found in this part. Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified. [if required]*

———————————

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE *(NAME)* REGION(S)

EXPLANATION OF THE TABLE

Column

1 State

2 Name of the Rescue Coordination Centre (RCC) and Rescue Sub-centre (RSC).

3 SAR points of contact (SPOC). Name of the SPOC.

4 Remarks. Supplementary information such as the type of RCC (e.g. maritime or aviation or joint).

State	Name of and RCC/RSC	SPOC	Remarks
1	2	3	4
AMSWELL	NIBORD RCC XXXXX RSC	Nibord RCC	

(NAME) ANP, VOLUME II

PART VII - AERONAUTICAL INFORMATION MANAGEMENT (AIM)

1. INTRODUCTION

1.1 This part of the ***(NAME)*** ANP, Volume II, complements the provisions in ICAO SARPs and PANS related to AIS/AIM and aeronautical charts (MAP). It contains dynamic plan elements related to the assignment of responsibilities to States for the provision of AIS/AIM 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 AIS/AIM 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 State(s) concerned to implement the requirement(s) specified.

2. GENERAL REGIONAL REQUIREMENTS

2.1 The responsibility for the provision of AIS/AIM facilities and services in the ***(NAME)*** Region(s), is reflected in the ***(NAME)*** **Table AIM II-1,** which shows the list of designated international NOTAM Office (NOF), designated State for AIP production, designated State for aeronautical charts (MAP) production, designated State for the provision of the authoritative Integrated Aeronautical Information Database (IAID) and designated State for the provision of the pre-flight information services.

2.2 States should designate and implement an authoritative Integrated Aeronautical Information Database (IAID) where data sets are integrated and used to produce current and future AIS/AIM products and services, which is a fundamental step in the transition to AIM. The designation of authoritative databases should be clearly stated in the Aeronautical Information Package AIP.

2.3 The national plans for the transition from AIS to AIM identifying clearly the timelines for the implementation of the different elements of the ICAO Roadmap for the transition from AIS to AIM should be submitted by States to the ICAO ***(NAME)*** Regional Office(s). States should also inform the ICAO ***(NAME)*** Regional Office(s) of any update.

2.4 States should take necessary measures to ensure that aeronautical information and data they provide meet the regulatory Aeronautical Data quality requirements.

2.5 The Quality Management System (QMS) in AIS/AIM should define procedures to meet the safety and security objectives associated with the management of aeronautical data and information.

2.6 Recognizing the need to maintain or enhance existing safety levels of operations, States should ensure that any change to the existing systems or the introduction of new systems used for processing aeronautical data and/or information are preceded by a safety assessment.

2.7 Technical services responsible for origination of the raw aeronautical information should be acquainted with the requirements for promulgation and advance notification of changes that are operationally significant as established in Annexes 11 and 14 and other relevant ICAO documentation. They should take due account of the time needed by AIS/AIM for the preparation, production and issue of the relevant material, including the compliance with the AIRAC procedures.

2.8 AIS/AIM personnel should be involved in the air navigation planning processes. This should ensure the timely preparation of appropriate AIS documentation and that the effective dates for changes to

the air navigation system and procedures are satisfied.

2.9 States should produce relevant aeronautical charts required for civil air operations employing visual air navigation independently or in support of other forms of air navigation. The production responsibility for sheets of the World Aeronautical Chart (WAC) — ICAO 1: 1 000 000 or Aeronautical Chart — ICAO 1: 500 000 (*as an alternative to the World Aeronautical Chart — ICAO 1:1 000 000)* is set out in **Table AIM II-2**.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1 TBD (e.g. EAD for Europe, AIS/AIM Certification for EUR and MID, etc.)

———————

TABLE AIM II-1 - RESPONSIBILITY FOR THE PROVISION OF AIS/AIM FACILITIES AND SERVICES

EXPLANATION OF THE TABLE

Column:

1 Name of the State or territory

2 Designated international NOTAM Office (NOF)

3 Designated State for AIP production

4 Designated State for aeronautical charts (MAP) production

5 Designated State for the provision of the authoritative Integrated Aeronautical Information Database (IAID)

6 Designated State for the provision of pre-flight information services

7 Remarks — additional information, as appropriate.

State	NOF	AIP	MAP	IAID	Pre-flight briefing	Remarks
1	2	3	4	5	6	7

TABLE AIM II-2 - PRODUCTION RESPONSIBILITY FOR SHEETS OF THE WORLD AERONAUTICAL CHART - ICAO 1:1 000 000 OR AERONAUTICAL CHART — ICAO 1: 500 000

EXPLANATION OF THE TABLE

Column:

1 Name of the State accepting production responsibility.

2 World Aeronautical Chart — ICAO 1:1 000 000/Aeronautical Chart — 1: 500 000 sheet number(s) for which production responsibility is accepted.

3 Remarks.

Note — In those instances where the production responsibility for certain sheets has been accepted by more than one State, these States by mutual agreement should define limits of responsibility for those sheets. This should be reflected in the Remarks column

State	Sheet number(s)	Remarks
1	**2**	**3**

TEMPLATE APPROVED BY THE COUNCIL
on 18 June 2014

(*NAME*) AIR NAVIGATION PLAN

VOLUME III

(*NAME*) AIR NAVIGATION PLAN

VOLUME III

TABLE OF CONTENTS

(*NAME*) ANP, VOLUME III

PART 0 – INTRODUCTION

1. INTRODUCTION

1.1 The background to the publication of ANPs in three volumes is explained in the Introduction in Volume I. The procedure for amendment of Volume III is also described in Volume I. Volume III contains dynamic/flexible plan elements related to the implementation of the air navigation system and its modernization in line with the ICAO Aviation System Block Upgrades (ASBUs) and associated technology roadmaps described in the Global Air Navigation Plan (GANP).

1.2 The information contained in Volume III is related mainly to:

- Planning: objectives set, priorities and targets planned at regional or sub-regional levels;
- Implementation monitoring and reporting: monitoring of the progress of implementation towards targets planned. This information should be used as the basis for reporting purposes (i.e.: global and regional air navigation reports and performance dashboards); and/or
- Guidance: providing regional guidance material for the implementation of specific system/procedures in a harmonized manner.

1.3 The management of Volume III is the responsibility of the [***name of PIRG***].

1.4 Volume III should be used as a tool for monitoring and reporting the status of implementation of the elements planned here above, through the use of tables/databases and/or references to online monitoring tools, as endorsed by [***name of PIRG***]. The status of implementation is updated on a regular basis as endorsed by [***name of PIRG***].

2. AVIATION SYSTEM BLOCK UPGRADES (ASBUs), MODULES AND ROADMAPS

2.1. The ASBU Modules and Roadmaps form a key component to the GANP, noting that they will continue to evolve as more work is done on refining and updating their content and in subsequent development of related provisions, support material and training.

2.2. Although the GANP has a worldwide perspective, it is not intended that all Block Upgrade Modules are required to be applied in every State, sub-region and/or region. Many of the Block Upgrade Modules contained in the GANP are specialized packages that should be applied only where the specific operational requirement exists or corresponding benefits can be realistically projected. Accordingly, the Block Upgrade methodology establishes an important flexibility in the implementation of its various Modules depending on a region, sub-region and/or State's specific operational requirements. Guided by the GANP, ICAO [***Region-name***] regional, sub-regional and State planning should identify Modules which best provide the needed operational improvements.

(*NAME*) ANP, VOLUME III

PART I - GENERAL PLANNING ASPECTS (GEN)

1. PLANNING METHODOLOGY

1.1 Guided by the GANP, the regional planning process starts by identifying the homogeneous ATM areas, major traffic flows and international aerodromes. An analysis of this data leads to the identification of opportunities for performance improvement. Modules from the Aviation System Block Upgrades (ASBUs) are evaluated to identify which of those modules best provide the needed operational improvements. Depending on the complexity of the module, additional planning steps may need to be undertaken including financing and training needs. Finally, regional plans would be developed for the deployment of modules by drawing on supporting technology requirements. This is an iterative planning process which may require repeating several steps until a final plan with specific regional targets is in place. This planning methodology requires full involvement of States, service providers, airspace users and other stakeholders, thus ensuring commitment by all for implementation.

1.2 Block 0 features Modules characterized by technologies and capabilities which have already been developed and implemented in many parts of the world today. It therefore features a near-term availability milestone, or Initial Operating Capability (IOC), of 2013 for high density based on regional, sub-regional and State operational need. Blocks 1 through 3 are characterized by both existing and projected performance area solutions, with availability milestones beginning in 2018, 2023 and 2028 respectively.

2. REVIEW AND EVALUATION OF AIR NAVIGATION PLANNING

2.1. The progress and effectiveness against the priorities set out in the regional air navigation plans should be annually reported, using a consistent reporting format, to ICAO.

2.2. Performance monitoring requires a measurement strategy. Data collection, processing, storage and reporting activities supporting the identified global/regional performance metrics are fundamental to the success of performance-based approaches.

2.3. The air navigation planning and implementation performance framework prescribes reporting, monitoring, analysis and review activities being conducted on a cyclical, annual basis. An Air Navigation Reporting Form (ANRF) reflecting selected key performance areas as defined in the Manual on Global Performance of the Air Navigation System (ICAO Doc 9883) has been developed for each ASBU Module. The ANRF is a customized tool which is recommended for the application of setting planning targets, monitoring implementation, and identifying challenges, measuring implementation/performance and reporting. If necessary, other reporting formats that provide more details may be used but should contain as a minimum the elements described in the ANRF template. A sample of the ANRF is provided in **Appendix A**. A sample Template of a planning table which may be used to show the elements planned in an ICAO region is provided in **Appendix B**.

3. REPORTING AND MONITORING RESULTS

3.1 Reporting and monitoring results will be analyzed by the PIRGs, States and ICAO Secretariat to steer the air navigation improvements, take corrective actions and review the allocated objectives, priorities and targets if needed. The results will also be used by ICAO and aviation partner stakeholders to develop the annual Global Air Navigation Report. The report results will provide an opportunity for the international civil aviation community to compare progress across different ICAO regions in the establishment of air navigation infrastructure and performance-based procedures.

3.2 The reports will also provide the ICAO Council with detailed annual results on the basis of which tactical adjustments will be made to the performance framework work programme, as well as triennial policy adjustments to the GANP and the Block Upgrade Modules.

3.3 **Table GEN III-1** contains a minimum set of Implementation Indicator(s) for each of the eighteen ASBU Block 0 Modules necessary for the monitoring of these Modules (if identified as a priority for implementation at regional or sub-regional level). These indicators are intended to enable comparison between ICAO Regions with respect to ASBU Block 0 Modules and will apply only to commonly selected ASBU Modules. All regions/PIRGs reserve the right to select the ASBU Modules relevant to their needs and to endorse additional indicators, as deemed necessary. No reporting is required for ASBU Block 0 Modules that have not been selected.

*Note: The priority for implementation as well as the applicability area of each selected ASBU Block 0 Module is to be defined by the [**name** of **PIRG**]. This should be reflected in Part II – Air Navigation System Implementation.*

TABLE GEN III-1 – IMPLEMENTATION INDICATOR(S) FOR EACH ASBU BLOCK 0 MODULE

Explanation of the Table

1 Block 0 Module Code
2 Block 0 Module Title
3 High level Implementation Indicator
4 Remarks *Additional information as deemed necessary.*

Module Code	Module Title	Implementation Indicator	Remarks
1	2	3	4
B0-APTA	Optimization of Approach Procedures including vertical guidance	% of international aerodromes having at least one runway end provided with APV Baro-VNAV or LPV procedures	
B0-WAKE	Increased Runway Throughput through Optimized Wake Turbulence Separation	% of applicable international aerodromes having implemented increased runway throughput through optimized wake turbulence separation	1. Not to be considered for the first reporting cycles due to lack of maturity. 2. List of ADs to be established through regional air navigation agreement.
B0-RSEQ	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	% of applicable international aerodromes having implemented AMAN / DMAN	1. Not to be considered for the first reporting cycles due to lack of maturity. 2. List of ADs to be established through regional air navigation agreement.
B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	% of applicable international aerodromes having implemented A-SMGCS Level 2	List of ADs to be established through regional air navigation agreement.
B0-ACDM	Improved Airport Operations through Airport-CDM	% of applicable international aerodromes having implemented improved airport operations through airport-CDM	List of ADs to be established through regional air navigation agreement.
B0-FICE	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	% of FIRs within which all applicable ACCs have implemented at least one interface to use AIDC / OLDI with neighbouring ACCs	
B0-DATM	Service Improvement through Digital Aeronautical Information Management	- % of States having implemented an AIXM based AIS database - % of States having implemented QMS	
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	- % of States having implemented SADIS / WIFS - % of States having implemented QMS	

Module Code	Module Title	Implementation Indicator	Remarks
1	2	3	4
B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	% of FIRs in which FUA is implemented	
B0-NOPS	Improved Flow Performance through Planning based on a Network-Wide view	% of FIRs within which all ACCs utilize ATFM systems	
B0-ASUR	Initial capability for ground surveillance	% of FIRs where ADS-B OUT and/or MLAT are implemented for the provision of surveillance services in identified areas.	1. Not to be considered for the first reporting cycles due to lack of maturity.
B0-ASEP	Air Traffic Situational Awareness (ATSA)	% of States having implemented air traffic situational awareness	1. Not to be considered for the first reporting cycles due to lack of maturity.
B0-OPFL	Improved access to optimum flight levels through climb/descent procedures using ADS-B	% of FIRs having implemented in-trail procedures	1. Not to be considered for the first reporting cycles due to lack of maturity.
B0-ACAS	ACAS Improvements	% of States requiring carriage of ACAS (with TCAS 7.1 evolution)	
B0-SNET	Increased Effectiveness of Ground-Based Safety Nets	% of States having implemented ground-based safety-nets (STCA, APW, MSAW, etc.)	
B0-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDO)	- % of international aerodromes / TMAs with PBN STAR implemented - % of international aerodromes/TMA where CDO is implemented	
B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	% of FIRs utilising data link en-route in applicable airspace	
B0-CCO	Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)	- % of international aerodromes / TMAs with PBN SID implemented - % of international aerodromes/TMA where CCO is implemented	

Appendix A

SAMPLE TEMPLATE

1. AIR NAVIGATION REPORT FORM (ANRF)

(This template demonstrates how ANRF to be used.
The data inserted here refers to ASBU B0-05/CDO as an example only)

Regional and National planning for ASBU Modules

2. REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-05/CDO:
Improved Flexibility and Efficiency in Descent Profiles

Performance Improvement Area 4:
Efficient Flight Path – Through Trajectory-based Operations

3. ASBU B0-05/CDO: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	N	N	Y	Y	Y

4. ASBU B0-05/CDO: Planning Targets and Implementation Progress

5. Elements	6. Targets and implementation progress (Ground and Air)
1. CDO	
2. PBN STARs	

7. ASBU B0-05/CDO: Implementation Challenges

Elements	Implementation Area			
	Ground system Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. CDO				
2. PBN STARs				

8. Performance Monitoring and Measurement
8A. ASBU B0-05/CDO: Implementation Monitoring

Elements	Performance Indicators/Supporting Metrics
1. CDO	Indicator: Percentage of international aerodromes/TMAs with CDO implemented Supporting metric: Number of international aerodromes/TMAs with CDO implemented
2. PBN STARs	Indicator: Percentage of international aerodromes/TMAs with PBN STARs implemented Supporting metric: Number of international aerodromes/TMAs with PBN STARs implemented

8. Performance Monitoring and Measurement **8 B. ASBU B0-05/CDO: Performance Monitoring**	
Key Performance Areas (Out of eleven KPAs, for the present until experienced gained, only five have been selected for reporting through ANRF)	**Where applicable, indicate qualitative Benefits,**
Access & Equity	Not applicable
Capacity	Not applicable
Efficiency	Cost savings through reduced fuel burn. Reduction in the number of required radio transmissions.
Environment	Reduced emissions as a result of reduced fuel burn
Safety	More consistent flight paths and stabilized approach paths. Reduction in the incidence of controlled flight into terrain (CFIT).
9. Identification of performance metrics: It is not necessary that every module contributes to all of the five KPAs. Consequently, a limited number of metrics per type of KPA, serving as an example to measure the module(s)' implementation benefits, without trying to apportion these benefits between module, have been identified on page 5. For the family of ASBU modules selected for air navigation implementation, States/Region to choose the applicable performance (benefit) metrics from the list available on page 5. This approach would facilitate States in collecting data for the chosen performance metrics. States/Region, however, could add new metrics for different KPAs based on maturity of the system and ability to collect relevant data.	

AIR NAVIGATION REPORT FORM
HOW TO USE - EXPLANATORY NOTES

1. **Air Navigation Report Form (ANRF):** This form is nothing but the revised version of Performance Framework Form that was being used by Planning and Implementation Regional Groups (PIRGs)/States until now. The ANRF is a customized tool for Aviation System Block Upgrades (ASBU) Modules which is recommended for application for setting planning targets, monitoring implementation, identifying challenges, measuring implementation/performance and reporting. Also, the PIRGs and States could use this report format for any other air navigation improvement programmes such as Search and Rescue. If necessary, other reporting formats that provide more details may be used but should contain as a minimum the elements described in this ANRF template. The results will be analysed by ICAO and aviation partners and utilized in the Regional Performance Dashboards and the Annual Air Navigation Report. The conclusions from the Air Navigation Report will serve as the basis for future policy adjustments, aiding safety practicality, affordability and global harmonization, amongst other concerns.

2. **Regional/National Performance objective:** In the ASBU methodology, the performance objective will be the title of the ASBU module itself. Furthermore, indicate alongside corresponding Performance Improvement area (PIA).

3. **Impact on Main Key Performance Areas:** Key to the achievement of a globally interoperable ATM system is a clear statement of the expectations/benefits to the ATM community. The expectations/benefits are referred to eleven Key Performance Areas (KPAs) and are interrelated and cannot be considered in isolation since all are necessary for the achievement of the objectives established for the system as a whole. It should be noted that while safety is the highest priority, the eleven KPAs shown below are in alphabetical order as they would appear in English. They are access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of ATM community; predictability; safety; and security. However, out of these eleven KPAs, for the present, only five have been selected for reporting through ANRF, which are Access & Equity, Capacity, Efficiency, Environment and Safety. The KPAs applicable to respective ASBU module are to be identified by marking Y (Yes) or N (No). The impact assessment could be extended to more than five KPAs mentioned above if maturity of the national system allows and the process is available within the State to collect the data.

4. **Planning Targets and Implementation Progress:** This section indicates planning targets and status of progress in the implementation of different elements of the ASBU Module for both air and ground segments.

5. **Elements related to ASBU module:** Under this section list elements that are needed to implement the respective ASBU Module. Furthermore, should there be elements that are not reflected in the ASBU Module (example: In ASBU B0-80/ACDM, Aerodrome certification and data link applications D-VOLMET, D-ATIS, D-FIS are not included; Similarly in ASBU B0-30/DAIM, note that WGS-84 and eTOD are not included) but at the same time if they are closely linked to the module, ANRF should specify those elements. As a part of guidance to PIRGs/States, every Regional ANP will have the complete list of all 18 Modules of ASBU Block 0 along with corresponding elements, equipage required on the ground and in the air as well as metrics specific to both implementation and performance (benefits).

6. **Targets and implementation progress (Ground and Air):** Planned implementation date (month/year) and the current status/responsibility for each element are to be reported in this section. Please provide as much details as possible and should cover both avionics and ground systems. This ANRF being high level document, develop necessary detailed action plan separately for each element/equipage.

7. **Implementation challenges**: Any challenges/problems that are foreseen for the implementation of elements of the Module are to be reported in this section. The purpose of the section is to identify in advance any issues that will delay the implementation and if so, corrective action is to be initiated by the concerned person/entity. The four areas, under which implementation issues, if any, for the ASBU Module to be identified, are as follows:

- Ground System Implementation:
- Avionics Implementation:
- Procedures Availability:
- Operational Approvals:

Should be there no challenges to be resolved for the implementation of ASBU Module, indicate as "NIL".

8. **Performance Monitoring and Measurement:** Performance monitoring and measurement is done through the collection of data for the supporting metrics. In other words, metrics are quantitative measure of system performance – how well the system is functioning. The metrics fulfil three functions. They form a basis for assessing and monitoring the provision of ATM services, they define what ATM services user value and they can provide common criteria for cost benefit analysis for air navigation systems development. The Metrics are of two types:

A. **Implementation Monitoring**: Under this section, the indicator supported by the data collected for the metric reflects the status of implementation of elements of the Module. For example- Percentage of international aerodromes with CDO implemented. This indicator requires data for the metric "number of international aerodromes with CDO".

B. **Performance Monitoring**: The metric in this section allows to asses benefits accrued as a result of implementation of the module. The benefits or expectations, also known as Key Performance Areas (KPAs), are interrelated and cannot be considered in isolation since all are necessary for the achievement of the objectives established for the system as a whole. It should be noted that while safety is the highest priority, the eleven KPAs shown below are in alphabetical order as they would appear in English. They are access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of ATM community; predictability; safety; and security. However, out of these eleven KPAs, for the present until experienced gained, only five have been selected for reporting through ANRF, which are Access & Equity, Capacity, Efficiency, Environment and Safety. Where applicable, mention qualitative benefits under this section.

9. **Identification of performance metrics:** It is not necessary that every module contributes to all of the five KPAs. Consequently, a limited number of metrics per type of KPA, serving as an example to measure the module(s)' implementation benefits, without trying to apportion these benefits between module, have been identified on page 6. For the family of ASBU modules selected for air navigation implementation, States/Region to choose the applicable performance (benefit) metrics from the list available on page 6. This approach would facilitate States in collecting data for the chosen performance metrics. States/Region, however, could add new metrics for different KPAs based on maturity of the system and ability to collect relevant data.

Appendix B - Main Planning Table Template

	Objectives					Priorities and targets			Reference
Block	**ASBU modules and elements Enablers**	**Performance Improvement Area**	**Applicable or not in [Region] (Yes/No)**	**Regional planning elements**	**Enablers**	**Priority allocated in [Region]**	**Target(s) in [Region]**	**Indicator(s) / Metric(s)**	**Supporting Planning Document (ANRF, other)**

(*NAME*) ANP, VOLUME III

PART II – AIR NAVIGATION SYSTEM IMPLEMENTATION

1. INTRODUCTION

1.1 The planning and implementation of the ICAO Aviation System Block Upgrades (ASBUs) should be undertaken within the framework of the [***name of PIRG***] with the participation and support of all stakeholders, including regulatory personnel.

1.2 The ASBU Blocks and Modules adopted by the [***region, sub-region name***] should be followed in accordance with the specific ASBU requirements to ensure global interoperability and harmonization of air traffic management. The [***name of PIRG***] should determine the ASBU Block Upgrade Modules, which best provide the needed operational improvements in the ICAO [***Region-name***].

2. ICAO [*REGION-NAME*] AIR NAVIGATION OBJECTIVES, PRIORITIES AND TARGETS

2.1 In accordance with Recommendation 6/1 of the Twelfth Air Navigation Conference (AN-Conf/12), PIRGs are requested to establish priorities and targets for air navigation, in line with the ASBU methodology.

2.2 The achievement of the intended benefits along each routing or within each area of affinity is entirely dependent on the coordinated implementation of the required elements by all provider and user stakeholders concerned.

2.3 Considering that some of the block upgrade modules contained in the GANP are specialized packages that may be applied where specific operational requirements or corresponding benefits exist, States and PIRGs should clarify how each Block Upgrade module would fit into the national and regional plans.

2.4 As Block 0 modules in many cases provide the foundation for future development, all Block 0 modules should be assessed, as appropriate, for early implementation by States in accordance with their operational needs.

2.5 In establishing and updating the [***region-name***] air navigation plan, the [***name of PIRG***] and States should give due consideration to the safety priorities set out in the Global Aviation Safety Plan (GASP) and [***region-name***] safety strategy.

2.6 States in the [***region-name***] through the [***name of PIRG***] should establish their own air navigation objectives, priorities and targets to meet their individual needs and circumstances in line with the global and regional air navigation objectives, priorities and targets.

3. MONITORING OF ASBU MODULES IMPLEMENTATION

3.1 The monitoring of air navigation performance and its enhancement should be carried out through identification of relevant air navigation Metrics and Indicators as well as the adoption and attainment of air navigation system Targets.

3.2 The monitoring of the regional implementation progress and performance metrics/indicators should be done for all elements planned by [***name of PIRG***]. The monitoring should allow global correlation of status and expectations, appreciation of benefits achieved for the airspace users, as well as corrective actions to be taken by the PIRG on implementation plans.

3.3 The [***name of PIRG***] should determine appropriate mechanisms and tools for the monitoring and the collection of necessary data at national and regional levels.

APPENDIX – ASBU BLOCK 0 MODULES APPLICABLE IN THE (*NAME*) REGION(S)

TO BE DEVELOPED

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION (Updated at MET SG/18)								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Meteorological observations and reports. (Annex 3, Chapter 4)	Solomon Islands AP-MET-01	Weather information is inadequate and not provided on a regular basis	1996 Confirmed 2006 SOA	Reported by airlines operating to Solomon I.	Equipment to be upgraded and arrangements to be made for regular observations. TC expert recommendation to replace and/or calibrate MET obs. equipment AGGH – 2008. State made aware of MET Services gaps identified by ICAO TC Project, CAEMSA-SP, in late 2008. CAEMSA-SP Phase II plan for Donors and associated remedies. Activation of WIFS will assist in overcoming deficiency. AWS was installed (2012) at Honiara (Henderson), AGGH, by New Zealand, including training of Solomon Is. technical personnel in the maintenance of the equipment. Responsibility for ongoing system calibration and verification may need to be determined. Secure transmission of weather information to the appropriate RODB may need to be verified (noting that transmission via email to the Australian Bureau of Meteorology may not be appropriate). Solomon Is. expected to address issues concerning calibration and verification of meteorological observation systems and proper/secure transmission of information.	Ministry of Transport, Works and Aviation, Solomon I. *Note: OPMET/M TF to carry out survey*	2011	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION (Updated at MET SG/18)								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Meteorological observations and reports. (Annex 3, Chapter 4)	Kiribati AP-MET-02	METAR from Kiribati not available on regular basis.	1998 Confirmed 2005 SIP	Reported by airlines	State's MET authority to consider urgent action to be taken for providing regular observations and reports. TC expert recommendation to purchase/install AWOS – 2008. ICAO SIP conducted in 2005. State made aware of MET Services gaps identified by ICAO TC Project CAEMSA-SP, in late 2008. CAEMSA-SP Phase II plan for Donors and associated remedies. Activation of WIFS will assist in overcoming deficiency. Kiribati requested assistance from New Zealand with respect to the supply of a new/replacement meteorological observing system. Kiribati was considering funding options for a new meteorological observing system and a full meteorological observing programme.	Directorate of Civil Aviation, Kiribati. *Note: OPMET/M TF to carry out survey*	2011	A
Reporting of information on volcanic eruptions to civil aviation units. (Annex 3, 3.6, 4.8)	Indonesia AP-MET-03	Information on volcanic activity not provided regularly to ATS units and MWOs.	1995 Confirmed by ICAO SIP mission Dec 2003	Observed by States concerned. Reported at the WMO/ICAO Workshop on Volcanic Ash Hazards (Darwin, 1995)	Three-party LOA to be signed between the MGA, DGCA and DVGHM. Information exchange between CVGHM & ABA in draft form. VSAT comms. installed to improve the monitoring in E Nusa Tenggara – provides direct transfer of data to CVGHM HQ full time. (AusAID-funded project). Bilingual reporting form based on VONA to improve comm. to VAAC in Sulawesi. Indonesia submitted official report to the RO (August 2014) on corrective action taken: (a) MoU	DGCA, MGA Indonesia	2014	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION (Updated at MET SG/18)								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
					between MET authority, volcano observatory and CAA; (b) implemented volcanic activity report dissemination system (1 May 2012); (c) coordination between MET authority, volcano observatory, CAA with VAAC Darwin; and (d) implementation of SIGMET procedures at relevant MWOs (April 2013) and successful participation in SIGMET tests.			
Reporting of information on volcanic eruptions to civil aviation units. (Annex 3, 3.6, 4.8)	Papua New Guinea AP-MET-04	Information on volcanic activity not provided regularly to ATS units and MWOs.	1995 Confirmed by ICAO SIP mission Dec 2003	Observed by States concerned. Reported at the WMO/ICAO Workshop on Volcanic Ash Hazards (Darwin, 1995)	Procedures to be set up for exchange of data between NWS, ATS and Rabaul Volcano Observatory (RVO) and a LOA to be signed Discussion of an agreement between RVO & PNG CAA to provide volcanic information to aviation through cost recovery is underway. Recent analysis of meteorological services provided in PNG (conducted by PNG, Australia and the ICAO) produced a number of recommendations for actions that would strengthen services and help rectify MET deficiencies. Future volcanic ash exercises in the APAC region would facilitate reporting of information on volcanic eruptions to civil aviation units in States concerned.	NWS, ATS PNG *Note: ICAO Regional Office to monitor*	TBD (no action plan submitted to RO)	A
Provision of SIGMET for volcanic ash (Annex 3, Chapter 7; ASIA/PAC FASID Table MET 1B)	Indonesia AP-MET-06 Philippines AP-MET-07 Papua New Guinea AP-MET-08	Requirements for issuance and proper dissemination of SIGMET, including SIGMET for volcanic ash, have not been fully implemented	ICAO SIP mission Dec 2003	a) Reported by airlines b) Noted by Volcanic Ash Advisory Centres	a) ICAO to carry out a Special Implementation Project (SIP) with the primary objective to improve implementation of SIGMET procedures, especially for VA. b) State to take urgent actions to implement the SIGMET procedures. Note. ICAO SIP carried out in 2003, progress in issuance of SIGMET for VA is noted; the outstanding problems to be resolved within 1-year	a) State's Met authorities b) ICAO to implement the SIP. c) ICAO Regional Office to co-ordinate and monitor.	2014 (AP-MET-06), To be advised (AP-MET-07 and 08)	U

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION (Updated at MET SG/18)								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
					(progress reported by VAAC Darwin) LOA between ATO, PHIVOCS & PAGASA signed in 2004 to make reporting part of information dissemination practice. LOA is undergoing periodic review (ref. letter of PAGASA dated March 12, 2008) VAAC Darwin trained forecasters in PNG and Philippines to prepare VA SIGMET Participated in VA SIGMET test 17 Nov 2009 SIGMET monitoring over a period of 2 months in August and September 2012 indicated that no SIGMET was received from PNG (MET SG/17, 8.4.3 & 13.9 refers). Indonesia advised (MET SG/17) that procedures were developed for the issuance of SIGMET (WS, WV and WC) compliant with ICAO provisions and that MWO Jakarta (WIII) and MWO Ujung Pandang (WAAF) have issued SIGMET according to the requirements since April 2013. MET SG/17 noted that validation of SIGMET receipt at RODBs and WIFS/SADIS gateways would be necessary and may require additional SIGMET monitoring and participation in SIGMET tests. Indonesia submitted official report to the RO (August 2014) on corrective action taken: (a) MoU between MET authority, volcano observatory and CAA; (b) implemented volcanic activity report dissemination system (1 May 2012); (c) coordination between MET authority, volcano observatory, CAA with VAAC Darwin; and (d)			

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION (Updated at MET SG/18)								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
					implementation of SIGMET procedures at relevant MWOs (April 2013) and successful participation in SIGMET tests. PNG did not participate in 2013 SIGMET tests. A recent analysis of the meteorological services provided in PNG (conducted by PNG, Australia and the ICAO) produced a number of recommendations for actions that would strengthen services and help rectify MET deficiencies. Future volcanic ash exercises in the APAC region would facilitate provision of SIGMET for volcanic ash in States concerned.			
a) Service for operators and flight crew members. (Annex 3, Chapter 9). b) WAFS products for flight documentation. (ASIA/PAC FASID Table MET 1A).	Cambodia AP-MET-09	Briefing and flight documentation not provided as required. WAFS products not available	1999	Airlines do not receive the required flight documentation including WAFS forecasts.	States to consider urgent action for installation of SADIS VSAT for receiving WAFS products and OPMET information. Action plan proposed by ICAO MET mission 2003 A TC project proposal submitted to SSCA, Cambodia Cambodia expects to have SADIS FTP operational in 2011 and may require training from a nearby State Cambodia informed MET SG/17 that the Secure SADIS FTP system was installed but further action was required in relation to training of personnel to use the system. Specific training necessary for the personnel to provide the WAFS products for flight documentation was expected to be addressed by Cambodia.	State's MET authorities	End 2011	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION (Updated at MET SG/18)								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
MWO for Phnom Penh FIR and SIGMET (Annex 3, Chapter 3 & 7; ASIA/PAC FASID Table MET 1B)	Cambodia AP-MET-11	Requirements for meteorological watch office (MWO) to be established at Phnom-Penh international airport have not been met.		MWO not established due to lack of trained personnel and technical facilities. No SIGMET service for Phnom Penh FIR	Establishment of MWO currently not feasible. SIGMET service is provided under bilateral agreement with China to meet requirements. A TC project proposal submitted to SSCA, Cambodia Cambodia is in process of establishing its own MWO with target date end of 2011. Bilateral arrangement with China has successfully addressed part of the deficiency (SIGMET issuance).	SSCA, Cambodia	TBD End 2011	A
Provision of SIGMET information (Annex 3, Chapter 7; ASIA/PAC FASID Table MET 1B)	Lao PDR AP-MET-12	Requirements for issuance and dissemination of SIGMET have not been fully implemented.	2000	SIGMET frequently not available Reported by airlines	State's MET authority to take urgent actions to implement the SIGMET procedures. Lao PDR has established MWO in 2010 and started issuing SIGMET since March 2011. As a result of monitoring by RODB Bangkok, LAO PDR was advised to correct noted formatting problem and to issue SIGMET on a regular basis to meet requirements. Lao PDR is expected to issue SIGMET regularly by the end of 2011. This deficiency can be considered for removal after correcting the above problems. SIGMET monitoring by RODB Bangkok in February 2012 failed to identify the issuance of any SIGMET by Lao PDR, indicating that the deficiency is still to be properly rectified (ROBEX WG/11, 2.1.4 refers). Lao PDR did not successfully participate in each of the three 2013 SIGMET tests.	State's MET authorities	End 2011	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION
(Updated at MET SG/18)

Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Provision of SIGMET information for Kathmandu FIR. (Annex 3, Chapter 7; ASIA/PAC FASID Table MET 1B)	Nepal AP-MET-14	Requirements for issuance and dissemination of SIGMET have not been met.	2000	Not established due to lack of technical facilities. No SIGMET service for Kathmandu FIR	Issuance of SIGMET currently not feasible. Action being taken to have SIGMET service provided under bilateral agreement with a neighbouring country to meet immediate requirement. Nepal is also planning to issue its own SIGMET. Nepal informed the RO of progress: now able to issue SIGMET when necessary; training was conducted by WMO (Nov 2013); SIGMET issuance in operation (July 2013); SIGMET information transmitted to ATS units and other CA units concerned; participated in 2013 SIGMET tests. Nepal expected to submit in writing an official report to the RO providing details of the corrective action taken.	MET Authority Nepal	2014	A
MWO for Pyongyang FIR and SIGMET (Annex 3, Chapter 3 & 7; ASIA/PAC FASID Table MET 1B)	Democratic Peoples' Republic of Korea AP-MET-16	Requirements for meteorological watch office (MWO) to be established at Pyongyang international airport have not been met.	2008	MWO not established due to lack of trained personnel and lack of resources. No SIGMET service for Pyongyang FIR Reported by RO mission	MWO established in February 2009 as reported by State. DPRK is subsequently producing SIGMET on a regular basis and is routing SIGMET to RODB Tokyo. It is required for Sunan MWO to participate the APAC SIGMET test in November 2011. This deficiency can be removed if SIGMET is continued to be issued regularly for another six months. DPRK informed RO that SIGMET were issued in May 2013; RO to coordinate confirmation of receipt of SIGMETs at required offices. DPRK to submit official report to RO providing	General Administration of Civil Aviation (GACA) DPRK	2014	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION (Updated at MET SG/18)								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
					details of corrective action taken. Validation would necessarily require SIGMET monitoring to confirm receipt at required offices. Test SIGMETs were not received from DPRK in 2013; assistance to be coordinated by ROBEX WG to resolve the communication issues.			
Volcanic activity information to be provided to ATS units, MWOs, and VAAC (Annex 3, 3.6 and 4.8)	Tonga AP-MET-17	Information on volcanic activity not provided regularly to ATS units, MWOs, and VAAC	2008	Reported by TCB CAEMSA-SP technical expert	Agreement drafted for the dissemination of volcanic ash information from MLSNRKT to MTKT for distribution to ACCs, MWOs and VAACs (under consideration) Tonga submitted official report to RO (10 May 2013) advising that MOU between the Ministry of Infrastructure (MOI) and the Ministry of Lands, Environment, Climate Change and Natural Resources (MLECCNR) signed 9 May 2013 for coordination procedures of the dissemination of detection of volcanic ash information to the appropriate ACC, VAAC and MWO. RO to validate the corrective action taken with assistance from VAAC Wellington.	Ministry of Transport of the Kingdom of Tonga (MTKT) Ministry of Lands, Survey and Natural Resources of the Kingdom of Tonga (MLSNRKT)	2014	U
Briefing and flight documentation (Annex 3, Chapter 9, Appendix 2 & 8)	Kiribati AP-MET-18 Nauru AP-MET-19 Solomon Islands AP-MET-20	WAFS products not accessed and therefore not available for inclusion in flight briefings and documentation	2008	Reported by TCB CAEMSA-SP Technical Expert	WAFS Internet File Service (WIFS) allows for the retrieval of WAFS forecasts for flight briefings and documentation (versus more expensive satellite dish) – available for operations since May 2010 Will seek donor ship for installation and training on WIFS as part of CAEMSA-SP Phase II	MET Services, TCB, Donor, ISCS Provider State	2012	U
Provision of meteorological	Nauru AP-MET-21	No METAR/SPECI observing programme in place	2008	Reported by TCB CAEMSA-SP Technical Expert	Automatic observing station needed as well as maintenance programme	MET Service, TCB, Donor	2012	U

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION (Updated at MET SG/18)								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
observations (Annex 3, 4.3.1, 4.5, 4.6)		(no calibrated and maintained equipment available)			Will seek donor for observing system and maintenance contract and/or training as part of CAEMSA-SP Phase II			
Provision of SIGMET information (Annex 3, Chapter 7)	Papua New Guinea AP-MET-22 Solomon Islands AP-MET-23 Nauru AP-MET-24	Lack of SIGMET issued for the Port Moresby, Honiara, and Nauru FIRs.	9/09/2011	IATA emphasized the importance of having hazards reported in this large sub-regional area that straddles the equator and deemed this situation unsafe and unacceptable to airline operations.	ICAO: States concerned are urged to take urgent action to seek assistance from a State in a position to do so to provide the service until such time the States concerned can provide their own SIGMET. SIGMET monitoring over a period of 2 months in August and September 2012 indicated that no SIGMET was received (MET SG/17, 8.4.3 & 13.9 refers). Arrangement for issuance of SIGMET by PNG on behalf of Solomon Is. and Nauru has not been successful. APANPIRG/24 Conclusion 24/51 to further investigate and assess the feasibility of bilateral agreements for the provision of SIGMET. PNG did not participate in 2013 SIGMET tests. A recent analysis of the meteorological services provided in PNG (conducted by PNG, Australia and the ICAO) produced a number of recommendations for actions that would strengthen services and help rectify MET deficiencies. Future volcanic ash exercises in the APAC region would facilitate provision of SIGMET for volcanic ash in States concerned.			U

SUMMARY OF RECENT AND FORTHCOMING DEVELOPMENTS TO THE WAFS

(Presented by WAFC Provider States)

1. Recent developments

1.1 Withdrawal of WAFS Upper Air Forecasts in WMO GRIB Edition 1 code form

WAFS Upper Air Forecasts in WMO GRIB Edition 1 code form were withdrawn from SADIS and WIFS on 14th November 2013.

Suggested action: *Any user who is still unable to obtain and/or visualize WAFS Upper Air Forecasts in WMO GRIB Edition 2 code form should contact the provider of their SADIS/WIFS Workstation/Software.*

1.2 Provision of WAFC London Upper Air Forecast data for FL410

WAFS Upper Air data for FL410 was made available by the WAFCs on 14th November 2013, in accordance with the applicability of ICAO Annex 3 – *Meteorological Service for International Air Navigation*.

Suggested action: *Note this information.*

1.3 Removal of the 'trial' label in ICAO Annex 3 in relation to the WAFS Upper Air Forecasts of cumulonimbus cloud, icing and turbulence.

The 'trial' label in relation to the WAFS Upper Air Forecasts of cumulonimbus cloud, icing and turbulence was removed with effect from the applicability date of Amendment 76 to ICAO Annex 3.

Suggested action: *Note this information.*

1.4 Earlier availability of WAFS Upper Air Forecasts for CB, icing and turbulence

In accordance with WAFSOPSG Conclusion 8/13, the WAFCs have been able to accelerate the production of the harmonized CB, icing and turbulence data. The data is now made available by T+4hrs 35mins; with a cut-off time (after which non-harmonized data will be issued) of T+4hrs 50mins. The change was implemented on 12th March 2014.

Suggested action: *Note this information.*

1.5 Issuance of WAFC SIGWX forecasts during planned backup tests to normal time

In accordance with WAFSOPSG Decision 8/8, the WAFCs are able to issue WAFC SIGWX forecasts during planned backup tests to the normal time. This was implemented with effect from 23rd October 2013, and is expected to further enhance the transparency of the SIGWX backup test events. In the event of a real requirement for a WAFC backup (i.e. in the rare event that one WAFC is unable to perform its role); then SIGWX forecasts may be issued up to 2 hours later than normal. Under such circumstances, administrative messages would be issued via SADIS and WIFS.

For information relating to the planned, quarterly SIGWX backup tests, please see section 3.2 below.

Suggested action: *Note this information.*

1.6 **Guidance and Training for States on the use and visualization of new gridded WAFS forecasts**

The WAFCs have produced a training module regarding the use of WAFS gridded CB, icing and turbulence forecasts. This guidance is provided via the internet with an English language voiceover. In addition, ICAO has provided PDF versions of the training module in the following languages: Arabic, Chinese, English, French, Russian and Spanish.

The training module and the related PDFs are supplemental to the existing guidance material 'Guidance on the Harmonized WAFS Grids for Cumulonimbus Cloud, Icing and Turbulence Forecasts - 11 September 2012'.

All of the material above is available via:
http://www.icao.int/safety/meteorology/WAFSOPSG/Pages/GuidanceMaterial.aspx.

1.7 **Inclusion of WAFS GRIB2 CAT and CB verification data on the 'WAFC London Performance Indicators' page**

WAFC London has made available (from 8th July 2014) verification data for WAFS GRIB2 CAT and CB data. The information can be obtained from the "WAFC London Performance Indicators" webpage: http://www.metoffice.gov.uk/aviation/responsibilities/icao. The verification data should be used in conjunction with the guidance material noted in 1.6 above.

Suggested action: *Note this information.*

2.8 **Inclusion of WAFS GRIB2 ICING verification data on the WAFC Washington website.**

WAFC Washington has made available, on a trial basis, verification for WAFS GRIB2 icing data. The information can be obtained from the "NCEP Verification System for WAFS Aviation Products" webpage:
http://nomad7.ncep.noaa.gov/WAFS/EMC_VSDB_verif_demo/aviation.cgi This web site will not be operational until December 2014 and may be down from time to time. Users are encouraged to provide feedback to Matt.Strahan@noaa.gov and hui-ya.chuang@noaa.gov.

Suggested action: *Note this information.*

2. Forthcoming developments

2.1 **Implementation of WAFS re-issuance policy for WAFS GRIB2 and WAFS SIGWX forecasts**

In accordance with WAFSOPSG Conclusion 7/5; the WAFCs are continuing to develop processes to enable the transmission of corrections to WAFS SIGWX forecasts and to WAFS GRIB2 forecasts in the event that errors or corruptions are identified. Information with regard to the methodology is provided below in **Part 4**. *Note: The above policy refers only to corrections and does not concern amendments for which there is no requirement.* The planned implementation is September 2014.

Suggested action: *Note this information.*

2.2 **Future Provision of additional flight levels to WAFS Upper Air Forecasts**

Subject to the finalised version of Amendment 77 to ICAO Annex 3; it is expected that data for additional flight levels will be provided as part of the WAFS gridded upper air forecasts. The extra levels will be FL080 (750hPa); FL210 (450hPa); and FL480 (125hPa). Expected implementation will be November 2016.

Suggested action: *Note this information.*

3. Standing arrangements

3.1 **WAFS SIGWX BUFR Edition**

The WAFC Provider's will continue to issue SIGWX forecasts in BUFR format using BUFR Edition 3. There are no current plans to migrate to BUFR Edition 4.

Suggested action: *Note this information and ensure that your systems remain compatible with the BUFR Edition 3 for decoding of SIGWX BUFR. Note also that the SIGWX forecasts in PNG form will continue to be issued until further notice.*

3.2 **WAFC backup tests**

The WAFC Provider States have continued to test their SIGWX backup procedures in the event that one WAFC is unable to produce SIGWX forecasts in the BUFR-code and PNG-chart format. Routine backup tests are conducted quarterly, with the results posted on the WAFSOPSG website in the document Forthcoming and Historical Record of WAFC Backup Tests' available via URL:
http://www.icao.int/safety/meteorology/WAFSOPSG/Reference%20Documents/Forms/AllItems.aspx.
Tests over the last 12 months have been largely successful and transparent for the overwhelming majority of WAFS users.

Forthcoming backup tests are outlined in the same document: Notification of WAFC backup tests is promulgated on the SADIS broadcasts in advance, by way of administrative messages.

In addition, WAFC backup procedures are outlined in the 'WAFC Backup Procedures' available from the same URL.

Suggested action: *Note this information and regularly visit the WAFSOPSG website to obtain information pertaining to WAFC backup tests and procedures.*

3.3 **Access to Internet based services (Secure SADIS FTP/WIFS).**

The policies regarding the development of clear guidelines with regard to the accessing of data from Secure SADIS FTP and from WIFS have been endorsed by WAFSOPSG, SADISOPSG[1] and SCRAG[2].

Suggested action: *Note this information. 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.*

[1] Satellite Distribution System Operations Group
[2] SADIS Cost Recovery Administrative Group

http://www.icao.int/safety/meteorology/sadisopsg/SADIS%20User%20Guide/Obtaining%20access%20to%20WIFS%20as%20a%20backup%20to%20SADIS%20FTP.pdf

4. Proposal for dealing with corrections to WAFS SIGWX forecasts and WAFS GRIB2 data on SADIS

4.1 Introduction

4.1.1 This document describes how the WAFCs will send corrected significant weather (SIGWX) forecasts and WAFS GRIB2 data. Please note that the WAFCs will ***not*** update or amend previously issued forecasts on the basis of updated information from new model runs or latest observations . The WAFCs will only issue corrections to address errors, such as missing information or corruption.

4.2 General Methodology

4.2.1 When a BUFR, PNG or GRIB2 file needs to be corrected, it will have 'CCA' added to its WMO AHL. For example, if the original 'JUCE00 EGRR 191800' *bulletin* requires correction, then 'JUCE00 EGRR 191800 CCA' would be issued. If further corrections are necessary, the 2nd correction will have '**CCB**' added to its WMO AHL, and the third correction will have '**CCC**', and so on. For simplicity and brevity, only 'CCA' will be referenced subsequently in this document.

4.2.2 On Secure SADIS FTP, all of the associated *files* will also have the '**CCA**' indicator added to their WMO AHL. For example, if the Jets BUFR file needs to be corrected, the Jets BUFR file and all the other BUFR and PNG files, such as the Cloud and Trop files, will be renamed with '**CCA**' appended to their filenames.

4.2.3 With regard to SADIS 2G, all of the associated bulletins will be re-transmitted. For example, if it is necessary to correct the High Level CAT BUFR file, all of the other BUFR files and PNG files for that SIGWX forecast time will be retransmitted, with 'CCA' added to their WMO AHLs. This process would also apply to the WAFS GRIB2 forecasts.

4.2.4 Secure SADIS FTP will replace all the associated files with the corrected files, appending '**CCA**' to the filenames. The original files will be deleted. See Section 1 below for details on filename conventions for Secure SADIS FTP.

4.2.5 A strictly formatted administrative message will be sent to notify users of the correction. The format and proposed WMO headers of this administrative message can be found in Section 2 below of this document.

4.2.6 Corrected PNG charts will have the '**CCA**' added to the bulletin ID, found in the top left corner of the PNG chart.

4.2.7 User created visualizations of BUFR and GRIB2 forecasts should note that the underlying data was corrected in an appropriate manner.

4.2.8 Examples of corrected BUFR and GRIB2 files can be found in Section 1 to 4 below.

Section 1

The tables below provide examples of filenames of corrected products for both WIFS and Secure SADIS FTP. Note that the corrected files will be in the same directories as the original files, and the original files will be deleted.

Secure SADIS FTP

Product type	Example Original Filename	Example Corrected Filename
PNG	PGCE05_EGRR_0000.PNG	PGCE05_EGRR_0000_CCA.PNG
BUFR	JUCE00_EGRR_191800	JUCE00_EGRR_191800_CCA
GRIB2	T+06_0000	T+06_0000_CCA
Signature	JUCE00_EGRR_191800.SIG	JUCE00_EGRR_191800_CCA.SIG

Section 2

Example of the proposed format of the Administrative Message used to notify users of corrections to SIGWX or GRIB2 products. Note that WAFC London will use the WMO header FKUK66 EGRR, and WAFC Washington will use the WMO Header FKUS66 KKCI. Users should use this message as a trigger to update their software with new files.

FXUK66 EGRR 200343
RETRANSMITTED WAFC LONDON DATA:
DATA TYPE: WAFC LONDON SIGWX BUFR AND PNG
ORIGINAL WMO AHL: PG//// EGRR 191800
JU//// EGRR 191800
RETRANSMITTED WMO AHL: PG//// EGRR 191800 CCA
JU//// EGRR 191800 CCA
WHERE PG//// REPRESENTS ALL WAFC LONDON SIGWX PNG FILES
AND JU//// REPRESENTS ALL WAFC LONDON SIGWX BUFR FILES
ALL WAFC LONDON SIGWX BUFR AND PNG FILES INDICATED ABOVE ARE NOW BEING RE-TRANSMITTED.
ISSUED BY WAFC LONDON=

Section 3

Example of the first few lines of a corrected BUFR file, if it were dumped to text by software such as Microsoft Notepad.

0000179500
958
JUCE00 EGRR 191800 CCA
BUFR à———————————— J @

Section 4

Example of a corrected GRIB2 file if it were dumped to text by software such as Microsoft Notepad.

0002938400
639
YUXC85 EGRR 210000 CCA
GRIB r¥ J Ý

Re-issuance of WAFC London corrected SIGWX.

On Secure SADIS FTP, SIGWX BUFR files are located in the 'BUFR' directory, under which there are two subfolders:

11/08/2010 12:00AM Directory EGRR
09/01/2010 12:00AM Directory KKCI

Within each of EGRR and KKCI, lie 'parameter' subfolders

10/21/2013 12:50PM Directory H_CAT
10/21/2013 12:50PM Directory H_EMBEDDED_CB
10/21/2013 12:50PM Directory H_FRONTS
10/21/2013 12:50PM Directory H_JETS
10/21/2013 12:50PM Directory H_TROP
10/21/2013 12:50PM Directory M_CAT
10/21/2013 12:50PM Directory M_CLOUD
10/21/2013 12:50PM Directory M_FRONTS
10/21/2013 12:50PM Directory M_JETS
10/21/2013 12:50PM Directory M_TROP
10/21/2013 12:50PM Directory OTHER_PARAMETERS

SIGWX BUFR, files are presented thus within their 'parameter' folder:

10/20/2013 12:50AM 1,805 JUCE00_EGRR_191800
10/20/2013 12:50AM 256 JUCE00_EGRR_191800.SIG
10/20/2013 06:50AM 1,911 JUCE00_EGRR_200000
10/20/2013 06:50AM 256 JUCE00_EGRR_200000.SIG
10/20/2013 12:50PM 1,455 JUCE00_EGRR_200600
10/20/2013 12:50PM 256 JUCE00_EGRR_200600.SIG
10/20/2013 06:50PM 1,429 JUCE00_EGRR_201200
10/20/2013 06:50PM 256 JUCE00_EGRR_201200.SIG
10/21/2013 12:50AM 2,295 JUCE00_EGRR_201800
10/21/2013 12:50AM 256 JUCE00_EGRR_201800.SIG
10/21/2013 06:50AM 2,431 JUCE00_EGRR_210000
10/21/2013 06:50AM 256 JUCE00_EGRR_210000.SIG
10/21/2013 12:50PM 1,761 JUCE00_EGRR_210600
10/21/2013 12:50PM 256 JUCE00_EGRR_210600.SIG

Consider, the High Level CAT parameter (H_CAT):

10/20/2013 12:50AM 1,805 JUCE00_EGRR_191800

This is how the data is represented as 'text' (say in notepad), WMO AHL bulletin ID is highlighted.

0000179500
958
JUCE00 EGRR 191800
BUFR à———————————— J @
————————————

A corrected bulletin (as part of a complete set of re-issued files) would have to follow the following process.

1) When issued, as a correction, the WMO AHL *bulletin* should read 'JUCE00 EGRR 191800 CCA'. This bulletin would be sent to MetSwitch and onward to downstream users. Secure SADIS FTP would need to detect the bulletin and recognise the 'CCA'. New *files* will be created containing the corrected *bulletins*. The file behaviour would be:

a) create a 'new' file 'JUCE00_EGRR_191800_CCA'
b) create a 'new' signature file 'JUCE00_EGRR_191800_CCA.SIG'
c) need to delete the original 'JUCE00_EGRR_191800' file
d) delete the original 'JUCE00_EGRR_191800.SIG' file

The new, corrected file would be something like this, and note the modification to the WMO AHL:

0000179500
958
JUCE00 EGRR 191800 CCA
BUFR à———————————— J @
————————————

Since the policy is that when a correction is issued for WAFS SIGWX forecasts, **all** SIGWX BUFR parameters originally issued by that WAFC will be re-issued (including those parameters that do not have an error). Similar actions will take place for all SIGWX BUFR files issued by that WAFC corrected from the original 191800 datatime.

i.e. the following files would be issued:

JUWE96_EGRR_191800_CCA (BUFR high level jetstreams)
JUCE00_EGRR_191800_CCA (BUFR high level CAT)
JUBE99_EGRR_191800_CCA (BUFR high level cloud)
JUTE97_EGRR_191800_CCA (BUFR high level TROP)
JUFE00_EGRR_191800_CCA (BUFR high level fronts)
JUVE00_EGRR_191800_CCA (BUFR high level TRS, Volcano, Radiation)
JUOE00_EGRR_191800_CCA (BUFR medium level TROP)
JUTE00_EGRR_191800_CCA (BUFR medium level jetstreams)
JUJE00_EGRR_191800_CCA (BUFR medium level fronts)
JUNE00_EGRR_191800_CCA (BUFR medium level cloud)
JUME00_EGRR_191800_CCA (BUFR medium level CAT)

The PNGs would also be reissued.

They are presented thus on Secure SADIS FTP:

In the 'SIGWX_PNG' folder there are two subfolders

09/01/2010 12:00AM Directory SWH_PNG
09/01/2010 12:00AM Directory SWM_PNG

In SWH_PNG:

10/21/2013 12:55PM Directory AREA_A
10/21/2013 12:50PM Directory AREA_B
10/21/2013 12:55PM Directory AREA_B1
10/21/2013 12:50PM Directory AREA_C
10/21/2013 12:50PM Directory AREA_D
10/21/2013 12:50PM Directory AREA_E
10/21/2013 12:55PM Directory AREA_F
10/21/2013 12:50PM Directory AREA_G
10/21/2013 12:55PM Directory AREA_H
10/21/2013 12:55PM Directory AREA_I
10/21/2013 12:55PM Directory AREA_J
10/21/2013 12:50PM Directory AREA_K
10/21/2013 12:55PM Directory AREA_M

In SWM_PNG

10/21/2013 12:50PM Directory AREA_ASIA_SOUTH
10/21/2013 12:50PM Directory AREA_EURO
10/21/2013 12:50PM Directory AREA_MID
10/21/2013 12:55PM Directory AREA_NAT

As an example (from AREA E)

10/21/2013 06:50AM 89,817 PGCE05_EGRR_0000.PNG
10/21/2013 06:50AM 256 PGCE05_EGRR_0000.PNG.SIG
10/21/2013 12:50PM 88,168 PGCE05_EGRR_0600.PNG
10/21/2013 12:50PM 256 PGCE05_EGRR_0600.PNG.SIG
10/20/2013 06:50PM 87,399 PGCE05_EGRR_1200.PNG
10/20/2013 06:50PM 256 PGCE05_EGRR_1200.PNG.SIG
10/21/2013 12:50AM 90,284 PGCE05_EGRR_1800.PNG
10/21/2013 12:50AM 256 PGCE05_EGRR_1800.PNG.SIG

Corrected SIGWX PNGs would be replaced with the following:

10/21/2013 06:50AM 89,817 PGCE05_EGRR_1800 CCA.PNG
10/21/2013 06:50AM 256 PGCE05_EGRR_1800 CCA.PNG.SIG

All other SIGWX PNGs would be similarly re-issued with the following filenames on Secure SADIS FTP.

PGSE05_EGRR_191800_CCA (PNG ICAO High Level SIGWX Area B)
PGRE05_EGRR_191800_CCA (PNG ICAO High Level SIGWX Area C)
PGZE05_EGRR_191800_CCA (PNG ICAO High Level SIGWX Area D)
PGGE05_EGRR_191800_CCA (PNG ICAO High Level SIGWX Area E)
PGCE05_EGRR_191800_CCA (PNG ICAO High Level SIGWX Area G)
PGAE05_EGRR_191800_CCA (PNG ICAO High Level SIGWX Area H)
PGKE05_EGRR_191800_CCA (PNG ICAO High Level SIGWX Area M)
PGDE14_EGRR_191800_CCA (PNG ICAO Medium Level SIGWX Area EURO)
PGCE14_EGRR_191800_CCA (PNG ICAO Medium Level SIGWX Area MID)

PGZE14_EGRR_191800_CCA (PNG ICAO Medium Level SIGWX Area S ASIA)

An automated SIGWX Correction message would be sent with the following:

FXUK66 EGRR 200343
RETRANSMITTED WAFC LONDON DATA:
DATA TYPE: WAFC LONDON SIGWX BUFR AND PNG
ORIGINAL WMO AHL: PG//// EGRR 191800
JU//// EGRR 191800
RETRANSMITTED WMO AHL: PG//// EGRR 191800 CCA
JU//// EGRR 191800 CCA
WHERE PG//// REPRESENTS ALL WAFC LONDON SIGWX PNG FILES
AND JU//// REPRESENTS ALL WAFC LONDON SIGWX BUFR FILES
ALL WAFC LONDON SIGWX BUFR AND PNG FILES INDICATED ABOVE ARE NOW BEING RE-TRANSMITTED.
ISSUED BY WAFC LONDON=

In addition, the usual FXUK65 EGRR message will be issued to inform those users who a) have not got systems that can re-process the re-issued files, or are – for whatever reason – unable to obtain updated visualisations (soft or hard copy).

1) Should further corrections be necessary, then the sequence CCB, CCC, CCD etc should be followed.

2) Should such messages be received from WAFC Washington, then they should be processed in the same fashion – distributed directly over SADIS 2G (SIGWX only, not GRIB2), and processed in the as described above for Secure SADIS FTP. The FXUS66 KKCI would be issued by WAFC Washington and distributed to inform users, and act as a trigger.

For GRIB2 data:

On Secure SADIS FTP, GRIB2 data is in the 'GRIB2' folder. There is a subfolder;

06/15/2011 12:00AM Directory COMPRESSED

And two lower level subfolder for WAFC London and WAFC Washington data.

08/20/2013 12:14PM Directory EGRR
08/20/2013 12:14PM Directory KWBC

Folders for CB, icing and turbulence are provided, and time-step concatenated GRIB2 bulletins. (sub folders in the CAT, CB, ICE and INCLDTURB also concatenate the GRIB2 data into separate time steps).

08/20/2013 12:14PM Directory CAT
08/20/2013 12:14PM Directory CB
08/20/2013 12:14PM Directory ICE
08/20/2013 12:14PM Directory INCLDTURB
10/21/2013 12:45PM Directory T+06
10/21/2013 12:45PM Directory T+09
10/21/2013 12:45PM Directory T+12

10/21/2013 12:45PM Directory T+15
10/21/2013 12:45PM Directory T+18
10/21/2013 12:45PM Directory T+21
10/21/2013 12:45PM Directory T+24
10/21/2013 12:45PM Directory T+27
10/21/2013 12:45PM Directory T+30
10/21/2013 12:45PM Directory T+33
10/21/2013 12:45PM Directory T+36

So, typically, for the T+06 folder:

10/21/2013 03:30AM 1,550,574 T+06_0000
10/21/2013 03:30AM 256 T+06_0000.SIG
10/21/2013 09:30AM 1,550,375 T+06_0600
10/21/2013 09:30AM 256 T+06_0600.SIG

A very truncated 'text' version of the T+06_0000 file is shown below, the WMO AHL of the *bulletin* is highlighted:

0002938400
639
YUXC85 EGRR 210000
GRIB r¥ J Ý

Data would be distributed as normal over SADIS 2G.

On Secure SADIS FTP, the following processes would need to occur:

Issue T+06_0000_CCA file
Issue T+06_0000_CAA.SIG signature file
Delete original T+06_0000 file
Delete original T+06_0000.SIG file

On Secure SADIS FTP, each concatenated file would contain corrected bulletins (note modified WMO AHLs):

0002938400
639
YUXC85 EGRR 210000 CCA
GRIB r¥ J Ý

An automated GRIB2 Correction message would be sent with the following:

FXUK66 EGRR 200343
RETRANSMITTED WAFC LONDON DATA:
DATA TYPE: WAFC LONDON GRIB2 UPPER AIR FORECASTS
ORIGINAL WMO AHL: Y/X/// EGRR 210000
RETRANSMITTED WMO AHL: Y/X/// EGRR 210000
WHERE Y/X/// REPRESENTS ALL WAFC LONDON GRIB2 WAFS FILES
ALL WAFC LONDON GRIB2 WAFS FILES INDICATED ABOVE ARE NOW
BEING RE-TRANSMITTED.

ISSUED BY WAFC LONDON=

1) Should further corrections be necessary, then the sequence will be CCB, CCC, CCD etc should be followed.

2) Should such messages be received from WAFC Washington, then they should be processed in the same fashion – and processed in the same way for Secure SADIS FTP. The FXUS66 KWBC would be distributed to inform users, and act as a trigger.

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SUMMARY OF RECENT AND FORTHCOMING DEVELOPMENTS TO THE SADIS

(Presented by the SADIS Provider)

1. Recent developments

1.1 Withdrawal of WAFS Upper Air Forecasts in WMO GRIB Edition 1 code form

Following the removal of WAFS Upper Air Forecasts in WMO GRIB Edition 1 code form from the WAFS portfolio, this dataset ceased to be made available via SADIS with effect from 14th November 2013.

Suggested action: *Any user who is still unable to obtain and/or visualize WAFS Upper Air Forecasts in WMO GRIB Edition 2 code form should contact the provider of their SADIS Workstation/Software.*

1.2 Provision of WAFC London CB, icing and turbulence data via SADIS 2G

WAFS Upper Air Forecasts for cumulonimbus (CB) cloud, icing and turbulence commenced distribution over SADIS 2G on 14th November 2013.

Suggested action: *Note this information*

1.3 Provision of WAFC London CB, icing and turbulence data via Secure SADIS FTP

WAFS Upper Air Forecasts for cumulonimbus (CB) cloud, icing and turbulence were made available in folders that no longer indicated the products were trial, effective from 14th November 2013. The data will also continue to be made available in the existing 'trial' folders (to aid transition by users) until 12 August 2014 – when the 'TRIAL_FORECASTS' folders (and subfolders) will be deleted along with the now redundant 'GRIB1' folder (and subfolders).

It should also be noted that effective 12 March 2014 both WAFCs were able to bring forward the availability of the GRIB2 cumulonimbus, icing and turbulence data. The data is now routinely made available by T+4:35 on Secure SADIS FTP, and by T+5:00 on SADIS 2G.

Suggested action: *Note this information.*

1.4 Provision of WAFC London Upper Air Forecast data for FL410

WAFS Upper Air data for FL410 was made available on SADIS 2G and Secure SADIS FTP on 14th November 2013.

Suggested action: *Note this information.*

1.5 Increase of Secure SADIS FTP bandwidth

The Secure SADIS FTP bandwidth (between the SADIS Provider and its Internet Service Provider) was increased to 16Mbit/sec bursting to 24Mbit/sec on 20th August 2013. It had previously been set to 4Mbit/sec bursting to 8Mbit/sec. At the same time, individual client limits were increased from 128Kbit/sec to 512Kbit/sec. The SADISOPSG/19 meeting considered proposals to increase the Secure SADIS FTP bandwidth further, but the group determined that the current bandwidth remained sufficient.

Suggested action: *Note this information.*

2. Forthcoming developments

2.1 Future requirements of a SADIS satellite broadcast beyond 2015

The SADISOPSG/18 meeting (29-31 May 2013, Dakar, Senegal), recommended that the SADIS 2G service be extended to November 2019, after which it is expected that the satellite service will be withdrawn. The Secure SADIS FTP service is expected to continue. This recommendation was presented to the Conjoint ICAO/WMO MET Divisional Meeting, (July 2014, Montréal).
Suggested action: *Note this information.*

2.2 SADIS Gateway mid-life upgrade

The existing SADIS Gateway infrastructure (known as CoreMet) is now at end of life, and a mid-life upgrade project is being implemented to ensure its continued resilience and availability, as well as introducing greater capability. The SADISOPSG/19 meeting endorsed the proposal, the costs attributable to SADIS amounting to GBP 187,110.27 capitalized over a period of 5 years.

Suggested action: *Note this information.*

2.3 Endorsement of targets to be used for availability of WAFC London GRIB2 and SIGWX data on SADIS 2G and Secure SADIS FTP.

The SADISOPSG endorsed targets to be used for availability of WAFC London GRIB2 and SIGWX data on SADIS 2G and Secure SADIS FTP. These targets take into account United Kingdom CAA requirements as well as ICAO requirements whilst taking into account the actual time required todeliver data via the differing mediums. The targets are presented below in **Part 4**.

Suggested action: *Note this information.*

2.4 Provision of a dedicated server for monitoring of availability of WAFC London data on SADIS 2G and Secure SADIS FTP

The SADISOPSG endorsed the provision of a dedicated server for monitoring of availability of WAFC London data on SADIS 2G and Secure SADIS FTP. This is expected to result in an annual cost of GBP4,000 and will make the monitoring of timeliness and availability statistics much more reliable. This is expected to be implemented by 30 September 2014.

Suggested action: *Note this information.*

2.5 Removal of redundant folders on Secure SADIS FTP

As noted in 1.3 certain folders on Secure SADIS FTP are now redundant and will be deleted on 12 August 2014. The affected folders are listed below. The Secure SADIS FTP User Guide will be amended accordingly.

a) GRIB1;
b) GRIB2/COMPRESSED/EGRR/TRIAL_FORECASTS; and
c) GRIB2/COMPRESSED/KWBC/TRIAL_FORECASTS

Suggested action: *Note this information.*

2.6 **Implementation of WAFS re-issuance policy for WAFS GRIB2 and WAFS SIGWX forecasts**

In accordance with WAFSOSPG/7 Conclusion 7/5 (and as also noted in the separate 'Summary of Recent and Forthcoming Developments to the WAFS' Working Paper), the SADISOPSG endorsed distribution of corrections to SIGWX forecasts and GRIB2 data via SADIS. In addition, the SADISOPSG endorsed the necessary modifications to file behavior on Secure SADIS FTP as described in the attachment to the separate 'Summary of Recent and Forthcoming Developments to the WAFS' Working Paper.

Suggested action: *Note this information.*

2.7 **Provision of One minute updates to traditional alphanumeric OPMET data on Secure SADIS FTP**

In accordance with WAFSOPSG/8 Conclusion 8/7, the SADISOPSG endorsed a proposal by the SADIS Provider to implement additional files/folders to provide traditional alphanumeric OPMET data at 1 minute intervals. The methodology is described below in **Part 5**. This was originally implemented on 22nd July 2014, but regrettably had to be withdrawn due to unforeseen consequences. This is now under review and is planned for implementation by 31 October 2014.

3. Standing arrangements

3.1 **Access to Internet based services (Secure SADIS FTP/WIFS).**

SADIS users are encouraged to apply for WIFS accounts for the establishment of backup/contingency processes in the rare event of a failure of SADIS. Users should note that there are now agreed policies with regard to accessing data from SADIS and WIFS, and the use of such backup/contingency accounts. Details are available on the SADISOPSG Website http://www.icao.int/safety/meteorology/sadisopsg/SADIS%20User%20Guide/Obtaining%20access%20to%20WIFS%20as%20a%20backup%20to%20SADIS%20FTP.pdf. It is the user's responsibility to apply for and arrange a WIFS account. *The SADIS Provider will not arrange such accounts on behalf of users.*

Suggested action: *Note this information. 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.*

4. Targets to be used for availability of WAFC London GRIB2 and SIGWX data on SADIS 2G and Secure SADIS FTP

4.1 The targets below (endorsed by SADISOPSG/19) are to be used to measure the availability and timeliness of data being *received* from the SADIS 2G satellite and *made available* on the Secure SADIS FTP server. The results will be provided annually in the SADIS Management Report.

SADIS 2G	>=99.2% available by*:	No target set
WAFC London GRIB2 (not CB, icing, turbulence)	T+5hrs 00mins	T+6hrs 00mins
WAFC London GRIB2 CB, icing, turbulence	T+5hrs 05mins	T+6hrs 00mins

SADIS 2G	>=99.2% available by*:	No target set
WAFC London SIGWX BUFR	T+7hrs 00mins	T+9hrs 00mins
WAFC London SIGWX PNG	T+7hrs 00mins	T+9hrs 00mins

Secure SADIS FTP	>=99.2% available by*:	No target set
WAFC London GRIB2 (not CB, icing, turbulence)	T+4hrs 20mins	T+6hrs 00mins
WAFC London GRIB2 CB, icing, turbulence	T+4hrs 50mins	T+6hrs 00mins

Secure SADIS FTP	>=99.2% available by*:	No target set
WAFC London SIGWX BUFR	T+7hrs 00mins	T+9hrs 00mins
WAFC London SIGWX PNG	T+7hrs 00mins	T+9hrs 00mins

* Based on UK CAA targets.

5. Methodology for the provision of one-minute updates to traditional alphanumeric OPMET data on Secure SADIS FTP

5.1 Illustrative proposal of additional "OPMET_LAST_MINUTE" file and "OPMET_SET_OF_1MIN_FILES" folder to be added to Secure SADIS FTP (note, ".SIG" files are not shown).

```
AIRMET                                  (DIR)
ALL                                     (DIR)
ASHTAMS_AND_VA_NOTAMS                           (DIR)
BUFR                                    (DIR)
GAMET                                           (DIR)
GRIB1                                   (DIR)
GRIB2                                   (DIR)
LAST_18HOURS_DATA                               (FILE)
NUCLEAR_EMERGENCY_MESSAGES                      (DIR)
OPMET                                           (DIR)
```

OPMET_DAILY_HOURLY_FILES	(DIR)	
OPMET_LAST_5MINS		(FILE)
OPMET_LAST_HOUR	(FILE)	
OPMET_LAST_MINUTE		(FILE)
OPMET_SET_OF_1MIN_FILES		(DIR)
OPMET_SET_OF_5MIN_FILES		(DIR)
SADIS_ADMINISTRATIVE_MESSAGES		(DIR)
SIGMETS	(DIR)	
SIGWX_CORRECTION_MESSAGES	(DIR)	
SIGWX_PNG	(DIR)	
SPECIAL_AIREP	(DIR)	
SUPP_VOLC_ASH_CONC_DATA		(DIR)
TROPICAL_CYCLONE_ADVISORIES		(DIR)
TROPICAL_CYCLONE_ADVISORY_GRAPHICS		(DIR)
VOLCANIC_ASH_ADVISORY_GRAPHICS	(DIR)	
VOLCANIC_ASH_ADVISORY_STATEMENTS		(DIR)
VOLCANIC_ASH_SIGMETS	(DIR)	

Note: when considering the naming of the new file/folder, due regard was given to the note to WAFSOPSG/8 Decision 8/6 that requested the WAFCs to align – where possible – folder structures/names. However, in this instance, given this is not a major upgrade to the service nor a successor system, it was determined that consistency with the existing Secure SADIS FTP folder structure overrode the need for alignment with the WIFS service in the provision of TAC OPMET at one minute updates.

5.2 The OPMET_LAST_MINUTE file would contain concatenated traditional alphanumeric OPMET data for the last minute only.

5.3 Illustrative content of the proposed new folder OPMET_SET_OF_1MIN_FILES:

OPMET_1100
OPMET_1101
OPMET_1102
OPMET_1103
OPMET_1104
OPMET_1105
OPMET_1106
OPMET_1107
...
OPMET_1159

and the corresponding signature files.

Each file would contain data from the minute preceding the time stated in the file name; i.e. OPMET_1101 would contain data from 11hrs 00min 00.01sec to 11hrs 01min 00sec.

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Results of Survey on Operational Use of Services and Products from Service Providers of WAFS in Asia/Pacific Region and WAFS Training Needs of Asia/Pacific States (Jan – March 2014)

Access to WAFS services

1. *Does your State/Territory currently have access to WAFS products?*

All States/Territories (20; 100%) said that they have access to WAFS products.

2. *Does your State/Territory have any plan to access WAFS products from either WIFS or SADIS or both?*

No State/Territory responded to this question since they all have access to WAFS products already.

3. *Which is the source of WAFS products in your State/Territory?*

10 States/Territories (50%) said they have access to both US and UK WAFS products. Among them, 4 States/Territories use US WAFS as the primary source while the other 6 States/Territories use UK WAFS as the primary source. There are 5 States/Territories having access to UK WAFS only whereas 5 other States/Territories having access to US WAFS only. See Figure 1.

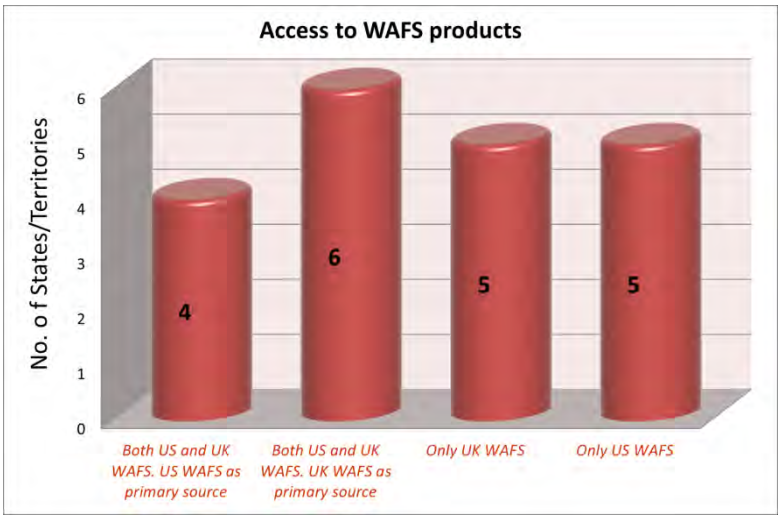

Figure 1

4. *If your State/Territory is having access to UK WAFS products (either as primary or backup source), what is/are the channel(s) through which your State/Territory gains access to UK WAFS products?*

There are 14 States/Territories responding to this question. 9 States/Territories (64%) said they gain access to UK WAFS products via SADIS 2G and all 14 States/Territories (100%) used Secure FTP Service (Figure 2).

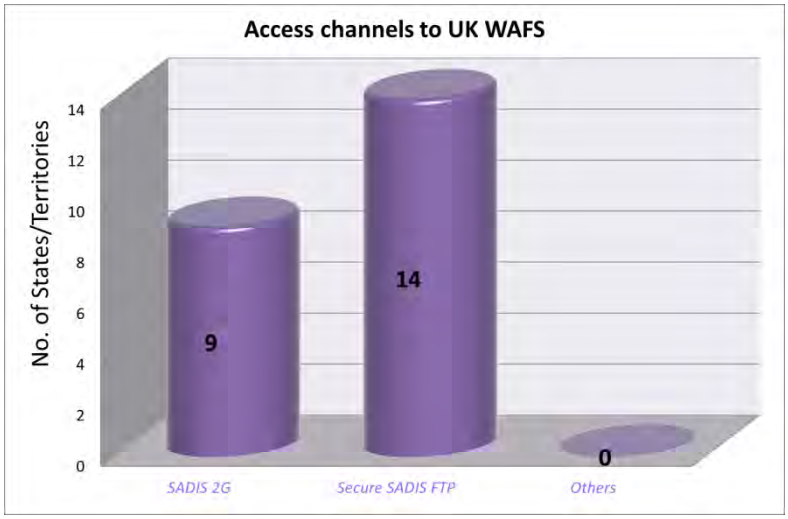

Figure 2

5. *If your State/Territory is under the footprint of SADIS 2G satellite and your State/Territory has NO access to UK WAFS products via SADIS 2G satellite, does your State/Territory have any plan to receive UK WAFS products via SADIS 2G satellite?*

6 States/Territories responded to this question. One State (17%) has a plan to receive UK WAFS products via SADIS 2G satellite beyond year 2015. The other 5 States (83%) said that they have no plan to use SADIS 2G for the following reasons:

(a) already receiving US WAFS products (4; 80%);
(b) already receiving UK WAFS products via Secure SADIS FTP Service (1; 20%);
(c) high implementation cost (2; 40%)
(d) high operating cost (2; 40%).

6. *If your State/Territory has not yet gained access to UK WAFS products via Secure SADIS FTP Service, does your State/Territory have any plan to do so?*

6 States/Territories responded to this question. All of them said that they have no plan to use Secure SADIS FTP Service. 5 States quoted the following reasons:

(a) already receiving US WAFS products (4; 80%);
(b) high implementation cost (2; 40%)
(c) high operating cost (2; 40%).

Operational use of WAFS gridded global forecasts

7. *Has your State/Territory implemented GRIB2 data as part of the flight planning documentation for operators?*

17 out of 20 responding States/Territories (85%) indicated that they have implemented GRIB2 data as part of flight planning documentation for operators while 3 States/Territories (15%) said they haven't. See Figure 3.

Figure 3

8. *If your answer to Q.11 (Question 7 in this Appendix) is 'no', does your State/Territory have any plan to implement GRIB2 data as part of the flight planning documentation for operators?*

3 States/Territories responded to this question. 2 of them (67%) said that they planned to implement GRIB2 data as part of the flight planning documentation for operators beyond year 2015. The remaining one State (33%) said they have no plan yet to implement GRIB2 data because their existing WAFS reception system broke down. They are seeking approval to upgrade their software to get access to SADIS FTP Service.

9. *Which of the following products does your State/Territory generate from WAFS data?*

19 States/Territories responded to this question. The products that they generate from WAFS data are as follows (Figure 4):

(a) High-level SIGWX charts (19; 100%)
(b) Medium-level SIGWX charts (16; 84%)
(c) Wind and Temperature charts (19; 100%)
(d) Text-based Wind and Temperature charts (3; 16%)

Three States/Territories (16%) generate other products, including:

(i) Tropopause, maximum wind, and freezing level;
(ii) Relative humidity and height charts; vertical cross sections of wind and temperature; and
(iii) height tropopause, height max wind level, geopotential height, relative humidity, cross section.

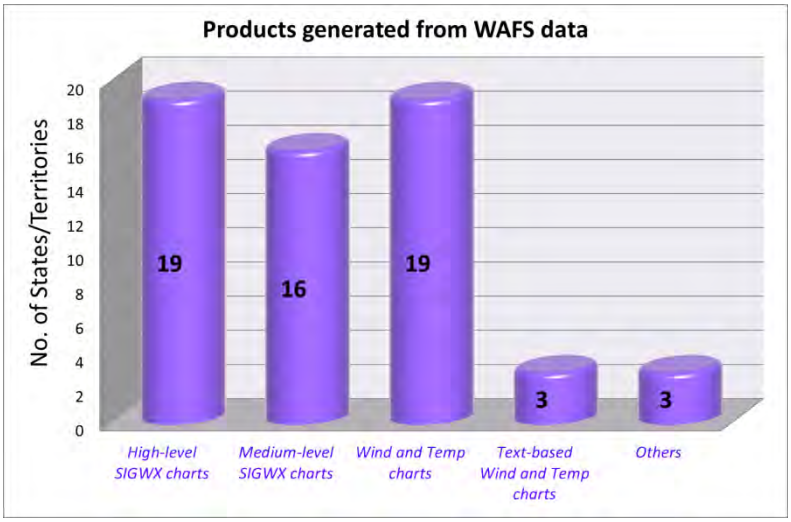

Figure 4

10. *Does your State/Territory utilize PNG formatted SIGWX charts from WAFCs?*

20 States/Territories responded to this question. 8 of them (40%) use PNG formatted SIGWX charts as a product, 7 (35%) use it as a backup to locally generated SIGWX charts while 5 others (25%) do not use PNG formatted SIGWX charts at all. See Figure 5.

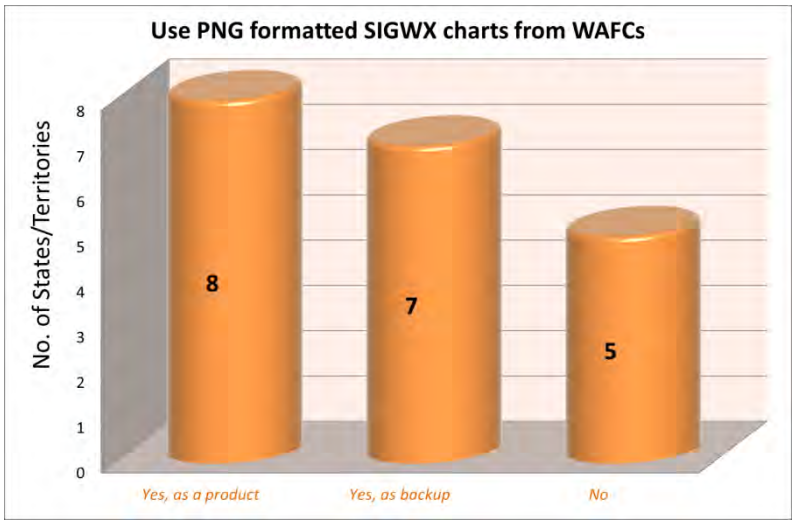

Figure 5

<u>Utilization of gridded forecasts of icing, turbulence and CB</u>

11. *What is the status of your State/Territory in retrieving icing, turbulence and/or CB parameters from the WAFS forecasts in GRIB2 format?*

20 States/Territories responded to this question. Their status in retrieving icing, turbulence and/or CB parameters from GRIB2 data is as follows (Figure 6):

(a) Not receiving or retrieving any parameter yet: 5 (25%)

(b) Providing gridded forecasts of icing, turbulence and CB in GRIB2 format to airline(s) who request support for ingestion into their flight planning system(s) : 4 (20%)

(c) Operators who are supported by Flight Planning Vendors are using the gridded forecasts of icing, turbulence and CB in GRIB2 format to support flight planning operation : 0 (0%)

(d) Receiving and retrieving icing, turbulence or CB parameters; and using them to assist in forecast operations (e.g. as additional guidance for forecasters) : 5 (25%)

(e) Other(s) : 6 (30%). Details of status as follows:

(i) Receiving and retrieving icing, turbulence or CB parameters; but not using them to assist in forecast operations yet; research on how to use these data effectively is still under way;
(ii) The icing, turbulence and CB parameters are being tested on their performances to assist forecast operation, in particular in the Asian subtropical region;
(iii) Production of icing/turb/cb products will be used in 01 May 2014;
(iv) Not applicable at present;
(v) Receiving and retrieving the gridded forecasts for icing, turbulence;
(vi) Receiving but could not process due to not yet upgrade software

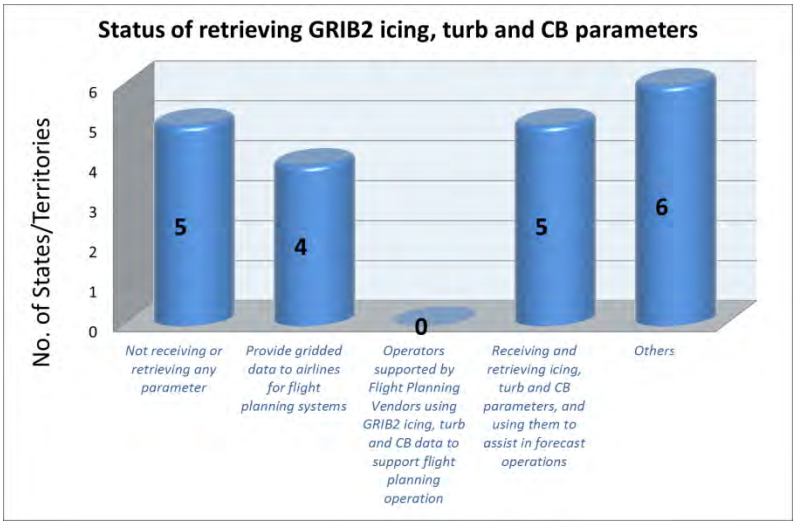

Figure 6

12. *If your State/Territory is retrieving icing, turbulence and/or CB parameters from the WAFS forecasts in GRIB2 format (whether or not used to assist in forecast operation), which parameter(s) is/are being retrieved and what is/are the source(s) of GRIB2 data?*

12 States/Territories responded to this question. Figure 7 illustrates the distribution in the source of GRIB2 parameters of icing, turbulence and CB being retrieved by States/Territories. In general, the numbers of States/Territories using UK WAFS source only, US WAFS source only and both sources were more or less the same.

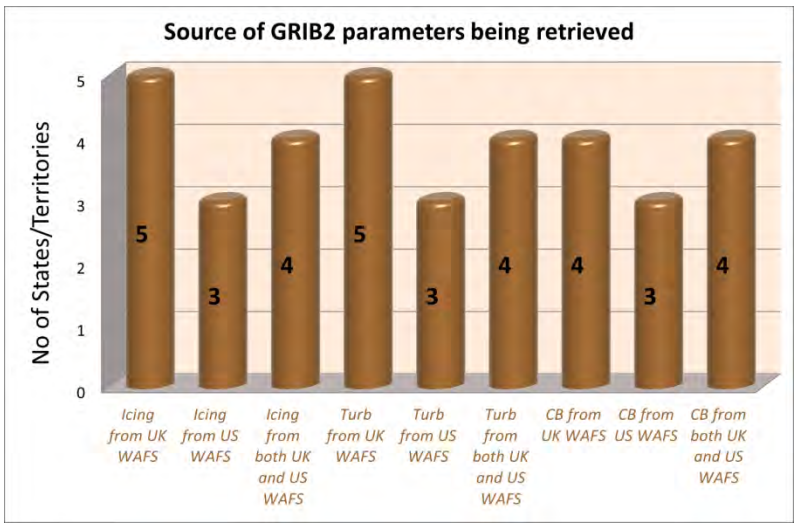

Figure 7

13. *For the parameter(s) being retrieved in Q.16 (Question 12 in this Appendix), which parameter(s) is/are being tested before being used to assist in forecast operation?*

8 States/Territories responded to this question. Figure 8 illustrates the distribution in the source of GRIB2 parameters of icing, turbulence and CB being tested by States/Territories. More States/Territories were using UK WAFS than US WAFS as the source of GRIB2 parameters of icing, turbulence and CB for testing. Relatively speaking, more States/Territories were testing with icing parameter than turbulence or CB.

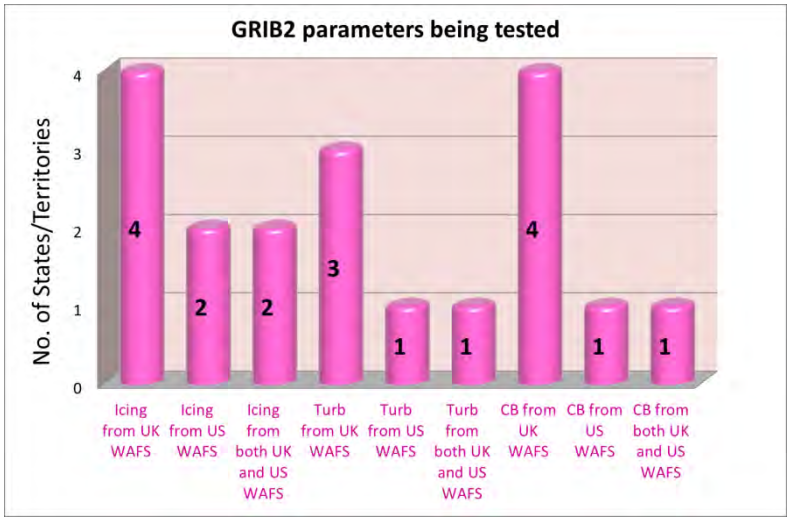

Figure 8

14. *For the parameter(s) being retrieved in Q.16 (Question 12 in this Appendix), which parameter(s) is/are being used in operation?*

5 States/Territories responded to this question. Figure 9 illustrates the distribution in the source of GRIB2 parameters of icing, turbulence and CB being used in operation by States/Territories. Again, more States/Territories were using UK WAFS than US WAFS as the source of GRIB2 parameters of icing, turbulence and CB for operational use.

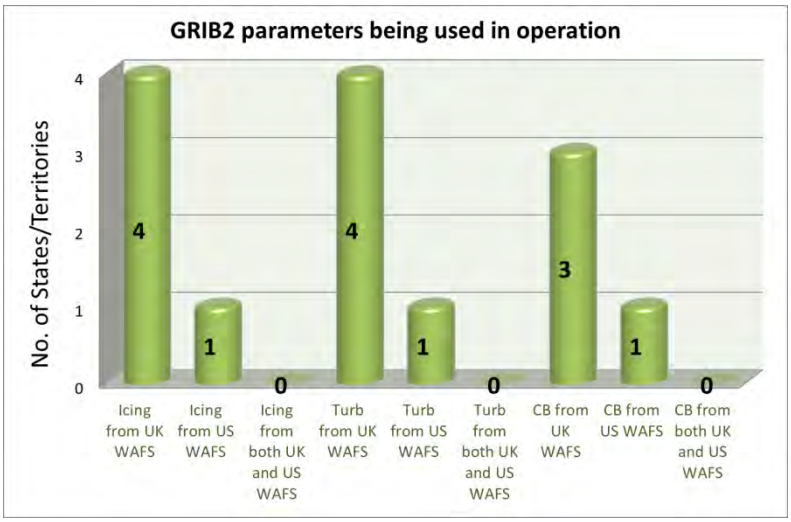

Figure 9

15. *For the parameter(s) being retrieved in Q.16 (Question 12 in this Appendix), what product(s) is/are being generated out of the parameter(s)?*

7 States/Territories responded to this question. Their quoted product(s) being generated included:

(a) Pictorial view: 1)CB horizontal extent 2)CB vertical extent; 3)ICAO height at CB base; 4) ICAO height at CB top; 5) Max CAT potential; 6) Max icing potential; 7) Max in-cloud turbulance; 8) Mean CAT potential; 9) Mean icing potential; 10) Mean in-cloud turbulence;
(b) Trial charts of maximum icing potential, CB horizontal extent, height at CB top, maximum CAT potential and mean in-cloud turbulence potential are being generated;
(c) CB horizontal extent;
(d) icing probability, mean CAT potential;
(e) SIGWX charts;
(f) Korean meteorological agency project is being implemented at the Aviation meteorological center of Mongolia. In the framework of the project, above mentioned products generated out of the parameters.

16. *If your State/Territory has not yet used gridded forecasts of icing, turbulence or CB to assist in forecast operation, does your State/Territory have any plan to do so?*

15 States/Territories responded to this question. Among them, 11 States/Territories plan to use gridded forecasts of icing, turbulence or CB to assist in forecast operation while the other 4 States/Territories do not have such a plan yet. Of those who plan to do so, 5 States/Territories plan to do so in 2014, 2 in 2015 and the remaining 4 beyond 2015. All of them plan to use gridded forecasts of icing, turbulence and CB except for one State who plans to use only gridded forecasts of turbulence and CB.

When asked if they have any details of their plan, one territory responded that:

"Based on initial evaluation of the performance of the gridded forecasts of icing, turbulence and CB, the performance of these gridded forecasts in HKFIR differs from those suggested in the Guidance material, in particular that for turbulence (see WAFSOPSG/8-IP/5). Further information from the WAFCs on the performance of these gridded forecasts in different

regions are required. Meanwhile, Hong Kong, China plans to conduct the followings before the gridded forecasts of icing, turbulence and CB are used to assist in forecast operation:
(1) validation on the performance of the gridded products, in particular over Asian subtropical region;
(2) establishment of thresholds more relevant for the Asian subtropical region based on the result of (1); and
(3) refine the visualization of these parameters based on the findings in (2).
As for the use of these gridded products in the flight planning system, no operator has indicated any interest so far. When such a need arises, Hong Kong China would provide assistance to the operators based on further guidance from WAFCs and our local experience."

One other territory responded that:
"The Icing and turbulence products generate by the WAFS Grib2 data is only used to assist the forecast operation, it is planned to provide this products in our new aviation weather information system for the flight planning to the flight crew members around the middle of 2014."

One State responded that:
"Due to inadequate observations/ reports, systematic validation of the icing, turbulence and CB forecasts are not done for Indian Region. However, with the involvement of the pilots/ airline operators, efforts will be started soon for an extensive validation and it is expected to put in operational use by early 2015.
As India has not participated in seminar/ workshops on validation and/or interpretation of WAFS products, we would like to host and organise such a seminar/ workshop for the region with the technical support of ICAO experts
Due to inadequate observations/ reports, systematic validation of the icing, turbulence and CB forecasts are not done for Indian Region. However, with the involvement of the pilots/ airline operators, efforts will be started soon for an extensive validation and it is expected to put in operational use by early 2015.
As India has not participated in seminar/ workshops on validation and/or interpretation of WAFS products, we would like to host and organise such a seminar/ workshop for the region with the technical support of ICAO experts"

One State also indicated their desire:
"To acquire necessary training on the use/retrieval of the WAFS products/parameters."

Training needs

17. *Have your State/Territory gained access to training via the following resources?*

14 States/Territories responded to this question and indicated that they have gained access to training in WAFS via the following sources:

(a) seminar(s)/Workshop(s) organized by ICAO (8 responses)
(b) seminar(s)/Workshop(s) organized by other organization(s) (4 responses; all from WMO)
(c) on-line training (3 responses; 1 from UK Meteorological Office Online; 1 from WMO and 1 from UK WAFC)
(d) self-study of training materials on Internet (5 responses, from the following sources
- MetED
- (i) SADIS User Guide; (ii) Secure SADIS FTP User Guide; (iii) Guidance on the Harmonized WAFS Grids for Cumulonimbus Cloud, Icing and Turbulence Forecasts; (iv) Representing WAFS Significant Weather (SIGWX) Data in BUFR; (v) WAFC London WAFS Upper Air Forecast GRIB2 Dataset Guide; (vi) WAFS

GRIB2 Specification; (vii) WIFS User Guide; (viii) Training module regarding gridded forecasts for CB, icing and turbulence.

- WAFSOPSG website
- http://www.icao.int/safety/meteorology/WAFSOPSG/pages/GuidanceMaterial.aspx
- https://aviationweather.gov/wafs)

(e) Others: (4 responses with details as follows:

- Departmental training
- MeteoFrance
- Training documents supplied by UKMO
- On-site software processing training after installation)

18. *What is/are the area(s) of training on WAFS that your State/Territory consider most needed?*

The table below summarizes the priority of areas of training on WAFS as indicated by the Sates/Territories:

Areas	No. of States/ Territories quoting this area as priority **'1'**	No. of States/ Territories quoting this area as priority **'2'**	No. of States/ Territories quoting this area as priority **'3'**	No. of States/ Territories quoting this area as priority **'4'**	No. of States/ Territories quoting this area as priority **'5' or lower**
Interpretation of WAFS products (see Note (1))	8	2	3	2	0
Generation of products for flight documentation (see Note (2))	6	4	3	0	0
Decoding of WAFS data (see Note (3))	3	4	3	1	0
WAFS processing software (see Note (4))	1	2	2	2	0
Channels for reception of WAFS products	0	2	1	2	3

Note :

(1) States/Territories remarked that the topics on 'Interpretation of WAFS products' should cover:

- how to translate CB, icing and turbulence into operationally useful products for the aviation industry
- SIGWX, wind/temperature chart, icing, turbulence, CB
- With regard to the gridded forecasts of CB, icing and turbulence:
  - (1) establishment of the threshold for specific application given the performance of these gridded products;
  - (2) visualization of the products; and
  - (3) use of these gridded products in the flight planning system

- WAFS gridded forecasts of cumulonimbus (CB) cloud, icing and turbulence

(2) States/Territories remarked that the topic on 'Generation of products for flight documentation' should cover:

- SIGWX, wind/temperature chart, icing, turbulence, CB
- Medum-level and low-level SIGWX charts

(3) States/Territories remarked that the topic on 'Decoding of WAFS data' should cover:

- SIGWX, wind/temperature chart, icing, turbulence, CB
- SIGWX charts

(4) One State remarked that the topic on 'WAFS processing software' should cover:

- Production of medium/low-level SIGWX charts

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IATA monitoring of the SADIS/WIFS broadcast over a period of 9 weeks (ending 1 August 2014)
AOP aerodromes

Loc Ind	SA/day	FC/day	FT/day	.	FASID	AOP	.	SA/SP	TAF	Service	.	Name	Country	ICAO region
AGGH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	HONIARA_(HENDERSON)	Solomon_Islands	ASI
ANYN	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**.**	**NAURU_AIRPORT**	**Nauru**	**PAC**
AYPY	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	PORT_MORESBY_INTL	Papua_New_Guinea	ASI
AYVN	YYYY~~~	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	_	F	.	VANIMO	Papua_New_Guinea	ASI
NCRG	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	RAROTONGA_INTL.	Cook_Islands	PAC
NFFN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	NADI/INTL	Fiji	PAC
NFNA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	NAUSORI/INTL	Fiji	PAC
NFTF	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	FUA'AMOTU_INTL.	Tonga	PAC
NFTV	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	VAVA'U	Tonga	PAC
NGFU	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	FUNAFUTI/INTL	Tuvalu	PAC
NGTA	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**.**	**TARAWA/BONRIKI_INTL**	**Kiribati**	**PAC**
NIUE	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	NIUE_INTL	Niue_(New_Zealand)	PAC
NLWW	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**.**	**WALLIS_HIHIFO**	**Wallis_and_Futuna_Islands_(France)**	**PAC**
NSFA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	FALEOLO/INTL	Samoa	PAC
NSTU	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	PAGO_PAGO_INTERNATIONAL,TUTUILA_I.	American_Samoa_(United_States)	PAC
NTAA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	TAHITI_FAAA	French_Polynesia_(France)	PAC
NVSS	**~~~~~Y~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**.**	**SANTO/PEKOA**	**Vanuatu**	**ASI**
NVVV	YYYYY~	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	PORT_VILA/BAUERFIELD	Vanuatu	ASI
NWWW	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	NOUMEA_LA_TONTOUTA	New_Caledonia_(France)	ASI
NZAA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	AUCKLAND_INTL	New_Zealand	ASI
NZCH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	CHRISTCHURCH_INTL	New_Zealand	ASI
NZWN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	WELLINGTON_INTL	New_Zealand	ASI
OAKB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	KABUL_INTERNATIONAL	Afghanistan	ASI
OAKN	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**.**	**KANDAHAR**	**Afghanistan**	**ASI**
OPGD	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**.**	**GWADAR/INTL.**	**Pakistan**	**ASI**
OPKC	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	KARACHI/JINNAH_INT'L	Pakistan	ASI
OPLA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	LAHORE/ALLAMA_IQBAL_INT'L	Pakistan	ASI
OPNH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	NAWABSHAH	Pakistan	ASI
OPPS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	PESHAWAR/INTL.	Pakistan	ASI
OPRN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	ISLAMABAD/BENAZIR_BHUTTO_INT'L	Pakistan	ASI
PGRO	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	P	.	ROTA/INTL,ROTA_I.	Northern_Mariana_Islands_(United_States)	PAC
PGSN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	FRANCISCO_C._ADA/SAIPAN_INTERNATIONAL,_OBYAN	Northern_Mariana_Islands_(United_States)	PAC
PGUA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	ANDERSON_AFB,GUAM_ISLAND	Northern_Mariana_Islands_(United_States)	PAC
PGUM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	GUAM_INTERNATIONAL,_GUAM_ISLAND	Northern_Mariana_Islands_(United_States)	PAC
PHNL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	HONOLULU_INTERNATIONAL,_OAHU,_HI.	Hawaii_(United_States)	PAC
PHOG	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	KAHULUI,_HI.	Hawaii_(United_States)	PAC
PHTO	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	HILO_INTERNATIONAL,_HILO_HI.	Hawaii_(United_States)	PAC
PKMJ	YYY~Y~~	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	P	.	MARSHALL_ISLANDS/INTL_MAJURO_ATOLL	Marshall_Islands	PAC
PLCH	**~Y~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**.**	**CHRISTMAS_ISLAND**	**Kiribati**	**PAC**
PTKK	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	WENO_ISLAND_,FM_CHUUK_INTL.	Micronesia_(Federated_States_of)	PAC
PTPN	**YYYYYYY**	**~~~~~~~**	**~Y~Y~~Y**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**P**	**.**	**POHNPEI_INTL,POHNPEI_ISLAND**	**Micronesia_(Federated_States_of)**	**PAC**
PTRO	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	BABELTHUAP/KOROR,_BABELTHUAP_ISLAND	Palau	PAC
PTYA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	YAP_INTL,YAP_ISLAND	Micronesia_(Federated_States_of)	PAC
RCKH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	GAOXIONG	China	ASI
RCSS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	TAIBEI/SONGSHAN	China	ASI
RCTP	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	TAIBEI_CITY/TAIBEI_INTL_AP	China	ASI
RJAA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	NARITA_INTL	Japan	ASI
RJBB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	KANSAI_INTL	Japan	ASI
RJCC	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	SAPPORO/NEW_CHITOSE	Japan	ASI
RJCH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	HAKODATE	Japan	ASI
RJFF	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	FUKUOKA	Japan	ASI
RJFK	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	KAGOSHIMA	Japan	ASI
RJFO	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	OITA	Japan	ASI
RJFT	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	KUMAMOTO	Japan	ASI
RJFU	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	NAGASAKI	Japan	ASI
RJGG	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	CHUBU_CENTRAIR_INTL	Japan	ASI
RJOA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	HIROSHIMA	Japan	ASI

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RJOB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	OKAYAMA	Japan	ASI
RJOO	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	OSAKA_INTL	Japan	ASI
RJOT	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	TAKAMATSU	Japan	ASI
RJSN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	NIIGATA	Japan	ASI
RJSS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	SENDAI	Japan	ASI
RJTT	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	TOKYO_INTL	Japan	ASI
RKJB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	MUAN	Republic_of_Korea	ASI
RKNY	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	YANGYANG	Republic_of_Korea	ASI
RKPC	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	JEJU_INTL	Republic_of_Korea	ASI
RKPK	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	GIMHAE_INTL	Republic_of_Korea	ASI
RKSI	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	INCHEON_INTL	Republic_of_Korea	ASI
RKSS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	GIMPO	Republic_of_Korea	ASI
RKTN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	DAEGU_INTL	Republic_of_Korea	ASI
RKTU	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	CHEONGJU	Republic_of_Korea	ASI
ROAH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	NAHA	Japan	ASI
RPLB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	P	.	SUBIC_BAY,SUBIC_BAY_INTL	Philippines	ASI
RPLI	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	P	.	LAOAG,_LAOAG_INTL	Philippines	ASI
RPLL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	MANILA/NINOY_AQUINO_INTL	Philippines	ASI
RPMD	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	P	.	DAVAO/FRANCISCO_BANGOY_INTL	Philippines	ASI
RPMZ	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	P	.	ZAMBOANGA,_ZAMBOANGA_INTL	Philippines	ASI
RPVM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	LAPU-LAPU/MACTAN_INTL	Philippines	ASI
VAAH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	AHMEDABAD	India	ASI
VABB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	MUMBAI	India	ASI
VANP	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	NAGPUR	India	ASI
VCBI	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	KATUNAYAKE/BANDARANAIKE_INTERNATIONAL_AIRPORT_COLOMBO	Sri_Lanka	ASI
VCCH	**~~~~~~~**	**~~~~~~~**	**~~~~~~~**	**.**	**Y**	**Y**	**.**	**Y**	**_**	**F**	**.**	**HINGURAKGODA/MINNERIYA**	**Sri_Lanka**	**ASI**
VCRI	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	MATTALA/MATTALA_RAJAPAKSA_INTERNATIONAL_AIRPORT	Sri_Lanka	ASI
VDPP	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	P	.	PHNOM_PENH	Cambodia	ASI
VDSR	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	P	.	SIEM_REAP	Cambodia	ASI
VECC	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	KOLKATA	India	ASI
VEGT	**Y~YYYYY**	**~~~~~~~**	**~Y~~~Y~**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**.**	**GUWAHATI**	**India**	**ASI**
VEGY	~~~~~~~	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	GAYA	India	ASI
VEPT	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	PATNA	India	ASI
VGEG	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	M.A._HANNAN_INTL._CHITTAGONG	Bangladesh	ASI
VHHH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	HONG_KONG/INTERNATIONAL	Hong_Kong,_China_(China)	ASI
VIAR	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	AMRITSAR	India	ASI
VIBN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	VARANASI	India	ASI
VIDP	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	DELHI_(IGI)	India	ASI
VIJP	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	JAIPUR	India	ASI
VILK	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	LUCKNOW	India	ASI
VLVT	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	P	.	VIENTIANE(WATTAY)	Lao_People's_Democratic_Republic	ASI
VMMC	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	MACAO/INTL_AIRPORT	Macao,_China_(China)	ASI
VNKT	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	KATHMANDU	Nepal	ASI
VOBL	**YYYYYYY**	**YYYYYYY**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**X**	**F**	**.**	**BANGALORE_INTL._AIRPORT**	**India**	**ASI**
VOCB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	COIMBATORE	India	ASI
VOCI	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	COCHIN_INTL.	India	ASI
VOCL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	CALICUT	India	ASI
VOHS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	HYDERABAD_INTL._AIRPORT	India	ASI
VOML	**~~Y~Y~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**.**	**MANGALORE**	**India**	**ASI**
VOMM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	CHENNAI	India	ASI
VOTR	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	.	TIRUCHIRAPPALLI	India	ASI
VOTV	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	THIRUVANANTHAPURAM	India	ASI
VQPR	**YYYYYY~**	**~~~~~~~**	**~~~~~~~**	**.**	**Y**	**Y**	**.**	**Y**	**_**	**F**	**.**	**PARO/INTL**	**Bhutan**	**ASI**
VRMG	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**X**	**F**	**.**	**GAN/GAN_INTERNATIONAL_AIRPORT**	**Maldives**	**ASI**
VRMH	**~~~~~~~**	**~~~~~~~**	**~~~~~~~**	**.**	**Y**	**Y**	**.**	**Y**	**X**	**F**	**.**	**HANIMAADHOO**	**Maldives**	**ASI**
VRMM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	IBRAHIM_NASIR_INTERNATIONAL_AIRPORT	Maldives	ASI
VTBD	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	BANGKOK/DON_MUEANG_INTL_AIRPORT	Thailand	ASI
VTBS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	.	BANGKOK/SUVARNABHUMI_INTL_AIRPORT	Thailand	ASI

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VTBU	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. RAYONG/U-TAPAO_PATTAYA_INTL_AIRPORT	Thailand	ASI
VTCC	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. CHIANG_MAI/CHIANG_MAI_INTL._AIRPORT	Thailand	ASI
VTCT	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. CHIANG_RAI/MAE_FAH_LUANG-CHIANG_RAI_INTL_AIRPORT	Thailand	ASI
VTPP	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	P	. PHITSANULOK	Thailand	ASI
VTSB	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	P	. SURAT_THANI	Thailand	ASI
VTSG	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. KRABI	Thailand	ASI
VTSP	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. PHUKET/PHUKET_INTL_AIRPORT	Thailand	ASI
VTSS	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. SONGKHLA/HAT_YAI_INTL_AIRPORT	Thailand	ASI
VTUK	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	P	. KHON_KAEN	Thailand	ASI
VTUU	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. UBON_RATCHATHANI	Thailand	ASI
VVCR	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. CAM_RANH	Viet_Nam	ASI
VVCT	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. CAN_THO	Viet_Nam	ASI
VVDN	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. DA_NANG	Viet_Nam	ASI
VVNB	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. HA_NOI/NOI_BAI	Viet_Nam	ASI
VVPB	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. HUE/PHU_BAI	Viet_Nam	ASI
VVPQ	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. PHU_QUOC	Viet_Nam	ASI
VVTS	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. HO_CHI_MINH/TAN_SON_NHAT	Viet_Nam	ASI
VYYY	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. YANGON_INTERNATIONAL	Myanmar	ASI
WAAA	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. MAKASSAR/SULTAN_HASANUDDIN	Indonesia	ASI
WABB	**~~Y~~~~**	**~~~~~~~**	**YYYYYYY**	**. Y**	**Y**	**. Y**	**X**	**F**	**. BIAK/FRANS_KAISIEPO**	**Indonesia**	**ASI**
WADD	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. BALI_INTL/NGURAH_RAI	Indonesia	ASI
WAJJ	**YYYYYYY**	**~~~~~~~**	**~~~~~~~**	**. Y**	**Y**	**. Y**	**T**	**F**	**. JAYAPURA/SENTANI**	**Indonesia**	**ASI**
WAKK	**~Y~~Y~~**	**~~~~~~~**	**~~~~~~~**	**. Y**	**Y**	**. Y**	**T**	**P**	**. MERAUKE/MOPAH**	**Indonesia**	**ASI**
WALL	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. BALIKPAPAN/SEPINGGAN	Indonesia	ASI
WALR	YYYYYYY	~~~~~~~	Y~Y~YYY	. Y	Y	. Y	T	P	. TARAKAN/JUWATA	Indonesia	ASI
WAMM	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. MANADO/SAMRATULANGI	Indonesia	ASI
WAOO	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. BANJARMASIN/SYAMSUDIN_NOOR	Indonesia	ASI
WAPP	**~~Y~~~~**	**~~~~~~~**	**YYYYYYY**	**. Y**	**Y**	**. Y**	**T**	**F**	**. AMBON/PATTIMURA**	**Indonesia**	**ASI**
WARR	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. SURABAYA/JUANDA	Indonesia	ASI
WATT	**~~~~~~Y**	**~~~~~~~**	**YYYYYYY**	**. Y**	**Y**	**. Y**	**T**	**F**	**. KUPANG/EL-TARI**	**Indonesia**	**ASI**
WBGG	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. KUCHING/INTL	Malaysia	ASI
WBKK	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. KOTA_KINABALU/INTL	Malaysia	ASI
WBSB	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. BRUNEI/INTL	Brunei_Darussalam	ASI
WIBB	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**. Y**	**Y**	**. Y**	**T**	**F**	**. PEKANBARU/SULTAN_SYARIF_KASIM_II**	**Indonesia**	**ASI**
WIDD	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. BATAM/HANG_NADIM	Indonesia	ASI
WIDN	YYYYYYY	~~~~~~~	~Y~~~~~	. Y	Y	. Y	T	P	. TANJUNG_PINANG/RAJA_HAJI_FISABILILLAH	Indonesia	ASI
WIHH	~Y~~~~~	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	P	. JAKARTA/HALIM_PERDANAKUSUMA	Indonesia	ASI
WIII	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. JAKARTA_INTL/SOEKARNO-HATTA	Indonesia	ASI
WIMM	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. MEDAN/KUALANAMU	Indonesia	ASI
WIOO	**~~~Y~~~**	**~~~~~~~**	**~~~~~~~**	**. Y**	**Y**	**. Y**	**T**	**F**	**. PONTIANAK/SUPADIO**	**Indonesia**	**ASI**
WIPP	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. PALEMBANG/SULTAN_MAHMUD_BADARUDDIN_II	Indonesia	ASI
WIPT	**YYYYYYY**	**~~~~~~~**	**~~~~~~~**	**. Y**	**Y**	**. Y**	**T**	**F**	**. PANDANG/MINANGKABAU**	**Indonesia**	**ASI**
WMKJ	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. JOHOR_BAHRU/SULTAN_ISMAIL	Malaysia_(Peninsular)_(Malaysia)	ASI
WMKK	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. SEPANG/KL_INTERNATIONAL_AIRPORT	Malaysia_(Peninsular)_(Malaysia)	ASI
WMKL	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. PULAU_LANGKAWI/INTL	Malaysia_(Peninsular)_(Malaysia)	ASI
WMKP	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. PENANG/INTL	Malaysia_(Peninsular)_(Malaysia)	ASI
WSAP	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. PAYA_LEBAR_(RSAF)	Singapore	ASI
WSSL	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. SELETAR	Singapore	ASI
WSSS	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. SINGAPORE/CHANGI	Singapore	ASI
YBAS	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. ALICE_SPRINGS	Australia	ASI
YBBN	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. BRISBANE/BRISBANE_INTL	Australia	ASI
YBCS	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. CAIRNS/CAIRNS_INTL	Australia	ASI
YBRK	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. ROCKHAMPTON	Australia	ASI
YBTL	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. TOWNSVILLE/TOWNSVILLE_INTL	Australia	ASI
YMHB	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. HOBART	Australia	ASI
YMML	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. MELBOURNE/MELBOURNE_INTL	Australia	ASI
YPAD	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	X	F	. ADELAIDE/ADELAIDE_INTL	Australia	ASI
YPCC	YYYYYYY	~~~~~~~	YYYYYYY	. Y	Y	. Y	T	F	. COCOS_(KEELING)_ISLANS_INTL	Australia	ASI

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YPDN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. DARWIN/DARWIN_INTL	Australia	ASI
YPPD	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. PORT_HEDLAND	Australia	ASI
YPPH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. PERTH/PERTH_INTL	Australia	ASI
YPTN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. TINDAL	Australia	ASI
YPXM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. CHRISTMAS_ISLAND	Australia	ASI
YSNF	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. NORFOLK_ISLAND	Australia	ASI
YSSY	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. SYDNEY/SYDNEY_(KINGSFORD_SMITH)_INTL	Australia	ASI
ZBAA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. BEIJING/CAPITAL	China	ASI
ZBHH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. HUHHOT/BAITA	China	ASI
ZBTJ	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. TIANJIN/BINHAI	China	ASI
ZBYN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. TAIYUAN/WUSU	China	ASI
ZGGG	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. GUANGZHOU/BAIYUN	China	ASI
ZGHA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. CHANGSHA/HUANGHUA	China	ASI
ZGKL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. GUILIN/LIANGJIANG	China	ASI
ZGNN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. NANNING/WUXU	China	ASI
ZGSZ	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. SHENZHEN/BAOAN	China	ASI
ZHHH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. WUHAN/TIANHE	China	ASI
ZJSY	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. SANYA/PHOENIX	China	ASI
ZKPY	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**. SUNAN**	**Democratic_People's_Republic_of_Korea**	**ASI**
ZLLL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. LANZHOU/ZHONGCHUAN	China	ASI
ZLXY	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. XI'AN/XIANYANG	China	ASI
ZMUB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. ULAANBAATAR/CHINGGIS_KHAAN	Mongolia	ASI
ZPPP	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. KUNMING/CHANGSHUI	China	ASI
ZSAM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. XIAMEN/GAOQI	China	ASI
ZSFZ	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. FUZHOU/CHANGLE	China	ASI
ZSHC	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. HANGZHOU/XIAOSHAN	China	ASI
ZSJN	**YYYYYYY**	**~~~~~~~**	**~~~~~~~**	**.**	**Y**	**Y**	**.**	**Y**	**T**	**F**	**. JINAN/YAOQIANG**	**China**	**ASI**
ZSNJ	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. NANJING/LUKOU	China	ASI
ZSOF	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. HEFEI/XINQIAO	China	ASI
ZSPD	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. SHANGHAI/PUDONG	China	ASI
ZSQD	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. QINGDAO/LIUTING	China	ASI
ZSSS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. SHANGHAI/HONGQIAO	China	ASI
ZUCK	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. CHONGQING/JIANGBEI	China	ASI
ZUUU	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. CHENGDU/SHUANGLIU	China	ASI
ZUXC	**~~~~~~~**	**~~~~~~~**	**~~~~~~~**	**.**	**Y**	**Y**	**.**	**Y**	**_**	**F**	**. XICHANG/QUINGSHAN**	**China**	**ASI**
ZWSH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. KASHI/KASHI	China	ASI
ZWWW	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	X	F	. URUMQI/DIWOPU	China	ASI
ZYHB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. HARBIN/TAIPING	China	ASI
ZYTL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. DALIAN/ZHOUSHUIZI	China	ASI
ZYTX	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	Y	.	Y	T	F	. SHENYANG/TAOXIAN	China	ASI

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Loc Ind	SA/day	FC/day	FT/day	.	FASID	AOP	.	SA/SP	TAF	Service	.	Name	Country	ICAO region
AYMH	**~~~~~~~**	**~~~Y~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**C**	**F**	**.**	**MOUNT_HAGEN**	**Papua_New_Guinea**	**ASI**
AYMO	**~~~~YY~**	**YYYYYYY**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**C**	**F**	**.**	**MOMOTE**	**Papua_New_Guinea**	**ASI**
AYNZ	**~~~~~Y~**	**YYYYYYY**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**C**	**F**	**.**	**NADZAB**	**Papua_New_Guinea**	**ASI**
AYWK	**~~Y~~Y~**	**YYYYYYY**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**_**	**F**	**.**	**WEWAK**	**Papua_New_Guinea**	**ASI**
OPDG	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**_**	**.**	**D.G._KHAN_INT'L**	**Pakistan**	**ASI**
OPMT	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	MULTAN/INTL.	Pakistan	ASI
OPST	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	SIALKOT_INTERNATIONAL_AIRPORT	Pakistan	ASI
PGWT	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	WEST_TINIAN,TINIAN_ISLAND	Northern_Mariana_Islands_(United_States)	ASI
PHJH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	LAHAINA/KAPALUA-WEST_MAUI,_HI.	Hawaii_(United_States)	PAC
PHKO	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	KONA/KEAHOLE_KAILUA,HI.	Hawaii_(United_States)	PAC
PHLI	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	LIHUE,_KAUAI,HI.	Hawaii_(United_States)	PAC
PHMK	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	MOLOKAI,_KAUNAKAKAI,HI.	Hawaii_(United_States)	PAC
PHNY	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	LANAI_CITY,_LANAI,HI.	Hawaii_(United_States)	PAC
PKWA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	KWAJALEIN_ATOLL/BUCHOLZ_AAF,_KIRIBATI	Marshall_Islands	PAC
PMDY	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	MIDWAY_NAF_(HENDERSON_FIELD)_,SAND_ISLAND	Midway_(United_States)	PAC
PTSA	YYYYYYY	~~~~~~~	~YYYYYY	.	Y	N	.	Y	T	F	.	KOSRAE,KOSRAE_ISLAND	Micronesia_(Federated_States_of)	PAC
PWAK	**~YY~~~Y**	**~~~~~~~**	**~~~~~~~**	**.**	**Y**	**N**	**.**	**Y**	**X**	**P**	**.**	**WAKE_ISLAND_AIRFIELD,WAKE_I.**	**Wake_Island_(United_States)**	**PAC**
RPLC	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	PAMPANGA/DIOSDADO_MACAPAGAL_INTERNATIONAL_MABALACAT,_PAMPANGA	Philippines	ASI
RPML	**~~~~~~~**	**~~~~~~~**	**~~~~~~~**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**CAGAYAN_DE_ORO,_MIZAMIS_ORIENTAL**	**Philippines**	**ASI**
RPMR	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**TAMBLER,GEN._SANTOS,SOUTH_COTABATO**	**Philippines**	**ASI**
RPVD	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**DUMAGUETE/SIBULAN,_NEGROS_ORIENTAL**	**Philippines**	**ASI**
RPVP	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**PUERTO_PRINCESA,_PALAWAN**	**Philippines**	**ASI**
VLLB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	LUANG_PRABANG	Lao_People's_Democratic_Republic	ASI
VLLN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	LUANG_NAMTHA	Lao_People's_Democratic_Republic	ASI
VLPS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	PAKSE	Lao_People's_Democratic_Republic	ASI
VLSK	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	SAVANNAKHET	Lao_People's_Democratic_Republic	ASI
VOHY	**~YYYYYY**	**~~~~~~~**	**~~~~~~~**	**.**	**Y**	**N**	**.**	**Y**	**X**	**P**	**.**	**HYDERABAD**	**India**	**ASI**
VTCH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	MAE_HONG_SON	Thailand	ASI
VTCL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	LAMPANG	Thailand	ASI
VTCN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	NAN	Thailand	ASI
VTCP	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	PHRAE	Thailand	ASI
VTPB	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**PHETCHABUN**	**Thailand**	**ASI**
VTPH	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	PRACHUAP_KHIRI_KHAN/HUA_HIN	Thailand	ASI
VTPM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	TAK/MAE_SOT	Thailand	ASI
VTPO	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	SUKHOTHAI	Thailand	ASI
VTPT	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**TAK**	**Thailand**	**ASI**
VTSC	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	NARATHIWAT	Thailand	ASI
VTSE	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	CHUMPHON/TAB_GAI	Thailand	ASI
VTSF	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	NAKHON_SI_THAMMARAT	Thailand	ASI
VTSH	**~Y~~~~Y**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**SONGKHLA**	**Thailand**	**ASI**
VTSK	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**PATTANI**	**Thailand**	**ASI**
VTSM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	SURA_TAHNI/SAMUI	Thailand	ASI
VTSR	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	RANONG	Thailand	ASI
VTST	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	TRANG	Thailand	ASI
VTUD	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	UDON_THANI	Thailand	ASI
VTUI	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**SAKON_NAKHON/BAN_KHAI**	**Thailand**	**ASI**
VTUL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	LOEI	Thailand	ASI
VTUO	Y~YYY~~	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	BURI_RAM	Thailand	ASI
VTUQ	**~~~~~~~**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**NAKHON_RATCHASIMA**	**Thailand**	**ASI**
VTUV	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	ROI_ET	Thailand	ASI
VTUW	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	NAKHON_PHANOM	Thailand	ASI
VYMD	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	P	.	MANDALAY_INTERNATIONAL	Myanmar	ASI
WABP	**~~~~Y~Y**	**~~~~~~~**	**YYYYYYY**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**.**	**TIMIKA/MOSES_KILANGIN**	**Indonesia**	**ASI**
WADL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	.	PRAYA/LOMBOK_INTERNATIONAL	Indonesia	ASI

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WARJ	**~~Y~~~~**	**~~~~~~~**	**~YYY~~Y**	**.**	**Y**	**N**	**.**	**Y**	**T**	**P**	**. YOGYAKARTA/ADI_SUTJIPTO**	**Indonesia**	**ASI**
WARQ	YYYYYYY	~~~~~~~	~~~~~~~	.	Y	N	.	Y	T	P	. SOLO/ADI_SUMARMO	Indonesia	ASI
WASS	**~~~~~~~**	**~~~~~~~**	**~~~~~~~**	**.**	**Y**	**N**	**.**	**N**	**T**	**P**	**. SORONG/DOMINE_EDUARD_OSOK**	**Indonesia**	**ASI**
WBGB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. BINTULU	Malaysia	ASI
WBGR	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. MIRI	Malaysia	ASI
WBGS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. SIBU	Malaysia	ASI
WBKL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. LABUAN_(RMAF)	Malaysia	ASI
WBKS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. SANDAKAN	Malaysia	ASI
WBKW	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. TAWAU	Malaysia	ASI
WMKA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. ALOR_STAR/SULTAN_ABDUL_HALIM	Malaysia_(Peninsular)_(Malaysia)	ASI
WMKB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. BUTTERWORTH_(RMAF)	Malaysia_(Peninsular)_(Malaysia)	ASI
WMKC	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. KOTA_BHARU/SULTAN_ISMAIL_PETRA	Malaysia_(Peninsular)_(Malaysia)	ASI
WMKD	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	_	F	. KUANTAN	Malaysia_(Peninsular)_(Malaysia)	ASI
WMKE	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. KERTEH_(PETRONAS)	Malaysia_(Peninsular)_(Malaysia)	ASI
WMKI	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. IPOH/SULTAN_AZLAN_SHAH	Malaysia_(Peninsular)_(Malaysia)	ASI
WMKM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	_	F	. MALACCA	Malaysia_(Peninsular)_(Malaysia)	ASI
WMKN	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. KUALA_TERENGGANU/SULTAN_MAHMUD	Malaysia_(Peninsular)_(Malaysia)	ASI
WMSA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. SUBANG/SULTAN_ABDUL_AZIZ_SHAH	Malaysia_(Peninsular)_(Malaysia)	ASI
YAMB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. AMBERLEY	Australia	ASI
YBCG	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. GOLD_COAST	Australia	ASI
YBHM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. HAMILTON_ISLAND	Australia	ASI
YBMA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. MOUNT_ISA	Australia	ASI
YBRM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. BROOME/BROOME_INTL	Australia	ASI
YCFS	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. COFFS_HARBOUR	Australia	ASI
YCIN	YYYYYYY	~~~~~~Y	YYYYYYY	.	Y	N	.	Y	T	F	. CURTIN	Australia	ASI
YFRT	YY~~YYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. FORREST	Australia	ASI
YGEL	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. GERALDTON	Australia	ASI
YHID	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. HORN_ISLAND	Australia	ASI
YMAV	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. AVALON	Australia	ASI
YMLT	YYYYYYY	~~~~~~~	~~YYYYY	.	Y	N	.	Y	T	F	. LAUNCESTON	Australia	ASI
YPEA	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. PEARCE	Australia	ASI
YPGV	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. GOVE	Australia	ASI
YPJT	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. PERTH/JANDAKOT	Australia	ASI
YPKG	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. KALGOORLIE-BOULDER	Australia	ASI
YPKU	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. KUNUNURRA	Australia	ASI
YPLM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. LEARMONTH	Australia	ASI
YPWR	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. WOOMERA	Australia	ASI
YSCB	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. CANBERRA	Australia	ASI
YSDU	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. DUBBO	Australia	ASI
YSRI	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. RICHMOND_(NSW)	Australia	ASI
YSTW	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. TAMWORTH	Australia	ASI
YWLM	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. WILLIAMTOWN	Australia	ASI
ZGOW	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. JIEYANG/CHAOSHAN	China	ASI
ZJHK	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	X	F	. HAIKOU/MEILAN	China	ASI
ZYCC	YYYYYYY	~~~~~~~	YYYYYYY	.	Y	N	.	Y	T	F	. CHANGCHUN/LONGJIA	China	ASI

APAC VOLCANIC ASH EXERCISES STEERING GROUP

DRAFT TERMS OF REFERENCE

VISION

Maintain safety, regularity and efficiency of aviation in the event of a volcanic eruption.

OBJECTIVES

Coordinate all aspects of the organization and conduct of volcanic ash exercises in the APAC region in order to:

1. Test volcanic activity alerting, AIS and MET message routing, volcanic ash information, air traffic control procedures, air traffic flow and capacity management and aircraft operator response and the CDM between the various actors in accordance with regional and global procedures. The exercises should be designed to:

    a) practice the conduct of volcanic activity response in accordance with the regional reference documents;

    b) verify existing information, AIS and MET message routing via AFTN addresses, relevant e-mail addresses, telephone and fax numbers, and internet addresses (URLs);

    c) maintain appropriate information and message routing between all involved agencies and organizations;

    d) provide volcanic activity response training for key personnel involved;

    e) allow regulators to assess the preparedness and operational response in terms of planning, process and procedures of operators; and

    f) provide, when appropriate, recommendations for amendment of the reference documents, in accordance with the lessons learned and conclusions contained in the final exercise report.

2. Ensure that detrimental effects of exercises on the aviation system performance are avoided, but that nevertheless useful experience and information is generated; and

3. Practice and develop inter-agency response to volcanic activity.

SCOPE

There is significant regional variation in the nature, frequency, observation of and response to volcanic eruptions. As the APAC region encompasses much of the volcanically active zone known as the “Ring of Fire”, there are several States where regular air traffic flow is at risk from encounters with volcanic ash.

The IAVW was established globally to mitigate the risks; however the diverse nature of the APAC region, in terms of both its geography and its communities, is reflected by the diverse challenges faced in responding to volcanic ash events. Therefore, each exercise may have different objectives, which the scenario will be designed to address. For example, any or all of the activities listed below may be tested depending on the scope of the individual exercise:

a) AFTN, e-mail addresses, websites, message routing and voice communications;
b) alerting and observation of ash (e.g. use of VONA and VAR);
c) VAAC response (e.g. volcanic ash information);
d) ATS response (including air traffic control and AIS for NOTAM issuance);
e) ATM response;
f) aircraft operator response (including safety risk assessment);
g) MWO response (i.e. SIGMET); and
h) suitability of information, its frequency, format and content.

DELIVERABLES

The steering group is expected to:

1. Appoint an exercise leader for volcanic ash exercise/s

2. Conduct planning meetings for volcanic ash exercise/s (initial exercise to be conducted in 2015)

3. Publish volcanic ash exercise directive/s, including:

    - ✓ Scenario/s – location/s should cover an area/s that could be affected by volcanic ash and the time/period/s should ensure volcanic ash would impact international routes

    - ✓ Procedures/instructions

    - ✓ Participants

4. Conduct volcanic ash exercise/s (initial exercise to be conducted in 2015)

5. Conduct debrief meeting/s to review the volcanic ash exercise/s, including:

    - ✓ Discuss reports

    - ✓ Review the lessons learnt

    - ✓ Revise and improve the volcanic ash exercise directive/s (based on lessons learnt)

    - ✓ Recommend improvements to the regional volcanic ash ATM contingency plan

    - ✓ Recommend improvements to global ICAO provisions and forward to APANPIRG and/or IAVWOPSG

    - ✓ Update the future work plan – for subsequent volcanic ash exercise/s

    - ✓ Consolidated report to the appropriate Sub-Group/s and APANPIRG

STAKEHOLDERS, ROLES and RESPONSIBILITIES

STAKEHOLDERS	ROLES	RESPONSIBILITIES
Volcano observatory	Participant	VONA
VAACs	Participant	VAA/VAG
MWOs	Participant	MET watch, SIGMET, supply information on VA
ANSPs (ACC/AIS/NOF)	Participant	Inform aircraft, issue ASHTAM/NOTAM, activate contingencies, forward special air-reports
RODBs	Support	OPMET exchange
Airspace users	Participant	Tactical response
Regulators	Participant	Regulations
ICAO	Facilitator	Meeting and exercise support

Minimum representation in the volcanic ash exercises steering group.

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SUBJECT/TASKS LIST IN THE MET FIELD

Updated by MET SG/18

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 and RACP/TF as necessary)	MET SG (MET/H TF)	On going
2 (36)	APANPIRG D. 4/46 RAN/3 C.12/3 APANPIRG 5/3	C- Sustainability All GPIs	Subject: Provision of adequate MET services Task: Monitor performance based systems research and development, trials and demonstrations in the fields of MET and facilitate the transfer of	A	1) Encourage States to conduct R&D, trials & demonstrations of new MET services; 2) Monitor global developments that may have beneficial consequences on	MET SG	On-going

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
	(TOR 3)		this information and expertise between States.		regional planning activities; 3) Consolidate information on new capabilities in the CNS/ATM system, for the Sub-Group's review and action; 4) Serve as a focal point for review of ongoing work of regional formal and informal working groups that is relevant to MET; 5) Provide for coordinated training/seminars to keep all States informed on developments of trials and demonstrations.		
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 2) Monitoring of the migration to SADIS 2G 3) Assist in preparation for the new gridded products for turbulence, icing and cumulonimbus 4) Monitoring of the implementation of WIFS until cessation of ISCS G2 broadcast	MET SG (WAFS TF) WAFS TF WAFS TF WAFS/I TF	Completed Completed Completed Completed

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
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; 2) Development of the MET components of the CNS/ATM concept/ strategy; 3) Inclusion of ATM requirements for MET information in the CNS/ ATM Plan; 4) MET/ATM Coordination Seminar – February 2006. 5) Conduct survey on ATM requirements for MET information 6) MET/ATM meeting in 2009 7) MET/ATM seminar in 2010 (in coordination with WMO) 8) MET/ATM seminar and MET/R TF meeting	CNS/MET SG with assistance of MET WG on CNS/ATM Plan CNS/MET SG MET/ATM TF MET/R TF MET/ATM TF MET/ATM TF MET/R TF	Completed Completed Completed Completed 2014 Completed Completed 2013 Completed 2015 Planning

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
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)	Recurrent task Recurrent task Recurrent task Recurrent task 2014-2016 2014-2016
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	

No.	Ref.	Associated Strategic Objective & GPIs	Task	Priority	Action Proposed/In Progress	Action by	Target Date
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/H TF in coordination with ROBEX WG)	Recurrent task Recurrent task Recurrent task Recurrent task

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

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International Civil Aviation Organization

EIGHTEENTH MEETING OF THE METEOROLOGY SUB-GROUP (MET SG/18) OF APANPIRG

ICAO Regional Sub-Office, Beijing, China
18 – 21 August 2014

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International Civil Aviation Organization

EIGHTEENTH MEETING OF THE METEOROLOGY SUB-GROUP (MET SG/18) OF APANPIRG

ICAO Regional Sub-Office, Beijing, China
18 – 21 August 2014

LIST OF WORKING/INFORMATION PAPERS

WP/IP/ SP No.	Agenda	Subject	Presented by
		WORKING PAPERS	
WP/1		Provisional Agenda	Secretariat
WP/2	4	Follow-up from MET SG/17 and APANPIRG/24	Secretariat
WP/3	4	Report of MET/ATM Seminar 2013 and MET/R TF/3 Meeting	Chair of MET/R TF
WP/4	4	ROBEX Working Group Report	Chair of ROBEX WG
WP/5	4	Report on MET/H TF/4	Secretariat on behalf of the Chairman of the MET/H TF
WP/6	4	Review outcomes of the Second Meeting of the ATM Sub-group of APANPIRG	Secretariat
WP/7	5	Air Navigation Reporting Forms, Seamless Reporting and Monitoring of Regional Progress	Secretariat
WP/8	5	Review Regional Priorities and Targets	Secretariat
WP/9	5	Updates to OPMET Related FASID Tables	Secretariat
WP/10	5	Review New Regional ANP Template	Secretariat
WP/11	6	Review APAC MET Deficiencies	Secretariat
WP/12	6	OPMET Data Deficiencies	IATA
WP/13	7.1	Summary of Recent and Forthcoming Developments to the WAFS	WAFC Provider States
WP/14	7.1	Summary of Recent and Forthcoming Developments to the SADIS	SADIS Provider
WP/15	7.4	Regional Advisory System in Asia and Pacific Regions	Japan
WP/16	7.6	Proposal for Regional Volcanic Ash Exercise	Japan

WP/IP/ SP No.	Agenda	Subject	Presented by
WP/17	7.5	IATA OPMET Data Monitoring	IATA
WP/18	7.5	Capacity Building to Foster the Implementation of Digital Exchange	Secretariat
WP/19	8	Review New SIGMET Guide Template	Secretariat
WP/20	8	Review Updates to ROBEX Handbook	Secretariat
WP/21	8	Review OPMET Data Banks Interface Control Document	Secretariat
WP/22	9	Proposal for APAC MET/ATM Seminar	Secretariat
WP/23	10	Review Future Work Programme of the MET SG	Secretariat
WP/24	11	Review APAC [MET] Contact Lists	Secretariat
		LIST OF INFORMATION PAPERS	
IP/1	3	Review Outcomes of the Twelfth Air Navigation Conference	Secretariat
IP/2	3	Review Outcomes of the ICAO Meteorology Divisional Meeting 2014	Secretariat
IP/3	3	Review Outcomes of WAFSOPSG/8	Secretariat
IP/4	3	Review Outcomes of SADISOPSG/18 and SADISOPSG/19	Secretariat
IP/5	3	Review Outcomes of AMOFSG/10	Secretariat
IP/6	3	Review Outcomes of IAVWOPSG/8	Secretariat
IP/7	3	Review Outcomes of METWSG/5	Secretariat
IP/8	4	Report on 50th Conference of Directors General of Civil Aviation Asia and Pacific Regions	Secretariat
IP/9	4	Update of WAFS Service Reference Document	Chairman, WAFS TF
IP/10	4	Update of Work Plan of WAFS TF	Chairman, WAFS TF
IP/11		Number was not used	
IP/12		Number was not used	
IP/13	7.1	Regional Progress in WAFS Implementation	Chairman, WAFS TF

WP/IP/ SP No.	Agenda	Subject	Presented by
IP/14	7.1	Survey on Operational Use of Services and Products from Service Providers of World Area Forecast System (WAFS) in Asia/Pacific Region and WAFS Training Needs of Asia/Pacific States	Chairman, WAFS TF
IP/15	7.1	Verification of the Harmonized WAFS Gridded Forecast of CAT Potential	Hong Kong, China
IP/16	7.1	WIFS Accounts	WIFS Provider State
IP/17	7.4	VAAC Darwin Management Report	Australia
IP/18	7.4	Outcomes of Volcanic Ash Exercise in Kamchatka in 20134 (VOLKAM14)	Japan
IP/19	7.4	Coordination of Volcanic Ash Information	Indonesia and Australia
IP/20		Number was not used	
IP/21	7.5	Overview of the WAFS Internet File Service OPMET Data	WIFS Provider State
IP/22	7.5	SWIM Test and Demonstration	USA
IP/23	7.9	The Provision of Global Space Weather Information in Support of International Air Navigation	USA
IP/24	7.9	HIMAWARI-8/9 – Japan's Next Generation of Geostationary Meteorological Satellite	Japan
IP/25		Number was not used	
IP/26	7.5	Status and Plans for IWXXM in Australia	Australia
IP/27	7.8	Quality Management Training Activities in the South West Pacific	Australia
IP/28	7.8	Competency Assessment Programme for Aviation Forecasters in Australia	Australia
IP/29	7.4	Enhanced Capability to Support the Issuance of Regional Hazardous Weather Advisory	China
IP/30	7.9	The China Space Weather Services for Civil Aviation	China
IP/31	7.6	The Need for Development of ATM-Tailored Meteorological Information for Approach Control Areas	Japan
IP/32	7.6	Potential Use of the Weather Impact Ratio (WXIR) in Future ATM	Japan

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Monday 18 August 2014 (Day 1)			
0830 – 0900	***Registration of participants***		
0900 – 1030	**Agenda Item 1:** Opening of the meeting **Agenda Item 2:** Organizational matters **Agenda Item 3:** Review outcomes from global ICAO groups		
1030 – 1045	***Coffee/Tea Break***		
1045 – 1200	**Agenda Item 4:** Review outcomes from APAC ICAO groups		
1200 – 1330	***Lunch Break***		
1330 – 1445	**Agenda Item 5:** Planning and monitoring		
1445 – 1500	***Coffee/Tea Break***		
1500 - 1600	**Agenda Item 7:** Research, development and implementation issues in the MET field 7.6 MET/ATM coordination		

Tuesday 19 August 2014 (Day 2)			
0900	***Start of business***		
0900 - 1030	**Agenda Item 7:** Research, development and implementation issues in the MET field		
1030 – 1100	***Group Photo & Coffee/Tea Break***		
1100 - 1200	**Agenda Item 7:** Research, development and implementation issues in the MET field *(cont.)*		
1200 – 1330	***Lunch Break***		
1330 – 1445	**Agenda Item 7:** Research, development and implementation issues in the MET field *(cont.)*		
1445 – 1500	***Coffee/Tea Break***		
1500 – 1600	**Side meetings (WAFS TF and MET/R TF)**		

Wednesday 20 August 2014 (Day 3)			
0900	***Start of business***		
0900 - 1030	**Agenda Item 7:** Research, development and implementation issues in the MET field *(cont.)*		
1030 – 1045	***Coffee/Tea Break***		
1045 - 1200	**Agenda Item 6:** Air navigation deficiencies in the MET field **Agenda Item 8:** Regional guidance material		
1200 – 1330	***Lunch Break***		
1330 – 1445	**Agenda Item 9:** Inter-regional and intra-regional coordination **Agenda Item 10:** Future work programme **Agenda Item 11:** Any other business		
1445 – 1500	***Coffee/Tea Break***		
1500 – 1600	**Side Meeting (MET/H TF and ROBEX WG)**		

Thursday 21 August 2014 (Day 4)			
0900	***Start of business***		
0900 - 1030	Review of report		
1030 – 1045	***Coffee/Tea Break***		
1045 - 1230	Adoption of report		
1230 – 1240	***Close of meeting***		

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