



International Civil Aviation Organization

WORKING PAPER

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

Bangkok, Thailand, 6 – 9 June 2016

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

6.3 MET/ATM coordination (including MET/R WG Report)

**REVIEW OF THE FIFTH MEETING OF THE ASIA/PACIFIC
METEOROLOGICAL REQUIREMENT WORKING GROUP**

(Presented by Chair of the MET/R WG)

SUMMARY

This paper presents a summary of the fifth meeting of the Meteorological Requirement Working Group (MET/R WG/5), held in the ICAO APAC Regional Office, Bangkok, Thailand, from 19-21 April 2016.

1. INTRODUCTION

1.1 The Fifth Meeting of the Asia/Pacific (APAC) Meteorological Requirements Working Group (MET/R WG/5) of the APAC Air Navigation Planning and Implementation Regional Group (APANPIRG) was held at the ICAO Asia and Pacific Regional Office, Bangkok from 19 to 21 April 2016.

1.2 The meeting was attended by 30 participants from 12 States and one International Organization including Australia, Bangladesh, Cambodia, China, Hong Kong China, India, Japan, Mongolia, New Zealand, Republic of Korea, Singapore, Thailand and ICAO.

1.3 The final report of the meeting and other meeting documentation are available at the following ICAO website : http://www.icao.int/APAC/Meetings/Pages/2016-MET-R_WG5.aspx.

2. DISCUSSION

Follow-up from previous meetings

2.1 The meeting reviewed the status of follow-up on the task list of 6 action items developed by the fourth meeting of the Meteorological Requirements Task Force (MET/R TF/4) and the

Meteorology/Air Traffic Management (MET/ATM) Seminar in 2015. Two action items were considered as completed and the rest 4 items were in progress.

2.2 The meeting was informed that the CANSO, as a representative of air navigation service providers, was invited to join the working group as a member. It was concurred that additional strategies to encourage greater participation by experts from ATM sector were necessary and it was suggested that future meetings should be scheduled to avoid conflicts with other ATM-related forums in order to secure better participation from the ATM sector and that closer coordination with the Air Traffic Flow Management Steering Group (ATFM SG) may be helpful in raising awareness of the MET/R WG among ATM experts. In addition, the group agreed that the attributes of the group members should ensure its relevance to the ATM community. The meeting formulated the following draft conclusion;

Draft Conclusion MET SG/20/xx — Participation of ATM Experts in the Asia/Pacific Meteorological Requirements Working Group (MET/R WG)

That, recognizing the need to enhance air traffic management (ATM) operational decisions and the importance of establishing the appropriate meteorological requirements to support such needs in the Asia Pacific region, States/Administrations are encouraged to participate, with the appropriate representation by ATM experts, in the MET/R WG.

2.3 The meeting noted that the regional survey of MET information provided to support ATM was conducted in October/November 2015 (State letter Ref.: T 4/3.2.7:AP152/15 (MET), dated 1 October 2015, refers). The group discussed necessary follow-up action to develop analysis of this survey, which will be coordinated together with the chair and the secretariat. The **Appendix 1** is a draft summary of the survey result prepared at the meeting by the chair, as a flimsy.

2.4 The meeting revised the group's work programme to facilitate progress on the other action items related the development of regional guidance for tailored MET information supporting ATM, the possible improvements to the SIGMET Guide to assist States in aligning cross-boundary SIGMET information and the identification of MET information needed to support the elements of the APAC Seamless ATM Plan, with reviewing appropriate deliverables, milestones, rappourteurs, and responsibilities. The revised work programme is shown as the **Appendix 2** to this paper.

MET information required to support end user systems

2.5 The meeting was informed that in Australia, the Bureau of Meteorology has developed range of MET information and services, intended for both international and domestic users, which are distributed by the national aeronautical information service (AIS) provider (Airservices Australia). Some MET information and services provided in Australia are not fully compliant with ICAO provisions, e.g.: the trend forecast validity period is 3 hours rather than 2 hours; AIRMET information uses complete words rather than the specified abbreviations; and area forecasts for low-level flights do not fully comply with ICAO Annex 3 specifications. The meeting was informed that Australia planned to either phased out the non-compliant services or replace them with compliant services in the near future.

2.6 In addition to the internationally required information and services, the meeting was informed that other types of MET services are provided in Australia to meet special, local needs, providing information such as: airport weather briefings; ditching reports, area QNH forecasts and automated (airport) thunderstorm alerts. Future improved services currently under development were also presented, such as "aviation/airport weather matrix", "MET collaborative decision making", and

“low probability forecasts”, all of which will work towards translating MET information into impacts on ATM operations.

2.7 The meeting was informed that Australia has developed an automated system known as “Cloud Object Tracking and Classification (COTAC)”, which is currently in use by MWOs responsible for MET watch over the Australian FIRs and provides guidance to assist MET personnel with the issuance of SIGMET information (for thunderstorms).

2.8 The COTAC system combines MET observations (from the Japan Meteorological Agency’s latest generation MET satellite, Himawari 8, and real-time lightning detection systems) with specified SIGMET criteria (based on ICAO Annex 3 provisions for thunderstorms in SIGMET information and on user consultation) to provide objective decision support guidance presented in graphical format, which is used for the issuance and monitoring of (thunderstorm) SIGMET information across the Australian FIRs.

2.9 In addition, the meeting noted that Australia provides currently, or is planning to provide, a range of MET information in graphical format, including: SIGMET information; significant weather forecasts (both high- and medium- level); volcanic ash and tropical cyclone advisory information; AIRMET information; and area forecasts for low-level flights. The meeting was advised that the graphical format MET information was not currently included in the MET information supplied to operators and flight crew members in the “Pilot Briefing Package” disseminated via the national AIS because the exchange of graphical format MET information is not supported by the AIS.

Coordination between MET and ATM services

2.10 The meeting was informed that, in Republic of Korea the Aviation Meteorological Office (AMO) aims to support the Air Traffic Flow Management Center (ATFMC) by providing MET services that help improve the efficiency of aircraft operations. The AMO is implementing new MET services to provide information on the occurrence of hazardous MET phenomena and their impacts on airport and airspace capacity.

2.11 The meeting was informed that, in Hong Kong, China, flight-specific SIGMET information is provided for each flight departing from the Hong Kong International Airport by using data from the filed ICAO flight plans to match flight positions with valid SIGMET information. This is a new service developed and implemented in close consultation with, and to meet the needs of the users (i.e., airline dispatchers and pilots).

2.12 The meeting was informed that, in Japan, the Japan Meteorological Agency (JMA) has implemented the Tokyo Metropolitan Area Team (TMAT) to support Traffic Management Units (TMUs) of the Japan Civil Aviation Bureau (JCAB) by providing MET information and services tailored to the special requirements of the TMUs, including detailed briefings focused on significant weather impacts on air traffic flow in and around the Tokyo metropolitan area and the approach control area of the Haneda and Narita Airports. Additionally, specially tailored MET information is presented in tabular and graphical format, i.e., the “Tokyo Metropolitan Area Weather Bulletin for ATM” and the “ATM Categorized Impact of weather ELEMENT prediction (ATM CIEL)”, based on specifications agreed with the TMUs. The information provides users with estimates of the level of impact of weather on air traffic flow, based on empirical data from past weather-impact events.

2.13 The use of a special “chat tool” enables TMAT to rapidly share critical MET information and estimates of possible impacts on air traffic flow with TMUs, as necessary, to enhance the effectiveness of MET support to ATM operations in the Tokyo metropolitan area. The TMUs are also able to reaffirm the contents of briefings (with TMAT) at any time. Graphical MET information can

be shared using the tool, which assists the TMUs to more easily visualize and understand the weather condition/s, which otherwise may be difficult to do (e.g., by telephone). The meeting was informed that a brochure on the Air Traffic Meteorology Center (ATMetC) includes further information on the TMAT and is available on the JMA website: http://www.jma.go.jp/jma/en/Activities/ATMetC_leaflet.pdf.

2.14 The meeting was informed that, in Australia, the Bureau of Meteorology and the Airservices Australia, in collaboration with major airlines, have developed and implemented a MET CDM process to support ATFM operations at Australia's major international aerodromes.

2.15 The MET CDM process specifically supports pre-tactical traffic management strategies and the optimised use of available runway capacity. The process involves direct information sharing by all stakeholders to produce a MET CDM "matrix", which incorporates pre-defined business rules (based on the aerodrome concerned) with specially tailored MET information, and has resulted in significant traffic flow efficiencies.

2.16 The meeting was informed that Australia is in the process of planning a combined Civil-Military ATM System (CMATS) to replace the existing, separate civil and military ATM systems. The CMATS will support a range of ATM applications and, hence, will require a range of MET data to suit; including GRIB 2 data (for aircraft trajectory calculation), weather radar data (for situational awareness) and OPMET information. It is envisaged that CMATS will support the exchange of OPMET information in the digital format (IWXXM).

2.17 The meeting was informed that, in Australia, Bureau of Meteorology, in consultation with the Airservices Australia, has developed a contingency plan for the delivery of MET information and services in the event of an emergency situation (at the Bureau of Meteorology), e.g., degradation/loss of power and/or communication systems, staffing emergency situation or loss of critical infrastructure. The contingency plan ensures continuity of key or critical services by adopting a 3-tiered system of service priorities applicable according to the severity of an emergency situation. The plan also incorporates an additional list of top service priorities for use in an extreme emergency.

2.18 The meeting was advised that, in support of the recommendation of the ICAO Meteorology Divisional Meeting, 2014 (MET/14), to include MET services for the terminal area in the next update of Global Air Navigation Plan (GANP), the WMO is undertaking an Aviation Research Demonstration Project (AvRDP) initiative to demonstrate the capability of MET 'nowcasting' and mesoscale numerical weather prediction (NWP) techniques to support the specific requirements of ATM – in particular for information related to the impact of 'convective weather' and 'winter weather' on operations.

2.19 The meeting was provided with an update on the activities of the Asia/Pacific Region Air Traffic Flow Management Steering Group (ATFM/SG). Information was provided on the Regional ATFM Concept of Operations, and the Asia/Pacific Framework for Collaborative ATFM.

2.20 The Framework for Collaborative ATFM included information on MET information for ATM, including the performance expectation of the implementation of MET services to support ATM in the Terminal area. Such services included near-term or now-casting forecasts of convective weather activity at or affecting ATFM program airports and associated instrument approach procedures, terminal area ATS routes and holding points and other significant locations.

2.21 It was expected that the Framework for Collaborative ATFM would be amended to add performance expectations of the implementation of near-term forecasting of convective weather in en-route airspace.

Future Work Program

2.22 The meeting revised the work programme document for the MET/R WG (based on the former MET/R TF work programme), and provided further revisions to the terms of reference, to provide a more concise statement on which to proceed with its work.

2.23 The meeting considered that membership information in the MET/R WG work programme should highlight the field of expertise (e.g., ATM, MET, etc.) of the respective experts.

2.24 The meeting requested the Secretariat to coordinate further with MET/R WG member States, including Thailand, Republic of Korea and Viet Nam, to ensure updated membership information is recorded in the MET/R WG work programme document.

2.25 In view of the discussion above, the meeting agreed to forward the revised MET/R WG terms of reference and work programme document to the MET SG for further review and possible adoption and formulated the following corresponding draft decision:

Draft Decision MET SG/20/xx – Terms of reference of the MET/R WG

That, the revised terms of reference of the Meteorological Requirements Work Group (MET/R WG) to this paper be adopted (see **Appendix 3** to this paper).

2.26 The meeting also discussed the composition of the membership of the group. In order to optimize the balance between MET and ATM experts it was proposed that States should nominate, where feasible, experts from both MET and ATM fields as members for MET/R WG. The meeting formulated the following corresponding draft decision:

Draft Conclusion MET SG/20/xx — Nomination of MET and ATM experts as members of the MET/R WG

That, recognizing the need for both MET and ATM expertise in the MET/R WG, States/Administrations participating in the MET/R WG are encouraged to nominate, where feasible, both MET and ATM experts as members of the MET/R WG.

Next meeting

2.27 The group concurred that it would be reasonable to secure enough time before the next MET/ATM Seminar and the WG meeting, so that each member State will be able to bring mature update information on the development of MET services and information in support of ATM.

2.28 Currently the Chair and the Secretariat tentatively agreed to hold the next MET/ATM Seminar and the 6th WG meeting in the 2nd half of 2017, seeking for the possibility to have these events conjointly with the relevant ATM related groups, like ATFM/SG.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) Note the information contained in this paper;
- b) Discuss any relevant matters as appropriate; and
- c) Consider the proposed draft decision and conclusions for adoption.

SURVEY OF STATE METEOROLOGICAL INFORMATION SUPPORTING AIR TRAFFIC MANAGEMENT

(Presented by Chair and Secretariat)

1. INTRODUCTION

1.1. The survey was conducted by the Asia/Pacific Regional Office in October/November 2015 as follow-up to APANPIRG Conclusion 26/57 (State letter Ref.: T 4/3.2.7: AP152/15 MET refers). Responses were received from 19 States, including: Australia, Bangladesh, Fiji, Hong Kong China, Macao China, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Nepal, Pakistan, Republic of Korea, Singapore, Solomon Islands, Thailand, United Kingdom and United States.

1.2. The survey asked 10 questions about or related to the types of meteorological (MET) information and services provided and required specifically to support air traffic management (ATM) and air traffic flow management (ATFM) operations. A copy of the survey questionnaire is provided at **the Attachment** to this paper.

1.3. This paper provides a preliminary discussion on outcomes from the survey of state MET information supporting ATM.

2. DISCUSSION

Question 1

2.1. Most responses indicated that OPMET information (TAF, METAR and SIGMET) are disseminated to ATM organizations. Some States with maturely implemented ATM systems, like Australia, Hong Kong China, Japan and United States, indicated that ATM-tailored MET information was shared among ATM stakeholders.

Question 2

2.2. In terms of methods for information sharing, in addition to the components of the aeronautical fixed service (AFN), e.g., the aeronautical fixed telecommunication network (AFTN) and ATS message handling system (AMHS), web-based tools, such as web portals or web- /video- conference systems are used operationally in some States, indicating these latter, advanced type of tools can be useful to support collaborative decision making (CDM) and ensuring timely sharing of information among all stakeholders.

Question 3

2.3. Most responses placed priority on the provision of OPMET data to support ATM. However, considering that those types of information were not necessarily designed for ATM-specific purposes, the preference for OPMET information in the responses could be viewed as an artefact due to the ready availability of OPMET information provided in the responding States.

Question 4

2.4. Many responding States use WAFS forecasts to support trajectory setting and flight planning activities, except those States which have their own numerical weather prediction systems producing forecasts that are more precise in terms of temporal and spatial resolution.

Question 5

2.5. Most responding States use wind and temperature forecasts, which would probably be because those States would rely only on WAFC products, which originally include such weather elements.

Question 6

2.6. Some States, like Thailand, indicated their intention to implement ATFM systems supported using the grid-point MET data system.

Question 7

2.7. Some States indicated that MET services in support of ATM may be fostered through the establishment of sound communication channels between ATM and MET. Additionally, it was envisaged that ATM-tailored MET information would need to be compliant with applicable ICAO standards such as the provisions for quality assurance of the MET information.

Question 8

2.8. Initiatives and motivators which lead to the development of MET support for ATM appear NOT to be agreed among the responding States. Rather, some States indicated that information sharing to support CDM should be important; dedicated MET information and services may be improved through MET/ATM collaboration, including daily operational use and post-analysis. GANP/ASBU represents important global initiatives, which all the States should follow.

Question 9 and 10

2.9. Most responding States have implemented generic legislation for the MET services, regulated in accordance with the ICAO Annex3. There do not appear to be significant issues; however it may be considered that ATM-related global standards will be developed in the near future.

3. CONCLUSION

3.1. In accordance with the responses to the survey, some suggestions may be derived as follows:

3.1.1. MET information, which is basically necessary for ATM, has been shared among ATM stakeholders in most of the States. On the other hand, ATM-tailored MET information has only been developed in some States.

3.1.2. Most of the responding States actually depend on WAFS forecasts in generating air-routes or flight planning, but more precise data obtained from NWP systems may improve the quality of the support. In either case, it should be important to assure the quality of the information provided through continuous verification.

3.1.3. A number of States have developed MET information for ATM without the benefit of generic guidance or specific standards, indicating that the Regional guidance on the implementation of MET information and services in support of ATM should be developed, taking into account the GANP/ASBUs initiative.

3.1.4. It should be also considered that ATM requirement for MET information may be different according to the situation of each State, such as air traffic demands, climatology, geography, etc.

3.1.5. Mutual understanding through close coordination among stakeholders, ATM, MET, and airline users, should be an essential consideration for the development for MET information and services in support of ATM.



INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

SURVEY OF STATE
METEOROLOGICAL INFORMATION
SUPPORTING AIR TRAFFIC MANAGEMENT

(Adapted from APANPIRG/26 WP/10 Appendix E)

INTRODUCTION

This survey is intended to inform ICAO (and States) on the types of meteorological (MET) information currently provided by States specifically to support Air Traffic Management (ATM) including Air Traffic Flow Management (ATFM) operations.

The results will be used to facilitate a coordinated approach to the further development of MET services in the Asia/Pacific Region (within the context and scope of existing provisions in Annex 3 to the Convention on International Civil Aviation — Meteorological Service for International Air Navigation) specifically in support of ATM and ATFM operations.

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

Q1. Indicate below the specific MET information/service/website/s that your State/Administration has available to support ATFM:

- a) Local report, routine/special
b) Aerodrome meteorological report, routine/special (METAR/SPECI)
c) Volcanic activity report
d) Volcano Observatory Notice to Aviation (VONA)
e) Air-report, routine/special (ARP/ARS)
f) Aerodrome forecast (TAF)
g) Trend forecast (TREND)
h) Area forecast for low-level flights (GAMET)
i) Significant weather (SIGWX) forecast; low-level (flight levels below 100)
j) Significant weather (SIGWX) forecast; medium-level (flight levels between 100 and 250)
k) Significant weather (SIGWX) forecast; high-level (flight levels between 250 and 630)
l) Volcanic ash advisory information
m) Volcanic ash advisory information in graphical format (VAG)
n) Tropical cyclone advisory information
o) Tropical cyclone advisory information in graphical format (TCG)
p) SIGMET information
q) AIRMET information
r) Aerodrome warning (AD WRNG)
s) Wind shear Warning (WS WRNG)
t) Wind shear alert
u) Aeronautical climatological information
v) Other MET information, e.g., tailored service (please specify):
w) Websites (please specify):

ICAO APAC OFFICE – SURVEY OF MET SUPPORTING ATM
(Adapted from APANPIRG/26 WP/10 Appendix E)

Q2. Please indicate below the modes by which your State/Administration disseminates aeronautical MET information:

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

Q3. With reference to Q1, please list the MET information/services your State/Administration considers to be necessary to support ATFM operations (in order of priority, starting with highest):

- | | |
|----------|-----------|
| 1. | 13. |
| 2. | 14. |
| 3. | 15. |
| 4. | 16. |
| 5. | 17. |
| 6. | 18. |
| 7. | etc. |
| 8. | |
| 9. | |
| 10. | |
| 11. | |
| 12. | |

Q4. Does your State/Administration’s ATM and/or ATFM system/s utilize automated processing of gridded MET information (e.g., from world area forecast centres) in the generation of flight trajectories and flight plan updates?

- a) No
- b) Yes – using world area forecast system (WAFS) forecasts
- c) Yes – using forecasts from another source (please specify):
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-

Q5. If you answered Yes, b) or c), to Q4 – please indicate below which gridded forecasts are used:

- a) Wind
- b) Temperature and humidity
- c) Icing
- d) Turbulence
- e) Cumulonimbus cloud
- f) Other (please specify):
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Q6. If you answered No, a), to Q4 – is your State/Administration planning to implement automated process/es using gridded MET information to support ATM/AFTM system/s?

ICAO APAC OFFICE – SURVEY OF MET SUPPORTING ATM
(Adapted from APANPIRG/26 WP/10 Appendix E)

- a) No
- b) Yes (please specify target implementation date):
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Q7. Please elaborate below on your State/Administration’s expectations with respect to the provision of MET information/service in support of ATFM operations:

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Q8. Please elaborate below on what initiatives your State/Administration is presently undertaking or will undertake to enhance MET service provision specifically in support of ATFM operations:

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Q9. Has your State/Administration enacted primary legislation and supporting regulations to ensure the implementation of MET service in accordance with ICAO Annex 3 and any applicable regional air navigation agreements?

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

Q10. Has your State/Administration enacted regulations to ensure that air traffic service authorities and meteorological authorities establish an agreement defining roles and responsibilities and the MET information to be provided in accordance with ICAO Annex 3 and ICAO Doc. 9377 – *Manual on Coordination between Air Traffic Services, Aeronautical information Services and Aeronautical Meteorological Services*?

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

Thank you for your assistance.

**REVISED TERMS OF REFERENCE and WORK PROGRAMME
METEOROLOGICAL REQUIREMENTS WORKING GROUP (MET/R WG)**

DESCRIPTION	
Name and establishment of group	The Meteorological Requirements Working Group (MET/R WG) was established by the Meteorology Sub-group (MET SG) of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) [MET SG/19, Decision 19/2 refers].
Administrative arrangements	The membership and appointment of members, chairing, frequency of meetings and quorum, and recording of meetings shall be determined and conducted in accordance with the working arrangements and instructions provided in the APANPIRG Procedural Handbook.
Reporting mechanism	The MET/R WG shall report its work progress and co-ordination requirements to the MET SG, normally in the form of a report to the MET SG meeting presented by the chairperson of the MET/R WG. Reports may also be provided to other relevant bodies as necessary (e.g., contributory bodies of APANPIRG) with assistance from the ICAO Secretariat.
Objective	Improve safety, efficiency and sustainability of air traffic management (ATM ¹) operations by providing meteorological (MET) information needed to meet current and future requirements of the ATM system.
Benefits	Increase safety – optimize safety risk management Increase efficiency – save time and fuel Increase sustainability – reduce carbon emissions
Functions and delegated authority	Under guidance from the ICAO Secretariat, support the MET SG to assist APANPIRG in its planning and implementation work by carrying out designated tasks on specifically defined problems including: <ul style="list-style-type: none"> a) Recommend updates to the Asia/Pacific Regional Air Navigation Plan and other regional guidance material as necessary, based on analyses and evaluation of the current and future requirements for MET information in support of ATM, as well as ATM information required to support the provision of MET services; b) Facilitate the exchange of expertise in the Asia/Pacific Region on the integration of MET information into ATM systems to support collaborative decision making (CDM); c) Facilitate the monitoring and implementation of sub-regional exchange of MET information (including in digital format) and associated inter-agency agreements that support the integration of MET information in ATM operations in line with the priorities defined in the ASIA/PAC Seamless ATM Plan; d) Promote coordination between the MET and ATM communities in the Asia/Pacific Region to enhance the level of understanding of MET requirements and capabilities in support of ATM; and e) Report to the MET SG for further co-ordination through the ICAO Secretariat with APANPIRG and other relevant bodies.

¹ ATM: the dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions [ICAO Doc 4444, PANS ATM]

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MEMBERSHIP			
State	Field	Name/position/organization	Contact
AUSTRALIA	MET	Mr Ashwin NAIDU National Manager Regional Aviation Weather Services Australian Bureau of Meteorology	Tel: +61 2 9296 1503 a.naidu@bom.gov.au
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HONG KONG, CHINA	MET	Mr LI Luen On Acting Principal Experimental Officer Hong Kong Observatory	Tel: +852 2926 8209 Fax: +852 2375 2645 loli@hko.gov.hk
ICAO Secretary	ATM	Mr Shane SUMNER Regional Officer ATM International Civil Aviation Organization (ICAO) Asia and Pacific Office	Tel: +66 (2) 537 8189 x159 Fax: +66 (2) 537 8199 ssumner@icao.int
ICAO Secretary	MET	Mr Peter DUNDA Regional Officer MET International Civil Aviation Organization (ICAO) Asia and Pacific Office	Tel: +66 (2) 537 8189 x153 Fax: +66 (2) 537 8199 pdunda@icao.int
JAPAN Chair	MET	Mr Jun RYUZAKI Senior Scientific Officer, Administration Division, Forecast Department Japan Meteorological Agency (JMA)	Tel: +81 (3) 3212 8341 x3351 Fax: +81 (3) 3284 0180 jryuzaki@met.kishou.go.jp
NEW ZEALAND	MET	Mr Keith MACKERSY Senior Meteorological Specialist Civil Aviation Authority of New Zealand (CAANZ)	Tel: +64 (4) 560 9400 Fax: +64 (4) 569 2024 keith.mackersy@caa.govt.nz
REPUBLIC OF KOREA	TBC	TBC	TBC
RUSSIAN FEDERATION	TBC	TBC	TBC
SINGAPORE	MET	Mr CHOW Kwok Wah Senior Meteorological Officer Meteorological Service Singapore (MSS)	Tel: +65 6542 4715 Fax: +65 6545 7192 chow_kwok_wah@nea.gov.sg
THAILAND	TBC	TBC	TBC
UNITED STATES	MET	Mr Steven ALBERSHEIM Senior Meteorologist Federal Aviation Administration (FAA)	Tel: +1 (202) 385 7185 Fax: +1 (202) 385 7240 steven.albersheim@faa.gov
VIET NAM	TBC	TBC	TBC

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COMMUNICATION STRATEGIES				
Description	Target Audience	Delivery Method	Frequency / Date	Responsibility
Work Plan	MET/R WG, MET SG	Document via email and MET/R WG meeting	As required, but reviewed at MET/R WG and MET SG meetings	Chair and Secretariat
General correspondence	MET/R WG Members	Email	As required	MET/R WG Members
MET/R WG Meeting	MET/R WG Members	Meeting	As required; may be supplemented by tele- / web- conference	Chair and Secretariat
Status and Milestone Reports	MET/R WG Members	Email and working paper at MET/R WG meeting	At least annually	Chair and Secretariat
MET/R WG Report	MET SG and all APAC States	ICAO website and working paper at MET SG meeting	Following each MET/R WG meeting	Chair and Secretariat

DELIVERABLES
1. Input to the draft update to the Regional SIGMET Guide to assist States in aligning cross-FIR-boundary SIGMET information in coordination with MET/S WG
2. Documented analysis of MET information used in the Region specifically to support ATM operations
3. Draft regional guidance material on MET information needed to support the elements of the APAC Seamless ATM Plan
4. Draft regional guidance material for tailored MET information supporting ATM operations
5. Seminar on regional implementation of MET information to support ATM operations

MILESTONES	By date	Responsibility	Status
Deliverable 1: Input to the draft update to the Regional SIGMET Guide to assist States in aligning cross-FIR-boundary SIGMET information in coordination with MET/S WG			
1.1 Input to First draft of guidance for inclusion in Regional SIGMET Guide for review by MET/R WG members	May 2016	Secretariat in coordination with MET/S WG	In progress
1.2 Input to First draft of guidance for inclusion in Regional SIGMET Guide for review by MET SG	Jun 2016	Secretariat in coordination with MET/S WG, MET SG	
Deliverable 2: Analysis of MET information used in the Region specifically to support ATM operations			
2.1 Survey on regional requirements for MET information to support ATM operations	Oct/Nov 2015	Secretariat	Completed
2.2 Preliminary draft documented analysis of MET information used in the Region specifically to support ATM operations	Jun 2016	Secretariat and Chair	In progress
2.3 Final draft documented analysis of MET information used in the Region specifically to support ATM operations	Next meeting	Ad hoc group: Australia (Rapporteur), Singapore, New Zealand, China, Japan, Thailand, Hong Kong China	

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Deliverable 3: Draft regional guidance material on MET information needed to support the elements of the APAC Seamless ATM Plan			
3.1 First draft of a list on the MET information or services necessary to support implementation of each element of the Asia/Pacific Seamless ATM Plan	Jul 2016 ATM/SG	Ad hoc group: Australia, China, Hong Kong, China, and Japan, Thailand, Singapore (Rapporteur)	In progress
Deliverable 4: Draft regional guidance material for tailored MET information supporting ATM operations			
4.1 List of tailored MET information or services used in the region to support ATM operations	Jun 2016	Ad hoc group: Australia, China, Hong Kong, China, Japan (Rapporteur), Republic of Korea, Singapore, Thailand and Viet Nam	In progress
4.2 List of sub-regional exchange of MET information and associated agreements that facilitate ATM operations, particularly where major traffic flows affect multiple FIRs	Jun 2016	As above	In progress
4.3 First draft of regional guidance material for tailored MET information supporting ATM operations	Aug 2016	As above	In progress
Deliverable 5: Seminar on regional implementation of MET information to support ATM operations			
5.1 Propose date/location for seminar on regional implementation of MET information to support ATM operations for consideration by MET SG	Jun 2016	Chair and Secretariat	In progress
5.2 Plan for seminar on regional implementation of MET information to support ATM operations	TBA	Chair and Secretariat	In progress
