

International Civil Aviation Organization

ICAO

WORKING PAPER**ICAO Asia and Pacific (APAC)**Twenty-Seventh Meeting of the Meteorology Sub-Group
(MET SG/27)

Bangkok, Thailand, 04 to 08 September 2023

Agenda Item 2: Review outcomes from previous meetings**REVIEW OF OUTCOMES FROM MET/R WG/12**

(Presented by the Chair of MET/R WG)

SUMMARY

This paper presents a summary of the Meteorology/Air Traffic Management (MET/ATM) Seminar and the Twelfth Meeting of the Meteorological Requirements Working Group (MET/R WG/12), held from 1 to 5 May 2023 in Bangkok, Thailand. The paper includes agreed actions and the updated work plan.

1. INTRODUCTION

1.1 The ICAO Asia and Pacific (APAC) Office hosted the ICAO APAC Seminar on Meteorology/Air Traffic Management (MET/ATM Seminar) and the Twelfth Meeting of the Meteorological Requirements Working Group (MET/R WG/12) in Bangkok, Thailand, from 1 to 5 May 2023.

1.2 The MET/ATM Seminar was attended by 53 participants from fourteen (14) States and Special Administrative Regions and three (3) International Organizations. The Seminar was moderated by Mr. Ashwin Naidu, Aviation Customer Lead, Australian Bureau of Meteorology, and Mr. Hiroyuki Takata and Mr Peter Dunda, Regional Officers, Air Traffic Management (ATM) and Aeronautical Meteorology and Environment (MET/ENV), ICAO APAC Office.

1.3 The MET/R WG/12 Meeting was attended by fifty-one (51) participants from fourteen (14) States and Special Administrative Regions and three (3) International Organizations. Mr. Ashwin Naidu chaired the MET/R WG/12 Meeting and Mr. Peter Dunda assisted him in the Secretary role.

1.4 The Seminar considered thirteen (13) slide presentations (SPs), and the Meeting considered thirteen (13) working papers (WPs), six (6) information papers (IPs) and one (1) SP. This paper will focus on the outcomes of the Seminar and MET/R WG/12 Meeting.

1.5 A copy of the full seminar and meeting report, and all related meeting documentation is available at <https://www.icao.int/APAC/Meetings/Pages/2023-MET-R-WG-12.aspx>

2. DISCUSSION

Organisation Matters

2.1 The Meeting adopted the agenda as listed below:

Agenda Item 1: Organizational matters

Agenda Item 2: Review of MET/ATM Seminar

Agenda Item 3: Review of follow-up from previous meetings

Agenda Item 4: Collaboration between MET services and ATM stakeholders

Agenda Item 5: Future work program and terms of reference

Agenda Item 6: Any other business

Agenda Item 7: Next Meeting

Review of MET/ATM Seminar

2.2 The Seminar allowed States and Organizations to share information, experiences and ideas on planning and implementing MET services to support ATM and air traffic flow management (ATFM) operations, focusing on collaborative arrangements and integrating MET information into ATM.

2.3 The MET/ATM Seminar considered three major topics and included several presentations under each topic (as below):

Topic 1 - ICAO provisions: Framework of ICAO provisions supporting the integration of MET information into ATM.

- SP/01 – Development of future aeronautical meteorological services to better met ATM requirements;
- SP/02 – ICAO ANNEX 3 Amendment; and
- SP/03 - Meteorological requirements in Regional Framework for Collaborative ATFM.

Topic 2 - Collaboration within States: Benefits and challenges of collaboration between MET and ATM communities and integrating MET information within States' ATM systems.

- SP/04 - Improvement of impact-based MET INFO to support ATM operations (Adverse Weather in Airspace);
- SP/05 – Diurnal wind variation study for runway capacity optimisation at Hong Kong International Airport;
- SP/06 – Three-hourly updates of TAF for Hong Kong International Airport;
- SP/07 – Met support for runway condition report system; and
- SP/08 – Survey of State Met Information Supporting ATM

Topic 3: Collaboration on a Bilateral or Multilateral Basis between States: Benefits and challenges of collaboration between MET and ATM communities and integrating MET information within bilateral and multilateral ATM systems

- SP/09 – Space Weather Advisory Service for Aviation;
- SP/10 – Space Weather Exercise;
- SP/11 – NARAHG – ATFM and MET Collaboration to manage the impact of Typhoons;
- SP/12 – State of Aviation Post COVID-19; and
- SP/13 – Can we do better?

Copies of all the Seminar presentations, including a summary of the Seminar discussions, are available at the ICAO APAC Office website (www.icao.int/apac > Meetings)

Review of follow-up from previous meetings

2.4 The meeting reviewed the status of actions from the previous MET/R WG/11. These included:

- 2.4.1 Updates to the Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations;
- 2.4.2 Further analysis of ICAO APAC Regional Survey on the provision of MET services to support ATM and ATFM;
- 2.4.3 Updates to the draft reference document and ToR for the ad hoc group for APAC user requirements for SWIM-based MET information services supporting ATFM;
- 2.4.4 Updates to the Meteorological Information for ATFM in the Regional Framework Document for Collaborative ATFM; and
- 2.4.5 The MET/R WG/12 Meeting reviewed and updated the List of Actions as presented in **Appendix A** of this Report.

Review of other related meetings

2.5 Conclusion APANPIRG/33/12: WAFS, SADIS and WIFS upgrades and Conclusion APANPIRG/33/13: 0.25-degree WAFS hazard data, the Secretariat will issue a State letter promulgating the Conclusions with relevant guidance information.

2.6 Conclusion APANPIRG/33/14: Update of Information in APANPIRG Air Navigation Deficiencies Reporting Form, the Secretariat updated the APANPIRG Air Navigation Deficiencies Database on the ICAO Secure Web Portal.

2.7 ATFM/SG/13 noted that the MET/R WG designated ad hoc group to identify and document use cases and user requirements for SWIM-based MET information services supporting ATFM in the APAC region would consult ATFM experts to better understand the APAC ATFM operations and supplement the use cases with detailed information. Based on this, ATFM/SG/13 agreed to include an action item for the ATFM/SG to contribute to the MET/R WG to refine SWIM-based MET information service scenarios further and develop other scenarios and recorded the following actions:

- 13/7 – Update MET/R WG ad-hoc group member list (ATFM experts); and
- 13/8 – Provide feedback and additional use cases for APAC User Requirements for SWIM based MET Information Services Supporting ATFM to MET R/WG ad-hoc group.

2.8 ATFM/SG/13 proposed holding future ATFM/SG meetings in conjunction with MET/R WG meetings for better synergy.

Updates on APAC Regional Guidance for Tailored Meteorological Information and Services to Support Air Traffic Management Operations

2.9 The designated ad hoc group presented proposed updates to the *Asia/Pacific Regional Guidance for Tailored Meteorological Information and Services to Support Air Traffic Management*

Operations to enhance the contents related to the improvement process of the MET information and services, including post-operational analysis on the effect of tailored MET information on ATM decisions.

2.10 Based on the ad hoc group’s analysis of the information provided by the States, the updates include a new section 3.7 on ‘Continuous improvement of MET information and services’, which summarises the procedures and essential points to perform post-operational analysis and continuous improvement.

2.11 The term “post-operational analysis” is used in the update to cover the comprehensive framework of improvement of MET information and services; and replace the term “post-event analysis” used in the current Guidance, which is considered a particular case of the “post-operational analysis”.

2.12 In addition, the updates include a cross-reference to the Asia/Pacific Regional Framework for Collaborative ATFM (Version 4.0) in section 1.1 on ‘Purpose and overview of the Guidance’.

2.13 The Meeting congratulated the ad hoc group on its work and formulated the following Decision:

Decision MET/R WG/12-01: Update on Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations

a) The MET/R WG members review the draft Guidance attached to MET/R WG/12 WP/11 and provide comments to the ICAO RO MET no later than 14 July 2023;

b) The ad-hoc group, consisting of Australia, China, Hong Kong, China, Japan (rapporteur), Republic of Korea, Singapore, Thailand, Vietnam and IATA, finalizes the draft Guidance for approval at the MET SG/27; and

c) MET/R WG members are invited to share the State’s practices and challenges of verification and evaluation of impact-based MET information to support ATM operation to be included in the Guidance.

2.14 China (who was not present in the Meeting) submitted an IP on its MET services for aviation, including tailored MET information and services to support ATM operations in North China and its post-assessment methods, in response to Decision MET/R WG/11/01 to support the work of the ad hoc group on the APAC Regional Guidance for Tailored Meteorological Information and Services to Support Air Traffic Management Operations. The Meeting requested the ad hoc group to review the information in the IP further and consider its possible inclusion as an example in the draft Guidance for review by MET SG/27.

Survey of State Meteorological Information Supporting Air Traffic Management

2.15 The designated ad hoc group presented the ad hoc group’s analysis of the December 2021 survey results on the States’ provision of current and future MET information services to support ATM and in particular, ATFM.

2.16 Based on the ad hoc group's analysis, the meeting formulated several recommendations, agreed to update the MET/R WG work plan (deliverable 1), as follows:

- a) To consider the results of the survey when:
 - i. developing future MET requirements to support ATM/ATFM;
 - ii. developing and or updating future guidance material for tailored met information services to support ATM operations;
 - iii. developing 'APAC User Requirements for SWIM-based MET Information Services Supporting ATFM'.
- b) Socialize the survey results with the ATM community via ATFM SG and ATM SG;
- c) Promote the document titled Asia Pacific Regional Guidance for Tailored Meteorological Information and Services to Support Air Traffic Management Operations; and
- d) The MET/R WG/12 identify any other follow-up actions for further consideration.

Collaboration between MET services and ATM stakeholders

2.17 Hong Kong, China, presented an overview of the latest developments of the Aviation Research and Development Project Phase 2 (AvRDP-2) and the latest research efforts and trial products regarding en-route significant convection developed by HKO. The AvRDP-2 is a project under the World Weather Research Program (WWRP) led by the World Meteorological Organization (WMO) Research Board and the Services Commission (SERCOM) Standing Committee on Services for Aviation (SC-AVI). The project will focus on selected short and long-haul flight routes for areas prone to convection and crossing the tropics. In addition, trial products regarding en-route significant convection developed by HKO were introduced. The seamless forecast will be based on satellite now-casting and numerical weather models. The Meeting was invited to provide suggestions on relevant user requirements to be considered in AvRDP-2.

2.18 Hong Kong, China, presented the runway capacity optimization efforts and its tangible benefits achieved through collaboration between the Air Navigation Service Provider (Hong Kong Civil Aviation Department) and the Meteorological Authority (Hong Kong Observatory) in Hong Kong, China. Through detailed analysis of climatological surface wind data collected at the HKIA, 'firebreaks' are built in the seasonal scheduling capacity of the HKIA to match the time with the highest frequency of runway change triggered by a diurnal wind variation. Based on the climatological information, strategic scheduling of the 'firebreaks' reduces possible delays to air traffic due to runway changes in the strategic planning phase of ATFM. The Meeting noted that this is an excellent example of a close collaboration between MET services and ATM.

2.19 Hong Kong, China, presented information paper on its initiative to dedicate a team of meteorologists from the HKO to provide services to the Integrated Airport Centre of the HKIA in 2022, including a few tailored MET products related to tropical cyclones. It was noted that 'provisional TAF' was provided through presentations to aviation users during tropical cyclone scenarios, and it should be clarified with users against the official TAF to avoid confusion.

2.20 Japan provided an overview of its efforts to enhance impact-based ATM-tailored MET information, focusing on effective coordination between MET/ATM and translating information on MET conditions into ATM impacts. The overview included the challenges in predicting the impact of CB on air traffic, the improvements made based on ATFM requests, and the challenges and initiatives in assessing forecasts of weather-related impacts on ATFM.

2.21 Australia presented information on MET collaborative decision-making (MET CDM) to formulate aircraft arrival rates for ATFM. The benefits of MET CDM include pre-tactical arrival rates that better suit the weather conditions, enhanced planning, shared understanding and consensus between

stakeholders, flexibility and responsiveness for setting arrival rates considering weather constraints, and reduction in airborne delay (holding) leading to fuel and cost savings for airlines.

2.22 Given the information provided above, the Meeting requested,

- a) Australia to submit the example of its MET CDM for ATFM, following Decision MET/R WG/11/01; and
- b) the ad hoc group to consider the possible inclusion of the Australian example in the Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations.

2.23 The Republic of Korea presented the status of ATM-tailored MET services provided by the Aviation Meteorological Office (AMO) to support ATFM decision-making, including 24-hour service at the Air Traffic Control Center (ATCC) to support decision-making for ATFM and weather information for airports, airspace and air routes in Korea and other countries.

APAC use cases and user requirements for SWIM-based MET information services supporting ATFM

2.24 The designated ad hoc group presented the recent updates on the work to identify and document use cases and user requirements for SWIM-based MET information services supporting ATFM in the APAC region in coordination with other working groups and an updated draft version of the document for consultation. The Meeting noted that the use cases document should clearly differentiate the current and future use cases to avoid confusion.

2.25 The ad hoc group proposed to update the draft reference document further to add two new use cases, USE CASE 4: Weather impact assessment based on the occupancy of holding area, and USE CASE 5: Aircraft spacing management based on real-time surveillance information shared in SWIM, which demonstrate the potential benefits of MET information services to APAC ATFM operations in SWIM. The Meeting requested the ad hoc group seek comments and suggestions from the MET/R WG and ATFM/SG members and submit the updates to the MET SG for further review.

2.26 Given the discussion above, the Meeting adopted the following Decision:

Decision MET/R WG/12-02: APAC Use Cases and User Requirements for SWIM-Based MET Information Services Supporting ATFM

- a) The MET/R WG members and ATFM SG members review the proposed updates to the draft reference document in Attachment A to MET/R WG/12 WP/12, provide comments and suggestions on additional use cases, if any, to the ICAO Secretariats by 14 July 2023; and
- b) Depending on the feedback and information received, the ad-hoc group would submit an updated reference document to MET SG for review.

Future work program

2.27 The Secretariat referred to proposals¹ for the amendment of ICAO Annex 3, which are envisaged for applicability on 28 November 2024 or 27 November 2025, and which States and appropriate international organizations should comment on no later than 26 July 2023 or 14 August

¹ Circulated in the ICAO State letters, Ref.: AN 10/1-23/1 dated 26 January 2023, and Ref.: AN 2/36-23/6 dated 13 February 2023

2023, respectively. The proposals for the amendment of ICAO Annex 3 were discussed in detail in the MET/ATM Seminar.

2.28 Concerning the proposal for the amendment of ICAO Annex 3 circulated in the ICAO State letter Ref.: AN 2/36-23/6 dated 13 February 2023, the amendment recommends States should ensure that the MET information supplied to the users is provided through “information services”.

2.29 Furthermore, the proposal for amendment of ICAO Annex 3 notes that, in the context of SWIM, the notion of “information service” addresses machine-to-machine interaction in a service-oriented architecture, and the procedures on information services are contained in the Procedures for Air Navigation Services - Information Management (PANS-IM), which is also part of the proposal for amendment in AN 2/36-23/6. However, the Meeting was informed that the Guidance for this interaction (namely the Manual on System-wide Information Management Implementation and the Manual on Information Security) remains under development and has not yet been published.

2.30 Furthermore, the recipients of MET information to be supplied through information services cover a broad scope and number of users: i.e., operators, flight crew members, air traffic services units, search and rescue services units, airport management and others concerned with the conduct or development of international air navigation. Therefore, the proposed amendment may necessitate States, operators and service providers in the aviation system to implement significant changes by November 2024 to ensure the MET information is provided to users through information services.

2.31 The Meeting was informed that the METP was considering removing the (legacy) Annex 3 requirements for the global exchange of MET information in the traditional alpha-numeric code (TAC) form in 2029.

2.32 The Secretariat discussed the MET/R WG work plan deliverable 5 to propose improvements to clarify the MET-related implementation planning guidance in the ANP Volume III.

2.33 The Meeting was reminded that APANPIRG had suggested that MET SG progress with its proposal to amend the MET-specific requirements in ANP Volume III and coordinate such proposal with the other APANPIRG Sub-Groups. Furthermore, under the ATM agenda, the Secretariat had informed APANPIRG/33 of a proposed project to migrate the APAC Seamless ANS Plan and other regional plans and guidance material into ANP Volume III. However, further details of the proposal were to be established.

2.34 Given the discussion above, the Meeting agreed to update the MET/R WG work plan (deliverable 5) to ensure the following:

- a) The development of proposals to clarify the MET-related implementation planning guidance in the ANP Volume III is coordinated with the other APANPIRG Sub-Groups; and
- b) Concerning the work plan Deliverable 5, the MET/R WG considers the implications of the proposed project to migrate the APAC Seamless ANS Plan and other regional plans and guidance material into ANP Volume III.

Review of MET/R WG Work Program and Terms of Reference

2.35 The Meeting conducted a session with the core members of the MET/R WG to propose several updates to the Membership of the WG and the work plan. These are summarized below:

- 2.35.1 The proposed updates to the work plan Deliverable 1 clarify the work of the ad hoc group designated to analyse the survey of state MET information supporting ATM results.
- 2.35.2 The proposed updates to the work plan Deliverable 3 reflect the Meeting's discussion and Decision on the Regional guidance material for tailored MET information supporting ATM operations.
- 2.35.3 The proposed updates to the work plan Deliverable 4 to strengthen collaboration and relationship between MET, ATM and Airspace Users reflect the Meeting's adoption of the proposal to conduct MET/R WG/13 in conjunction with ATFM/SG/14 including a joint plenary component and a Seminar on MET/ATM.
- 2.35.4 The proposed updates to the work plan Deliverable 5, on a coordinated review of the APAC ANP Volume III, reflect the Meeting's proposal and agreement.
- 2.35.5 The proposed updates to the work plan Deliverable 6 on developing APAC Use Case and User Requirements for SWIM-based MET Information Services Supporting ATFM.
- 2.36 Detailed proposed updates to the MET/R WG terms of reference and work plan document, for further review and endorsement by MET SG, are highlighted in Appendix B to this paper.

Next Meeting

- 2.37 The Meeting agreed to plan to conduct MET/R WG/13 in conjunction with ATFM/SG/14 and a Seminar on MET/ATM in late May 2024.
- 2.38 The Chair invited Member States that wish to host MET/R WG/13 in conjunction with ATFM/SG/14 and a MET/ATM Seminar in 2024 to inform the Secretariat as soon as possible.
- 2.39 Hong Kong, China, expressed interest in hosting a MET/R WG meeting in conjunction with a MET/ATM Seminar in 2025.

3. ACTION BY THE MEETING

- 3.1 The meeting is invited to:
- a) note the information in this paper; and
 - b) propose further updates to the Terms of Reference, Future Work Programme and/or List of Actions.

APPENDIX A

MET/R WG – LIST OF ACTIONS

(Note: Proposed updates are indicated with ~~strike through~~ and **highlighted** text)

Unresolved action items recorded by MET/R WG/11

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/ REMARKS
MET/R WG/11 01	Propose further updates to the (MET/R WG work plan) Deliverable No. 2 and Deliverable No. 5 timeframe, responsibility, and requirements details. [Ref: MET/R WG/11 Report, 5.2.] - Deliverable 2: <i>Draft regional guidance material on MET information needed to support the elements of the APAC Seamless ANS Plan</i> - Deliverable 5: <i>A coordinated review of the APAC ANP Volume III, including proposals for improvements to the ANRF and other parts of Volume III, to clarify the MET-related implementation planning guidance</i>	MET/R WG/12	Chair and Secretariat	To begin In progress

Unresolved action items recorded by MET/R WG/09

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/ REMARKS
MET/R WG/09 01	Publicise the SIGMET Guide and, in particular, the guidance indicating the importance of exchanging special air-reports between airlines, ATS units and MWOs (and aerodrome meteorological offices (AMOs)) in support of improved SIGMET service and flight safety, by way of ICAO State letter (and/or other channels) with distribution to pilots and ATS units supported by States and relevant s organisations, as appropriate [include reference to the ICAO APAC Webinar on <i>Special Air-Reports needed by MET to Support Flight Safety</i> , conducted on 17 June 2021]	July 2020 Ongoing	Secretary and MET/R WG members MET/S WG	In progress Superseded and be transferred to MET/S WG

APPENDIX B

ICAO ASIA AND PACIFIC METEOROLOGICAL REQUIREMENTS WORKING GROUP (MET/R WG)

TERMS OF REFERENCE AND WORK PLAN

Proposed updates by MET/R WG/12

Editorial note: Proposed updates show deleted text using ~~strikeout (text to be deleted)~~ and added text with grey shading (**text to be inserted**).

TERMS OF REFERENCE

DESCRIPTION	
Name and establishment of the 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	The membership and appointment of members, chairing, frequency of meetings and quorum, and recording of

DESCRIPTION	
arrangements	meetings shall be determined and conducted following the working arrangements and instructions provided in the APANPIRG Procedural Handbook.
Reporting mechanism	The MET/R WG shall report its work progress and coordination requirements to the MET SG, generally in a report to the MET SG meeting presented by the chairperson of the MET/R WG. The MET/R WG may also provide reports 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 ²) operations by providing meteorological (MET) information needed to meet current and future requirements of the ATM system.
Benefits	<p>Increase safety – optimize safety risk management</p> <p>Increase efficiency – save time and fuel</p> <p>Increase sustainability – reduce carbon emissions</p>
Functions and delegated authority	<p>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:</p> <ul style="list-style-type: none"> a) Coordinate with other relevant contributory bodies of APANPIRG such as ATM/SG and ATFM/SG; b) Recommend updates to the Asia/Pacific Regional Air Navigation Plan and other regional guidance material as necessary, based on analysis 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; c) 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) and the migration of MET information into the SWIM environment; d) Facilitate the monitoring and implementation of the 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; e) 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 f) Report to the MET SG for further coordination through the ICAO Secretariat with APANPIRG and other relevant bodies.

MEMBERSHIP		
State/Organization Name	Position/organization (field of expertise)	Contact
AUSTRALIA Mr. Ashwin NAIDU (Chair)	Manager Senior Aviation Customer Lead Australian Bureau of Meteorology (MET)	Tel: +61 2 9296 1503 E-mail: ashwin.naidu@bom.gov.au
CHINA Mr. Hanqingyuan	Deputy Director, Met Division of ATMB, CAAC (MET)	Tel: +86(10)87786529 E-mail: hanqingyuan@atmb.net.cn
CHINA Ms. Huomiao	Engineer MET Center of North China, Air Traffic Management Bureau. CAAC (MET)	E-mail: huomiao0826@163.com
CHINA Ms Li Xiya	Engineer Meteorological Center of Middle South Regional Air Traffic Management Bureau of Civil Aviation of China (MET)	E-mail: gzlixia@qq.com

² 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]

MEMBERSHIP		
State/Organization Name	Position/organization (field of expertise)	Contact
HONG KONG, CHINA Mr. Marco Mang-hin KOK	Acting Senior Scientific Officer Hong Kong Observatory (MET)	Tel: +852-2926 8441 Mobile: +852 6226 7907 Fax: +852 2375 2645 E-mail: mhhok@hko.gov.hk
HONG KONG, CHINA Ms. Christy Leung Yan Yu	Scientific Officer Hong Kong Observatory (MET)	Tel: +852-2926 5013 Fax: +852 2375 2645 E-mail: yyleung@hko.gov.hk
HONG KONG, CHINA Mr. John Man-lok Chong	Scientific Officer, Hong Kong Observatory (MET)	Email: mlchong@hko.gov.hk
JAPAN HAYAMI, Erika (Ms)	Senior Coordinator for International Aeronautical Meteorology Planning Division, Administration Department, Japan Meteorological Agency (JMA)	E-mail: e-hayami@met.kishou.go.jp
JAPAN Ms. IKEDA Michiko	Scientific Officer Office of Aviation Weather Forecasting Forecast Division Japan Meteorological Agency (MET)	E-mail: michi-ikeda@met.kishou.go.jp
JAPAN YONE Toshihiro (Mr)	Special assistant to the Director, Air Traffic Control Division, Air Navigation Services Department, Japan Civil Aviation Bureau (ATM)	E-mail: yone-t46kg@mlit.go.jp
JAPAN UENISHI Miki (Ms)	Scientific Officer, Office of Aeronautical Meteorology Planning Division, Administration Department, Japan Meteorological Agency (JMA)	E-mail: m.uenishi@met.kishou.go.jp
JAPAN Ms. ITOU Miho	Special assistant to the Director Air Traffic Control Division, Japan Civil Aviation Bureau (ATM)	tel: +81-3-5253-8749 E-mail: itou-m46be@mlit.go.jp
PAKISTAN Mr. Fazal Ur Rehman	Sr. Joint Director (ATM / ANS Inspector)	Tel: +92-21-99072756 Mobile: +92-306-2266788 Fax: +92-21-99242676 E-mail: fazal_ur_rehman@caapakistan.com.pk
PAKISTAN Mr. Syed Ali Baqadar Shah	Deputy Director (MET / Meteorological Inspector)	Tel: +92-21-99072758 Fax No: +92-21-99242676 E-mail: baqadar@hotmail.com baqadar.shah@caapakistan.com.pk
REPUBLIC OF KOREA Mr. Yeonghun Kim	Assistant Director Aviation Meteorological Office (AMO) of Korea Meteorological Administration (KMA) (MET)	Tel : +82 (32) 222 3008 Fax : +82 (32) 740 2807 E-mail: av_pod@korea.kr
SINGAPORE Mr. Yeo Cheng Xun	Executive Meteorologist Meteorological Services Singapore Singapore Changi Airport P.O. Box 8, Singapore 918141 (MET)	E-mail: YEO_Cheng_Xun@nea.gov.sg
THAILAND Mr. Nuttawut Dandee	Director of Aeronautical Meteorology Division Aeronautical Meteorology Division Thailand Meteorological Department (MET)	Tel: +66 (2) 134 0011 Ext. 216 Fax: +66 (2) 213 4009 -10 E-mail: wut.tmd@gmail.com
THAILAND Mr. Somchai Yimsricharoenkit	Chief of Aeronautical Meteorology Division The Civil Aviation Authority of Thailand (MET/regulator)	Tel: +66 (0) 2568 8825 Fax: +66 (0) 2568 8847 E-mail: somchai.y@caat.or.th

MEMBERSHIP		
State/Organization Name	Position/organization (field of expertise)	Contact
THAILAND Ms. Vanatta Noipan	Acting Chief of Aeronautical Meteorology Division The Civil Aviation Authority of Thailand (MET/regulator)	Tel: +66 (0) 2568 8825 Fax: +66 (0) 25688847 E-mail: vanatta.n@caat.or.th
THAILAND Mr. Bunpot Kujaphun	Acting Director Aeronautical Information and Flight Data Management, AEROTHAI, Aeronautical Radio of Thailand Ltd.	E-mail: bunpot.ku@aerorhai.co.th
THAILAND Ms. Sujin Promduang	Director of Aeronautical Information and Flight Data Management Center Aeronautical Radio of Thailand Ltd. (AIS)	Tel: +66 (2) 2859083 Fax: +66 (2) 287 8538 E-mail: sujin.pr@aerorhai.co.th
UNITED STATES Mr. Michael WATKINS Ms. Almira (Alma) Ramadani	FAA Senior Asia/Pacific Air Traffic Representative Singapore (MET/ATM) Senior Air Traffic Representative, Asia Pacific Federal Aviation Administration Air Traffic Organization, Mission Support American Embassy, Singapore	Tel: +65 6476 9462 E-mail: michael.w.watkins@faa.gov Tel: +1 202-267-2757 Email: almira.ramadani@faa.gov
VIET NAM Ms. Lan Oanh Nguyen (Lana)	Deputy Director, Air Navigation Department Civil Aviation Authority of Vietnam (MET)	Tel: +84 (24) 3872 3600 E-mail: lanoanh@caa.gov.vn
VIET NAM Ms. Thi Thanh Tam VU	Meteorological Official Department of Air Traffic Services Viet Nam Air Traffic Management Corporation (MET)	Tel: +84 (24) 3873 0320 E-mail: tamvtt@vatm.vn Vuthithanhtam86@gmail.com
IATA Mr. John MOORE	Assistant Director (Infrastructure) Safety and Flight Operations Asia-Pacific (Airline operators)	Tel: +65 6499 2529 E-mail: moorej@iata.org
ICAO Mr. Shane SUMNER (Secretariat)	Regional Officer ATM International Civil Aviation Organization (ICAO) Asia and Pacific Office (ATM)	Tel: +66 (2) 537 8189 x159 Fax: +66 (2) 537 8199 E-mail: ssumner@icao.int
ICAO Mr. Peter DUNDA (Secretariat)	Regional Officer MET International Civil Aviation Organization (ICAO) Asia and Pacific Office (MET)	Tel: +66 (2) 537 8189 x153 Fax: +66 (2) 537 8199 E-mail: pdunda@icao.int

COMMUNICATION STRATEGIES				
Description	Target Audience	Delivery Method	Frequency / Date	Responsibility
Work Plan	MET/R WG, MET SG	Document via e-mail and MET/R WG meeting	As required, but reviewed at MET/R WG and MET SG meetings	Chair and Secretariat
Interim Work Program Progress Report	MET/R WG Members	Web-conference E-mail	Quarterly/as determined by Chair	Chair and Secretariat
MET Chairs Coordination Meeting	Chairs of MET SG and its contributory working groups	Web-conference E-mail	Quarterly	Chair and Secretariat
General correspondence	MET/R WG Members	E-mail	As required	MET/R WG Members
MET/R WG Meeting	MET/R WG Members	Meeting (face-to-face or tele-/web-conference)	As required	Chair and Secretariat
Status and Milestone Reports	MET/R WG Members	E-mail and working paper at MET/R WG meeting	At least annually	Chair and Secretariat
MET/R WG Report	MET SG and ATFM SG (and ATM/SG, through MET SG) and all APAC States	ICAO website and working paper at MET SG meeting	Following each MET/R WG meeting	Chair and Secretariat

PLAN OF WORK

DELIVERABLES
1. Documented analysis of MET information used in the Region specifically to support ATM operations
2. Draft regional guidance material on MET information needed to support the elements of the APAC Seamless ATM Plan
3. Draft regional guidance material for tailored MET information supporting ATM operations
4. Strengthen collaboration and relationship between MET, ATM and Airspace Users
5. Coordinated review of the APAC ANP Volume III, including proposals for improvements to the ANRF and other parts of Volume III, to clarify the MET-related implementation planning guidance
6. Development of APAC Use Case and User Requirements for SWIM-based MET Information Services Supporting ATFM
7. Promote and assist ATM and Airspace Users with user education on the Space Weather Advisory service
8. Meteorological Information for the Asia Pacific Regional Framework for Collaborative ATFM

MILESTONES	By date	Responsibility	Status
1. Deliverable 1: Analysis of MET information requirements (current and future) used in for the Region specifically to support ATM operations			
1.1. Final draft documented analysis of the survey of MET information requirements (current and future) used in for the Region specifically to support ATM operations	MET/R WG/12 MET SG/27	Ad hoc Group-2: Rapporteur- Australia, Singapore, New Zealand, China, Japan, Thailand, Hong Kong China, Viet Nam	To begin In progress
1.2. Identify follow-up actions (including presenting the results at ATM and Airspace Forums)	MET/R WG/12 MET SG/27	Ad hoc Group 2 (above)	To begin In progress
2. Deliverable 2: Draft regional guidance material on MET information needed to support the elements of the APAC Seamless ANS Plan			
2.1. Further development (of the list of MET information or services necessary to support the implementation of each element of the Asia/Pacific Seamless ANS Plan) pending outcomes of the ICAO A40 review of GANP 2019 in coordination with ATFM/SG	TBD MET/R WG/13	TBD Ad hoc group-3: Rapporteur- Singapore, Australia, China, Hong Kong China, Japan, Thailand	On hold
3. Deliverable 3: Draft regional guidance material for tailored MET information supporting ATM operations			

MILESTONES	By date	Responsibility	Status
3.1. Finalize and submit to MET SG/26 the proposed updates to the Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations – as agreed in Decision MET/R WG/11/01, part a), and Draft Decision MET/R WG/11/02,	MET SG/26	Ad hoc group	In-progress Completed
3.2. Provide the Secretariat examples on State's post operational analysis and suggestions regarding the amendment to the Guidance document to enhance the post-operational analysis framework – as agreed in Decision MET/R WG/11/01, part b)	30 November 2022	MET/R WG members	To-begin Completed
3.3. Enhance the contents relevant to post-operational analysis in the main body of the Guidance based on the information provided by the MET/R WG members	MET/R WG/12	Ad hoc group	To-begin Superseded by 3.4
3.4. Review the draft Guidance attached to MET/R WG/12 WP/11 and provide comments to the ICAO RO MET	14 July 2023	MET/R WG and ATFM SG members	To begin
3.5. Consider including States implementation example reported by IP06 and IP04 and finalize and submit to MET SG the proposed updates to the Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations – as agreed in Decision MET/R WG/12/xx	MET SG/27	Ad hoc group: Rapporteur-Japan, Australia, China, Hong Kong, China, Republic of Korea, Singapore, Thailand, Vietnam and IATA	To begin
3.6. Share the States' practices and challenges of verification and evaluation of impact-based MET information to support ATM operation in the MET/ATM seminar and/or MET/R WG/13 and the ad-hoc group analyze provided information and consider appropriate actions, such as include it to the Guidance	MET/R WG/13	MET/R WG members	To begin
4. Deliverable 4: Strengthen collaboration and relationship between MET, ATM and Airspace Users			
4.1. Report to ATFM/SG (and ATM SG) (including the following topics: MET/ATM webinar 2022 outcomes, MET/ATM survey results, updates on the regional MET/ATM guidance document, education on the SWX advisory service, guidance on exchanging special air-reports, etc.)	ATFM/SG/12	Chair and Secretariat	To-begin Completed
4.2. Plan for a future seminar on regional implementation of MET information to support ATM operations	MET SG/26	Chair and Secretariat in coordination with ATM/SG	To-begin Completed
4.3. Plan to conduct MET/R WG/13 in conjunction with ATFM/SG/14 to include a joint plenary component on matters of importance to both groups, including a Seminar on MET/ATM collaboration	MET SG/27	Chair and Secretariat in coordination with ATFM/SG Chair	To begin
5. Deliverable 5: A coordinated review of the APAC ANP Volume III, including proposals for improvements to the air navigation reporting form (ANRF) and other parts of Volume III, to clarify the MET-related implementation planning guidance			
5.1. Support MET SG with the development of MET-specific requirements in the ANP, Volume III; giving consideration to: i. The need to coordinate development of proposals for the ANP Volume III with the other APANPIRG Sub-Groups; ii. The implications of the proposed project to migrate the APAC Seamless ANS Plan and other regional plans and guidance material into ANP Volume III; and iii. Examples of ANP Volume III from other ICAO regions	As required MET SG/27	MET/R-WG Rapporteur-Secretariat, Australia, Hong Kong China, IATA, Japan, Singapore, Thailand	To begin
6. Deliverable 6: Development of APAC Use Case and User Requirements for SWIM-based MET Information Services Supporting ATFM			
6.1. In coordination with other related sub-groups, working groups, etc., identify: i) SWIM-based MET information affecting ATFM operations; ii) how often these products	MET/R WG/12 MET SG/27	Ad-hoc group 8 (see below)	In progress

MILESTONES	By date	Responsibility	Status
be provided and rules for updates to meet the ATFM needs; and (iii) identify any other information required by ATFM and gaps to meet the needs of ATFM users			
6.2. Identify MET and ATFM data to be exchanged using SWIM-based Information Exchange Service	MET/R WG/12 MET SG/27	Ad-hoc group 8 (see below)	In progress
6.3. Based on the findings (above), develop APAC use cases and a user requirements document for future SWIM-based MET information services supporting ATFM	MET/R WG/12 MET SG/27	Ad-hoc group 8 (see below)	In progress
6.4. Review the proposed updates to the draft reference document in Attachment A to MET/R WG/12 WP/12 and provide comments and suggestions for additional use cases, if any, to the ICAO Secretariat	14 July 2023	MET/R WG members and ATFM/SG members	In progress
6.5. Submit an updated version of the reference document to MET SG for review, giving consideration to the comments and suggestions received in 6.4.	MET SG/27	Ad-hoc group (see below)	To begin
7. Promote and assist ATM-ANSPs and Airspace Users with user education on the Space Weather Advisory service			
7.1. Seek input from end users (by way of questionnaire) on the content of a SWX workshop or seminar	MET SG/26 MET SG/27	Secretariat and MET/R WG members	To begin
7.2. Seek input from end users on the content of a SWX advisory exercise	MET SG/26 MET SG/27	Secretariat and MET/R WG members	To begin
7.3. Deliver information on Space Weather service to participants at the ICAO APAC MET/ATM seminars	MET/ATM seminars 2022 and 2023	Australia	Completed
8. Meteorological Information for the Asia Pacific Regional Framework for Collaborative ATFM			
8.1. Review Meteorological Information for ATFM (paragraphs 5.59-5.67) in the Regional Framework Document for Collaborative ATFM and provide inputs of the latest examples to the ICAO Secretariat and the task coordinators [Ref: Decision MET/R WG/11/05]	17 June 2022	MET/R WG members	To begin Completed
8.2. Provide input on seasonal meteorological information for the Regional Framework	TBC	MET/R WG members	

Ad-hoc group 8 for Deliverable 6: Development of APAC Use Case and User Requirements for SWIM-based MET Information Services Supporting ATFM			
State / Administration / IO	Name	Position and/or Organisation	Expertise
Australia	Jesper Bronsvort	Airservices Australia	ATFM
Australia	Ashwin Naidu	BOM	MET
CANSO	Stuart Ratcliffe	CANSO	ATFM
Hong Kong China	Marco Kok (Rapporteur)	HKO	MET/SWIM
Hong Kong China	John Chong	HKO	MET
Hong Kong China	Anfernee Poon	Acting Senior Operations Officer (Strategic Planning) / HKCAD	ATFM
IATA	John Moore	IATA	ATFM/MET
Japan	IKEDA Michio YONE Toshihiro	JCAB	ATFM
Japan	IKEDA Michiko	JMA	MET
Pakistan	Fazal Ur Rehman	PCAA	ATFM
Pakistan	Syed Ali Baqadar Shah	PCAA	MET
Republic of Korea	Dong-won, LEE	Assistant of Director / KMA	MET
Republic of Korea	Jiwon, LEE	Assistant of Director / KMA	MET
Singapore	Zhang HuanBin	Head, ATM development/CAAS	ATFM
Singapore	Aw Ying Kit	Senior Engineer, ATM Systems /CAAS	ATFM
Singapore	Jack Toh	Head (ATM Info System)	ATFM
Singapore	Yeo Cheng Xun	MSS	MET
Thailand	Amornrat Jirattigalachote (Amo)	Strategic Planning Manager /AEROTHAI	ATFM/SWIM
Thailand	Dudsadee Sungthong	Strategic ATFM Team/AEROTHAI	ATFM
Vietnam	Mr. Nguyen Van Dung	VATM	MET/ATFM
