



*International Civil Aviation Organization*

**THIRD MEETING OF THE METEOROLOGICAL REQUIREMENTS  
TASK FORCE (MET/R TF/3)**

28 – 29 November 2013, Bangkok, Thailand

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**Agenda Item 2: Review:**

**a) MET/ATM TF/2 meeting**

**REVIEW OF MET/ATM TF/2**

(Presented by the Secretary)

**SUMMARY**

This paper presents a summary of MET/ATM TF/2, held in Fukuoka, Japan, from 27 to 28 January 2011.

**1. Introduction**

1.1 The Second Meeting of the Meteorology/Air Traffic Management Task Force (MET/ATM TF/2), of the Asia and Pacific (APAC) Air Navigation Planning and Implementation Regional Group (APANPIRG) was held in Fukuoka, Japan, from 27 to 28 January 2011, back-to-back with the MET/ATM Seminar 2011, which was held in Fukuoka from 24 to 26 January 2011.

1.2 MET/ATM TF/2 was attended by 43 experts from 11 States, 1 Special Administrative Region, IFATCA, WMO and ICAO. The full report of the meeting and other documentation can be found at the following website: <http://www.icao.int/APAC/Meetings/Pages/2011-metatm-tf2.aspx>. A copy of the combined executive summary of the MET/ATM Seminar 2011 and MET/ATM TF/2 meeting is provided in **the Attachment 1** to this paper.

**2. Discussion**

2.1 In view of the significant growth in international air traffic in the APAC Region, MET/ATM TF/2 reviewed the discussions from the MET/ATM Seminar 2011 with a focus on enhanced MET services and products required to meet the needs of ATM in optimizing traffic flow.

2.2 Six action items were formulated by MET/ATM TF/2; these are reproduced in **the Attachment 2** to this paper for the meeting to review.

2.3 Topics discussed by MET/ATM TF/2 included:

- State arrangements between MET and ATM;
- Impacts of MET phenomena on ATM;
- Volcanic Ash;
- Tropical Cyclones;
- Inter-tropical Convergence Zone;
- Dust Storms;
- Use of MET information by ATM;
- ATM developments requiring additional/new MET information;
- MET Services in the Terminal Area (MSTA);
- Future data delivery; and
- Air Traffic Flow Management (ATFM) Survey 2010

### **3. Action by the Meeting**

3.1 The meeting is invited to:

- a) note the information contained in this paper and the attachments; and
  - b) discuss any relevant matters as appropriate.
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## Attachment 1

### ICAO/WMO APAC MET/ATM Seminar and TF/2 meeting – Executive Summary Fukuoka, Japan 24-26 and 27-28 January 2011

Annex 3, *Meteorological Provisions for International Civil Aviation*; provides standards and recommended practices on services for flight planning and tactical decision-making. Air traffic in some places, particularly North America and Europe, require additional meteorological products and services to those in Annex 3 for strategic planning by Air Traffic Management (ATM). The Asia and Pacific Regions currently have significant growth, which is forecasted to continue such that enhanced MET services and products are required to meet the needs of ATM in optimizing traffic flow. The ICAO/WMO APAC MET/ATM Seminar held in Fukuoka, Japan from 24-26 January 2011 (APANPIRG Conclusions 19/53 and 21/50 refer) allowed States to discuss their progress on MET products and services that better serve ATM. In addition, some issues were further considered by the APAC MET/ATM TF/2 meeting which resulted in six action items.

The seminar was attended by 76 experts from 14 States, 2 Special Administrative Regions, IATA, IFALPA, IFATCA, WMO and ICAO. The task force meeting was attended by 43 experts from 11 States, 1 Special Administrative Region, IFATCA, WMO and ICAO. The full reports of each can be found at the following website <http://www.icao.int/APAC/Meetings/Pages/default.aspx>. A brief summary of items discussed and resulting six actions are provided here within.

#### **State arrangements between MET and ATM**

Many States at the seminar have arrangements between MET and ATM. The host State, Japan, detailed steps in developing a MET service for ATM called the Air Traffic Meteorology Centre (ATMetC) located at the Air Traffic Management Centre (ATMC). These steps may be useful for emerging States that plan to provide such services in the future. The Republic of Korea noted that due to constraints in resources, visits to the nearby Area Control Centre (ACC) are conducted to provide briefings of weather impacts on ATM for each shift. The Russian Federation provides a mechanism for former Soviet Union States to improve MET services for aviation in the form of a working group. Most States with MET services for ATM provide briefings catered to ATM, in addition to teleconferences and mutual training (ATM for MET, MET for ATM) as described by Hong Kong China. The United States described the use of the Central Weather Service Unit at the En-route Centres in serving ATM needs in addition to products being used for strategic planning (greater than 4 hours in advance) at the Central Flow Control Unit. Collaborative decision making includes the airline operators which has proven successful in that they often cancel flights in advance resulting in less ATM workload to manage a particular weather event. Decision support tools include when aircraft are expected to be in convective weather, based on forecasts of convection overlaid on historic air traffic data at one hour intervals. Capacity impacts are forecasted using a combination of airport/terminal/en-route impacts due to weather, which allows for a prediction of how many flights should be cancelled to reduce delays to an acceptable level. Furthermore, operators are provided with choices (cancellation, delay, reroutes) which allow the operator to make the decision that best suits them. When an operator chooses a cancellation or delay, that time slot becomes available for another operator to use. Lastly, the seminar noted that the knowledge of other States air traffic impacts due to weather also assists neighboring States or States where operations are numerous to the other State in ATM planning.

Given the importance of collaborative decision-making, the MET/ATM TF/2 meeting agreed that terms of reference of the task force include “study the successful involvement of MET in the development of CDM in other regions with a view to future application in ASIA/PAC” (TF/2 meeting **Action 2/1 refers**).

### **Meteorological impacts on ATM**

Various types of weather have significant impact on all phases of flight (en-route, terminal and aerodrome).

#### **Volcanic Ash**

States discussed various volcanic ash impacts on en-route and aerodrome operations. Japan noted the disruption to trans-Pacific flights that utilize one of the five Northern Pacific (NOPAC) routes as a result of the volcanic eruption of Mt. Sarychev in the Russian Federation on June 12, 2009. Many flights were en-route several hours before turning back to their point of origin and due to the operators not having the same information as the Japan Civil Aviation Bureau (JCAB) and city-pair restrictions. This has been partly resolved by sharing of information, but city-pair restrictions are only done on a case by case basis with an investigation on relaxing this constraint in such events before the aircraft departs. The use of Pacific Organized Track System (PACOTS), which are optimized routes determined by Japan and the United States each day based on the jet-stream. These routes are typically south of the volcanic ash cloud, however, adjustments to tracks based on new information are not currently made. Improvements being considered at the Informal Pacific ATC Coordination Group (IPACG) include coordination between the Russian Federation and Japan in terms of alternate routes. Another improvement is having accurate volcanic ash information for users. The Russian Federation has designated the Institute of Volcanic Geology and Geochemistry of FED Russian Academy of Sciences (IVGG FED RAS) as the State Volcano Observatory to continuously monitor active volcanoes in the Russian Far East, which includes the Sakhalin and Kuril Islands.

Indonesia informed the seminar of the significant air traffic impacts, which included 400 cancelled flights at Jogjakarta Airport due to the eruption of Mount Merapi on Java Island that began on October 26, 2010. The impact of ash was probably reduced due to the ATS contingency plan in place (est. 2007), which involves collaboration between the civil aviation authority, MET authority, air navigation service provider, and the military. Further developments include bilateral ATM coordination for volcanic ash events between Indonesia and Singapore (TF/2 meeting **Action 2/4**). Specifically, a plan to develop contingency routes and FIR to FIR coordination in case of volcanic ash events is expected. A working paper on this subject will be submitted to the METWARN/I TF/1 meeting of the APANPIRG in March 2011.

Indonesia CAA and operators desire volcanic ash maps that contain thresholds of ash concentration. The seminar was briefed that volcanic ash thresholds are being investigated by the International Volcanic Ash Task Force (IVATF) airworthiness sub group which plans to use information provided by engine manufacturers. In addition, the IVATF ATM sub group is investigating a template on regional contingency plans for volcanic ash. This outcome would affect the development of the APAC regional contingency plan for volcanic ash. In the meantime, points of contact for operational purposes during a volcanic ash event have been provided by 13 States and one Special Administrative Region and posted on the APAC website (APANPIRG D21/9 refers). States who have not provided this information will be reminded by the APAC RO (TF/2 meeting **Action 2/3 refers**) for updating by 1 April 2011.

Other improvements of volcanic ash information services were provided to the seminar, such as the stakeholder meeting outcome conducted by the Federation Aviation Administration of the United States to improve volcanic ash information from the Volcanic Ash Advisory Centres (VAACs) Anchorage and Washington.

### **Tropical Cyclone**

As volcanic ash events impact mainly en-route and aerodrome operations in the cases described, a tropical cyclone event in Japan on 7 and 8 October affected airport capacity at the Tokyo International Airport mainly due to operational requirements related to wind and visibility. The forecast for significant reduction in airport capacity was accurate and assisted in limiting the number of in air holds, saving costs to the airlines.

### **Intertropical Convergence Zone**

Accurate convective forecasts in graphical and tabular form for air traffic focal points such as holding areas assists planning for the Hong Kong China ATM in determining proactive measures to avoid significant diversions caused by convective weather. Furthermore, ATM utilizes different flight levels in the Hong Kong FIR to avoid aircraft conflicts with the anticipation of deviations. These meteorological products are useful to air traffic planning for several months of the year when the Intertropical Convergence Zone results in large areas of significant convection.

### **Dust Storms**

Airport arrival rates (AAR) were significantly reduced due to low visibility operations at Sydney International Airport as a large part of eastern Australia was affected by dust storms from 21-27 September 2009. The forecast for high winds provided anticipation of AAR reductions, but low visibility was not forecasted in time to assist AAR planning. The seminar noted that clarification on criteria and reporting of dust storms is being developed by the World Meteorological Organization (WMO) Sand and Dust Storm (SDS) Warning Advisory Assessment System (WAS) in conjunction with ICAO at the global study groups (AMOFSG and METWSG). Australia has taken an initiative in training and improved forecasting documentation guidance in the Bureau of Meteorology's Aeronautical Forecasters Handbook.

### **Use of Meteorological information by ATM**

The seminar noted the 1,000 feet vertical spacing where Reduced Vertical Minimum Spacing (RVSM) is utilized is increased to 2,000 feet vertical spacing when severe turbulence is reported as per the RVSM Manual. WMO noted that the theoretical altimeter errors associated with vertical motion in situations such as turbulence and gravity waves should be investigated further. As a result, the MET/ATM TF/2 meeting invited WMO to request the ICAO Separation and Airspace Safety Panel (SASP) to investigate these theoretical errors, which could be done by comparing GPS readings with altimeter readings (TF/2 meeting **Action 2/5 refers**).

IFATCA noted their input could have been of use at the global study groups (AMOFSG, METWSG) when developing standards and guidance material related to visibility reporting and spatial area of TAF and METAR to name examples. IFATCA was invited to request membership of the global study groups to request membership. IFATCA also noted the importance of ATC to be involved in the development of ATM products since ATC is a tactical phase, while ATM is a strategic phase and a link is needed in the timeline of 0-4 hours in the operational planning phase. In addition, ATC desires products that are in graphic or tabular form whereas the strategic phase may have different product representation.

### **ATM developments requiring additional/new MET information**

The seminar noted that future MET requirements for ATM will likely have high level enabling clauses in Annex 3 with more dynamic information in a WMO/ICAO Manual (TF/2 meeting action **2/6 refers**). These new requirements should assist in maximizing the benefits of performance based navigation (PBN). The World Area Forecast System in its current form does not meet the demands of PBN due to the coarse spatial and temporal resolutions. Some locations utilize greater spatial and temporal resolutions of upper level wind to assist in arrival metering and sequencing, such as Hong Kong China.

### **Meteorological Services in the Terminal Area (MSTA)**

To close the gap between current Annex 3 provisions and ATM needs, the Meteorological Services in the Terminal Area (MSTA) initiative is being developed by WMO in collaboration with ICAO. The prototype MSTA is expected to assist ICAO in developing requirements on MET products and services (forecasts and probabilities of convection, winds, low ceiling/visibility, winter weather and dust/sand storms) for a wider terminal area not currently prescribed in Annex 3. These services are subject to endorsement at the ICAO MET/AIM Divisional Meeting / WMO CAeM XV Session in 2014. User input is provided to WMO, which is linked to an ICAO user group in the development of requirements. User input at the regional level was provided at the task force meeting, which addressed the following points: **development of probabilistic forecasts, verification and validation of forecast accuracy, translating weather products to user impacts and standards and guidance material for MSTA.** The seminar consensus to these points will be incorporated in the AMOFSG ad-hoc group and WMO encouraged sharing its feedback at forthcoming MET/ATM meetings in other ICAO regions (TF/2 meeting **Action 2/6** refers).

### **Future data delivery**

The delivery of weather information to ATM and other AT sectors will change from alphanumeric code to extensible markup language (subject to endorsement by the ICAO MET/AIM Divisional Meeting / WMO CAeM XV Session in 2014). The reason for the change is to enable automated systems, reduce coding errors and improve quality control.

### **Other**

The only subject exclusively raised in the MET/ATM TF/2 meeting was the review of the Air Traffic Flow Management (ATFM) Survey 2010. Several States noted the MET information provided was incomplete, misleading or missing. As a result, the meeting requested the survey be checked for validation by those States as described in **Action 2/2**.

### **Next MET/ATM event**

The meeting agreed that the CNS/MET SG/15 meeting will have the most insight in determining the time frame of the next MET/ATM event, which may not be required each year, but should be tied in with global developments such as Annex 3 amendments and WMO meetings.

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**Attachment 2**

Follow-up of APAC MET/ATM TF/2  
ACTION AGREED

✓ = completed

No.	Title/Action	Follow-up action (target/completion dates in brackets)
2/1	<b>Proposed updates to TORs</b>  That, the Secretariat will draft a working paper with the proposed changes to the TORs: <ul style="list-style-type: none"><li>• membership to include Singapore and Russian Federation</li><li>• removal of ATFM in (a) since it is covered in ATM</li><li>• include new TOR “<i>study the successful involvement of MET in the development of CDM in other regions with a view to future application in ASIA/PAC</i>”</li><li>• include IAVW in section (f) (now g)</li><li>• modify WMO reference to WMO IVGG scientific advisory group in section (f) (now g)</li><li>• the inclusion of ATM/AIS/SAR/SG in section (g) to be coordinated with the Secretariat (now h)</li></ul> for further consideration by the CNS/MET SG/15 meeting	✓ Secretariat  WP for CNS/MET SG/15  (31 May 2011)
2/2	<b>Check the validity of the ATFM survey by States for more accurate depiction of MET elements used for ATFM</b>  That, States check the validity of the ATFM survey to obtain more accurate contributions from MET for ATFM.  Update survey and draft WP for ATM/AIS/SAR/SG/22 and CNS/MET SG/15 meetings.	✓ Secretariat Email original survey to TF members of the following States: Brunei Darussalam, China, Malaysia and United States (15 February 2011)  Collect responses  Secretariat Update survey results for consideration by ATM/AIS/SAR/SG/22 and CNS/MET SG/15 (30 April 2011)

2/3	<b>Operational point of contact for volcanic ash events</b>  That, the Secretariat remind States to provide an operational point of contact in case of a volcanic ash event (APANPIRG Decision 21/9 refers)	✓ Secretariat  State letter (reminder)  (15 February 2011)  States to respond to SL  Secretariat update website (1 April 2011)
2/4	<b>Bilateral ATM coordination for volcanic ash events</b>  That, ATM of Indonesia and Singapore prepare a working paper for the METWARN/I TF/1 meeting on a plan to develop contingency routes and FIR to FIR coordination in case of volcanic ash events	✓ States: Indonesia and Singapore  WP  (1 March 2011)
2/5	<b>Altimeter reading study when vertical motion is present</b>  That, WMO considers requesting ICAO Separation and Airspace Safety Panel (SASP) to investigate theoretical errors associated with altimeter readings when vertical motion is present (in such situations as turbulence and gravity waves). This could be done by operators in comparing GPS readings with altimeter readings.	WMO  letter  (1 May 2011)
2/6	<b>APAC ATM input to MSTA questions for further development for AMOGSG</b>  That, the feedback from the APAC MET/ATM TF/2 meeting to MSTA Expert Team be incorporated in the AMOFSG ad-hoc group and WMO be encouraged to share its feedback at forthcoming MET-ATM meetings in other ICAO regions.	✓ WMO input to ad-hoc study group  Study note  (1 June 2011)  [AMOFSG/9-SN No. 34]