

Agenda Item 8: Regional Implementation of World Area Forecast System (WAFS):

- 1) Implementation issues associated with cessation of ISCS-G2
- 2) Progress on trial gridded forecasts and related implementation issues
- 3) Other WAFS (SADIS & ISCS) implementation issues

8 Regional Implementation of World Area Forecast System (WAFS)

8.0 The meeting noted reference to global MET study groups as they contain progress on action items and conclusions that may relate to implementation issues in the ASIA/PAC Region. The meeting agreed that when necessary, discussions can reference this material to note progress of the various global groups regarding how they relate to implementation of current and future standards in the region. Relevant to the World Area Forecast System (WAFS) are the Satellite Distribution System Operations Group (SADISOPSG) and World Area Forecast System Operations Group (WAFSOPSG) developments that can be accessed at the following website: <http://www2.icao.int/en/anb/met-aim/met/Pages/OperationsandStudyGroups.aspx>.

8.1 Implementation issues associated with cessation of ISCS-G2

8.1.1 The meeting was informed of the implementation of the WAFS Internet File Server (WIFS) in March 2010 for trial operations and May 2010 for operations. The meeting was also informed of the plan to terminate the ISCS satellite broadcast on 30 June 2012. From then on, the data currently being provided by ISCS satellite service will only be available via the WIFS. In light of the above, ISCS user States are requested to implement WIFS to obtain OPMET data and WAFS forecasts after June 30, 2012. The meeting also recalled that for those States under the SADIS footprint, WIFS can serve as a backup. Likewise, for those States who have the WIFS as primary service, SADIS FTP can serve as a backup. The meeting noted that the WIFS and SADIS FTP do not use the same protocol, but workstation vendors allow for the different protocols. Valid concerns on how the switch from one system to the other for backup purposes were brought to the attention of the WAFS Providers. For those who have SADIS/WIFS as primary service, a contingency WIFS backup is possible through application to the respective backup provider for direct data link. It was noted that a backup service would be provided only for the purpose of backup and not for the dual reception of WAFS products. In order to facilitate implementation of WIFS, the meeting was encouraged to update the list of ISCS focal points.

8.1.2 The meeting recalled that a State letter sent by the ICAO Asia and Pacific Regional Office, dated 10 May 2010, provided States with contact information necessary for the implementation of WIFS. Full details of WIFS are contained in a WIFS User Guide, available at <http://aviationweather.gov/wifs>. The meeting was also advised of a change to the WIFS registration process. WP/36 stated that the approval process for a user to obtain a user identifier and password (required to access WIFS) was by using a PDF form available on the WIFS website and in the WIFS User Guide. It was noted that user registration can be done online through the WIFS website.

8.1.3 The meeting expressed a wish for an expanded discussion on the results of a survey concerning the cessation of ISCS-G2. It was noted that Working Papers 14 and 15 of the OPMET/M TF/8 meeting responded to two of the concerns expressed by States in the Region. That is, Internet security and quality of service issues. In addition, the meeting raised concerns about backup for accessing WAFS products in disaster situations such as earthquake damage to undersea cables. It was noted that the ISCS Provider State provides internal backup service by utilizing server farms and that for some locations States would have access to SADIS as a backup if the WIFS failed. Alternate paths for a State other than the Internet are not part of the WIFS.

8.1.4 Further discussion noted that ICAO enabled the use of the Internet (APANPIRG D20/59, WAFSOPSG D5/9 and Amendment 75 to ICAO Annex 3) for obtaining non-time critical MET data such as WAFS forecasts. With regard to time critical elements (e.g. SIGMET) the meeting noted that AFTN is the method of communication prescribed in Annex 3. It was noted that a number of States in the South

Pacific currently obtain WAFS products via the Internet rather than through ISCS. However, the meeting was advised that the cost of the Internet service in at least one State in the South Pacific was quite high.

8.1.5 The meeting discussed the concept of WAFS as it has evolved since the inception of WAFCs development in 1982. Concerns with the cessation of ISCS-G2 June 2012 and an investigation of the need for SADIS satellite broadcast beyond 2015 by the SADISOPSG has raised the need for this matter to be raised at the next Conjoint ICAO MET/AIM Divisional Meeting / WMO CAem-XV session tentatively scheduled to be held in 2014. The meeting acknowledged that global policies were outside the terms of reference for the meeting. As the discussion did not provide a timely consensus, the co-chairs proposed that an ad-hoc group should be convened to discuss this matter. The ad hoc group consisting of the ISCS Provider State, Australia, Hong Kong China, New Caledonia, New Zealand, Singapore and IATA. The ad-hoc group met and developed the following draft Conclusion.

Draft Conclusion 14/xx – Transition to WAFS Internet File Server (WIFS) from ISCS-G2

That,

- a) The ISCS Provider State will work with States, in cooperation with the Secretariat and Asia and Pacific office, to assist States with the implementation of WIFS by March 2012;
- b) States to review Points of Contact in **Appendix (ISCS focal points)** to the Report and submit the WIFS registration form; and
- c) ICAO Asia and Pacific Regional Office to request States to advise on the status of their implementation of WIFS by March 2011.

Note 1: The data currently being provided by ISCS satellite service will only be available via the WAFS Internet File Server (WIFS) from June 30 2012.

Note 2: WIFS commenced operation in May 2010.

8.2 Progress of trial gridded forecasts and related implementation issues

8.2.1 The meeting was presented with an analysis of the WAFS trial gridded forecasts of icing, turbulence and cumulonimbus clouds conducted by Hong Kong, China. Evaluation of the five gridded forecasts (maximum CAT potential, mean in-cloud turbulence potential, ICAO height at CB top, CB horizontal extent, and maximum icing potential) by aviation users is made possible at the following website <http://wafs-grid-fc.weather.gov.hk/>. Since the CNS/MET SG/13 meeting, the following conclusions deduced from maps showing absolute difference in the forecasts of the two WAFCs for the same parameter at the same valid time since May 2009 was presented:

- Maximum CAT potential – mean absolute difference has decreased since December 2009 while relatively large differences are noted near certain mountainous regions (e.g. Andes)
- Mean in-cloud turbulence potential – mean absolute difference at high latitudes in Northern Hemisphere has decreased since December 2009
- ICAO height at CB top – no change (differences noted)
- CB horizontal extent – no change (differences noted)
- Maximum icing potential – no change (differences noted)

Improvements in harmonization for the first two forecasts mentioned were due to model changes by WAFS. The WAFS Providers noted that WAFS changes are placed on the bulletin notice board available on the WAFSOPSG website. However, further clarity on model changes and implementation dates were determined by the meeting as necessary to inform the users of these trial product changes. In addition, this is necessary information for proper analysis and subsequent reporting of results. The meeting requested the WAFCs to inform users of forthcoming changes to the contents of the WAFS forecasts in more detail than what is provided, which is addressed in the below draft Conclusion section a.

8.2.2 With regard to further harmonization of the gridded trial forecasts the meeting acknowledged further harmonization is necessary based on the differences noted above, the greatest differences noted with CB forecasts. The meeting also acknowledged that this effort is in progress and covered by WAFSOPSG Conclusion 4/17 and 5/10.

8.2.3 The meeting noted that compressed GRIB2 WAFS forecast data are approximately 17 MB per model run whereas uncompressed GRIB2 forecast data amount to 50 MB per model run. To efficiently manage bandwidth of obtaining these files (one file represents a forecast run for all forecast elements), the meeting was presented with a solution to streamline data transmission that would consist of required forecasts (upper wind, upper-air temperature, and SIGWX phenomena) in flight documentation (Annex 3, 9.3.1 refers) in the first file of two for each forecast hour. The second would comprise forecasts (upper-air humidity, geopotential altitude of flight levels, flight level and temperature of tropopause, and direction, speed and flight level of maximum wind) that are supplied to operators and flight crew members as established by meteorological authority in consultation with operators concerned. The size of the required forecasts mentioned above is about 11 MB, comparable to that of GRIB1 forecasts. This concept would reduce the reception time of required forecasts for timely preparation of flight documentation. IATA expressed concerns of this suggested solution since forecasts in both categories are used in their ingest systems as the forecasts become available. The meeting noted that different viewpoints provided promote the need for further consideration at the global forum and included this proposal in the below draft Conclusion part b for WAFSOPSG consideration.

8.2.4 The meeting discussed limitations of WAFS administrative messages for which guidance material (*Guidance for Users Regarding WAFS Administrative Messages Issued in Events of Errors Identified in WAFS SIGWX Forecast (in BUFR Code and/or PNG Chart Form)*) was provided in response to APANPIRG Conclusion 19/44 and WAFSOPSG/5. Special attention was placed on the following text of this guidance material in connection with errors identified in WAFS SIGWX forecast:

The content of such administrative messages shall be brought to the attention of users of the WAFS SIGWX forecast at the pre-flight planning stage. Where relevant to a particular flight, such correction information may be forwarded to aircraft in flight, but is not mandatory.

In this context, MET Services may find difficulty in determining whether or not a flight is in pre-flight stage or in-flight. Further guidance was requested with regards to what the MET Service and relevant end users should do with the administrative messages. For example, ignore the part of the forecast with error or correct it manually? The meeting agreed that the WAFSOPSG consider further guidance on administrative messages and reflected in part c of the below draft Conclusion.

8.2.5 Given the aforementioned topics in 8.2.1, 8.2.3 and 8.2.4, the meeting formulated the following draft Conclusion.

Draft Conclusion 14/xx – Improvements to WAFS Implementation

That, the WAFSOPSG is invited to discuss and consider the following improvement measures in WAFS implementation:

- a) the WAFS Provider States inform users in advance about forthcoming changes to the contents of the WAFS forecasts; and
- b) the WAFS Provider States consider separating the GRIB2 data file into two parts, one containing upper wind and upper-air temperature, and the other one containing upper-air humidity, geopotential altitude of flight levels, flight level and temperature of tropopause, and direction, speed and flight level of maximum wind, to facilitate more efficient transmission and use of the data; and
- c) further guidance be provided regarding the specific actions to be taken by the MET service providers and all relevant end users of WAFS upon receiving the administrative message.

8.3 Other WAFS (SADIS & ISCS) implementation issues

8.3.1 The meeting was informed of SADIS developments since the CNS/MET SG/13 meeting, which include the following: upgraded uplink ground segment infrastructure of the SADIS 2G service, progress in eliminating cause of transmission data losses on SADIS 2G, update to the 4th edition of the SADIS User Guide, development of secure SADIS FTP service, and reasoning for not changing the future SADIS 2G bandwidth. More information can be found in [Appendix \(WAFS and SADIS developments\)](#) to the Report.

8.3.2 The meeting was apprised of developments common to both WAFS (SADIS and ISCS) such as continued development and implementation of WAFS upper-air forecasts in GRIB2 code that includes CB, icing, and turbulence (undergoing harmonization), implemented provision of WAFS Aviation GRIB 2 data in compressed form on server based system SADIS FTP and WIFS on 2 March 2010 (CB, icing, turbulence available as trial forecast products for evaluation only), alignment of SIGWX issue times on 15 June 2010, WAFS backup tests, corrections to WAFS SIGWX forecasts, implementation of additional WAFS output performance indicators at WAFS London, update to the legend text of WAFS forecasts that indicates provider of data and issuer source of data, WAFCs and TCACs coordination for harmonization between tropical cyclone advisories and SIGWX, development of guidance on use and visualization of new gridded WAFS forecasts underway for possible endorsement at WAFSOPSG/6, and development of web-based training for States and WAFS users and associated costs for possible endorsement at WAFSOPSG/6.

8.3.3 The meeting acknowledged the availability of CB, icing and turbulence forecasts only on SADIS FTP and WIFS beginning 2 March 2010, but these forecasts are not on satellite broadcast. These products will not be transmitted on satellite broadcast in GRIB 2 form until WAFSOPSG endorsement. Another point the meeting acknowledged were the outcomes of the Workshop on gridded WAFS forecasts for icing, turbulence and CB cloud held in Paris from 14-15 September 2009. In particular, the preference for WAFS forecasts to be provided in its current form in that WAFS SIGWX BUFR should be visualized by workstation software. Therefore, the development of WAFS web-based server forecasts has been temporarily suspended. Further harmonization of forecasts was deemed necessary as well as guidance on the use of products. [Appendix \(WAFS and SADIS developments\)](#) provides more details on WAFS developments.

8.3.4 The meeting reviewed the draft SADIS Strategic Assessment Tables for Asia, 2010-2014 prepared by the SADIS Strategic Assessment Team which are used to help guide the SADIS Provider State in future developments necessary for SADIS. The process of formulating the regional SADIS Strategic Assessment Tables was addressed in SADISOPSG Conclusion 15/10 calling for the SADIS Provider State to take note of the completed SADIS Strategic Assessment Tables to form the basis for the future development of the SADIS and to forward the SADIS Strategic Assessment Tables to the MET

sub-groups of the PIRGs concerned for update in respect of future requirements. The meeting agreed with the SADIS Provider State proposals for 2014, except for the category of FC. As pointed out, FC is no longer required in the Region and though some FC have been exchanged in the Region as recorded by SADIS, the meeting agreed to reflect requirements and use zero for all entries for FC for the period 2010 to 2014. It was also noted that XML code in the exchange of TAF, METAR and SIGMET will impact these tables in the future, but for the period of concern the tables were not expected to change considerably because bilateral use of XML will be enabled beginning the end of 2013.

Decision 14/xx– SADIS Strategic Assessment Tables

That, the Asia region SADIS strategic assessment tables, as given in [Appendix \(SADIS Strategic Assessment Tables\)](#) to the Report, be adopted and forwarded to the SADISOPSG for planning the future SADIS bandwidth requirements.

8.3.5 The meeting reviewed the WAFS Implementation Plan and Procedures and WAFS Implementation Task Force work programme and composition and took note of the points mentioned above and that Item 16 (implementation of WIFS) and 17 (workshop on gridded forecasts of icing, turbulence and convective clouds) of the WAFS Implementation Plan and Procedures in [Appendix \(WAFS Implementation Plan and Procedures\)](#) were completed.

8.3.6 With regard to Item 18 (WAFCs beginning parallel broadcast of WAFS forecasts in the GRIB2 code form), GRIB2 has been made available via SADIS FTP and WIFS (not via satellite broadcast). With regard to Item 20, regional training on the use of gridded forecasts in 2011 and the provision of computer-based training products and web-based training package will be considered by the WAFSOPSG/6 meeting. Lastly, the task on cessation of the WAFS SIGWX forecasts in BURF code form and PNG chart form has been removed from the WAFS long-term plan (2009-2013) based on user needs expressed at WAFSOPSG/5 for a need of a similar product to SIGWX that would utilize gridded forecast data. In the light of the above discussions, the meeting formulated the following Decision.

Decision 14/xx – ASIA/PAC WAFS Implementation Plan and WAFS Implementation Task Force

That,

- a) the ASIA/PAC WAFS Implementation Plan and Procedures be amended as shown in [Appendix \(WAFS Implementation Plan\)](#) to this report;
- b) the work programme and composition of the WAFS Implementation Task Force be amended as given in [Appendix \(WAFS TOR and work programme\)](#) to this the report.

8.3.7 One State expressed interest in obtaining WAFS forecasts in TIFF format for data verification reasons. It was noted that user requirements be considered at the global forums (SADISOPSG and WAFSOPSG) and if not a member of these groups that consultation with a member in the Region could facilitate information being provided to the global forums. Furthermore, bulletin headers with regard to errors will be improved to be more user friendly by the WAFS. In terms of operational use of trial gridded forecasts, clarification was sought by ICAO as to whether or not they can be used operationally. As noted in Amendment 75 to Annex 3 section 3.2.1, gridded global forecasts of cumulonimbus clouds, icing and turbulence are currently of an experimental nature, labelled as “trial forecasts” and only distributed through the Internet-based FTP services. IATA will be providing thresholds of the new trial products that relate to user impacts based on airframe and aircraft type which will facilitate the evaluation of these trial products.

8.3.8 The meeting was apprised of developments with regard to the international flight folder documentation programme (IFFDP) in that the flight documentation programme currently available by facsimile and the Internet for dispatch and preflight planning and flight crews en-route will be completely web-based utilizing virtual flight folders. The flight folder information provided in IP/22 relevant to the route of flight and altitude will be available utilizing WebIFFDP system beginning in late 2010. Users may log in to their custom web page and view and print charts in their Virtual Flight Folders. Other delivery mechanisms such as email, chat-rooms, and client-side software are also being investigated.

Agenda Item 9: Regional Implementation of International Airways Volcano Watch (IAVW)

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Provision of graphical advisories

9.1 The meeting discussed the difficulty in identifying information associated with volcanic ash cloud from the header of graphical Volcanic Ash (VA) advisories, noting the requirement in Amendment 75 to ICAO Annex 3 to provide such advisory information relevant to the whole route to operators and flight crew members. The difficulty arises from the fact that the header code “X” for area designator indicates global region and there is no direct match with the corresponding textual advisory for the same volcano. This makes automatic extraction of volcanic information relevant to the flight route difficult. Of parallel interest, Tropical Cyclone (TC) advisories in graphical form will be available to operators and flight crew beginning November 2010. It was suggested that Volcanic Ash Advisory Centres (VAACs) and Tropical Cyclone Advisory Centres (TCACs) include the file name of the graphical advisories under remarks (RMK) of the corresponding VA/TC text advisories so that appropriate graphical advisory could be identified and included in flight documentation. In light of the above, the meeting formulated the following draft Conclusion.

Draft Conclusion 14/xx – Improvements to VA and TC advisories

That,

The IAWOPSG consider including the file name of the graphical advisories, if issued, under “Remarks” of the corresponding textual advisories.

Distribution of radioactive cloud information

9.2 The meeting discussed regional developments associated with IAVW, in particular, obtaining 8 character AFTN addresses for Area Control Centres (ACCs) in the ASIA/PAC Region to support the IAVW Operations Study Group (IAVWOPSG) Secretariat that will provide a global list of ACC AFTN addresses to VAAC London for the distribution of radioactive cloud information beginning 18 November 2010 (Amendment 75 to Annex 3). The meeting noted that 80% of the addresses have been obtained, but would strive to achieve 100% completion before November 2010 for proper implementation of this critical information that would be provided by VAAC London. The meeting was invited to complete their respective ACC AFTN addresses as indicated in **Appendix (ACC AFTN addresses)** to the Report in the near future. The meeting also noted that some States were in the process of determining what to do with the information received on radioactive cloud. Japan noted that the ACC AFTN addresses would be provided by 1 September 2010 as requested.

Dissemination of volcanic ash agreement

9.3 The meeting noted an agreement between the Ministry of Transport of the Kingdom of Tonga (MTKT) and the Ministry of Lands, Survey and Natural Resources of the Kingdom of Tonga (MLSNRKT) on the dissemination of volcanic ash information from MLSNRKT to MTKT for distribution to ACCs, Meteorological Watch Offices (MWO)s and VAACs.

Volcanic Activity Reports (VAR)

9.4 The meeting noted the need for improving the collection and dissemination of VAR, special air reports containing information on volcanic activity. In particular, noting that of 80 written pilot reports related to a series of serious high level eruptions in Papua New Guinea, very few were transmitted in real-time and less than 5% reached the VAAC. As specified in ICAO *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM), VAR are required to be forwarded to air traffic services and then to MWOs and VAACs. The need for disseminating VAR has been raised at ICAO and WMO global forums and as per IAVWOPSG/4 Conclusion 4/22, the VAAC Darwin collected VAR globally on a trial basis and determined relevant Aeronautical Information Service (AIS) and Regional OPMET Data Bank (RODB) to be most suited for central collection and distribution.

Global and regional developments in response to the Icelandic Volcano

9.5 In light of the Eyjafjallajökull Volcano eruption on 14 April 2010 that significantly disrupted air travel and commerce, the meeting noted the developments of the new ICAO International Volcanic Ash Task Force (IVATF). Goals of the IVATF were noted, in particular the agenda items of the first IVATF meeting to be held in Montréal from 27 to 30 July 2010. That is, results of the European and North Atlantic Volcanic Ash Task Force (EUR/NAT VATF) meetings, review of operational response to volcanic ash aircraft encounter and notification and warning for VA (ATM sub-group), development of ash concentration thresholds (AIR sub-group), improvement of ash detection/avoidance systems (Science sub-group), and improvement and harmonization of dispersion models and their visual presentation (IAVW Coordination Group). The VAACs in the ASIA/PAC Region (Darwin, Tokyo, and Wellington) have been invited to the IVATF/1 meeting. New Zealand objectives for the IVATF/1 meeting were detailed in IP/17. The ICAO IVATF website is located at <http://www2.icao.int/en/anb/met-aim/met/ivatf/default.aspx?PageView=Shared>.

9.6 The meeting noted the developments of the EUR/NAT VATF in that the second meeting of the EUR/NAT TF held in Paris from 8 to 10 June 2010 recommended the NAT and EUR volcanic ash contingency plans (EUR Doc 019 and NAT Doc 006, Part II) be combined and updated and referenced in Appendix C to Attachment 2 of WP/12. The consolidated volcanic ash contingency plan has been endorsed by the States members of the European Air Navigation Planning Group (EANPG) and the North Atlantic Systems Planning Group (NAT SPG) on 9 July 2010 with immediate applicability within the two ICAO Air Navigation Regions.

9.7 The updated, combined contingency plan provides contamination levels (low, moderate and high) based on volcanic ash concentrations. That is, low contamination is defined as volcanic ash concentration of less than 2×10^{-3} g/m³; medium contamination is defined as volcanic ash concentration greater than 2×10^{-3} g/m³ but less than 4×10^{-3} g/m³ and high contamination is defined as volcanic ash concentration greater than 4×10^{-3} g/m³. The meeting noted that these volcanic ash concentration thresholds and associated contamination levels are not yet a global standard and that the formal procedures of developing this type of standard would be conducted through the established ICAO procedures. Nevertheless, this contingency plan provides these volcanic ash concentration levels for operators to use in their risk assessment in determining how and where to conduct operations. Nomenclature such as danger area was also used to be consistent with current ICAO documents. Danger areas as defined in Annex 2, *an airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times*, may be determined by the State using the volcanic ash concentration levels. However, no international standard currently exists in making that determination and therefore operators are made aware that differences in State policy in declaring a danger area may affect transitioning from one FIR to another. This issue is expected to be addressed by the IVATF.

ASIA/PAC Volcanic Ash Contingency Plan

9.8 The ASIA/PAC Region does not have a volcanic ash contingency plan, which was raised at the Twentieth Meeting of APANPIRG Air Traffic Management/Aeronautical Information Services/Search and Rescue Sub-Group (ATM/AIS/SAR/SG/20) held in Singapore from 5-9 July 2010. Specifically, ATM/AIS/SAR/SG/20 draft Decision SG 20/12 invited the CNS/MET SG to develop sub-regional volcanic ash contingency plans in the Asia/Pacific Region and urges States to establish/maintain appropriate contact points in the interim period until these contingency plans become available.

9.9 The meeting expressed concerns about current capabilities with regard to providing volcanic ash information utilizing volcanic ash thresholds and verification of ash concentrations utilizing aerosolsounde, lidar, radar and aircraft measurements. Furthermore, the meeting agreed that the task of volcanic ash contingency plans involves many disciplines such as ATM, air worthiness, scientific community, and MET as detailed in the composition of the IVATF. The uniqueness of the ASIA/PAC region dotted with volcanic activity, multiple FIRs, lack of central flow control unit, and current monitoring capabilities added more concern to the group in providing the most sensible pragmatic approach for the region to consider. In addition, some States were noted to have sophisticated contingency plans for volcanic ash. As a result, an ad-hoc group was formed consisting VAAC Wellington, Darwin and Tokyo as well as IATA and Hong Kong China to consider the development of a regional volcanic ash contingency plan.

9.10 The ad-hoc group reported to the meeting that the TC/VA Implementation Task Force could be invited to develop a framework for a regional contingency plan for the Asia/Pacific Region. Using the EUR/NAT contingency plan and the findings of the IVATF and WMO scientific steering committee, the TC/VA I TF would be invited to present the framework to the CNS/MET SG/15 meeting. In completing this task the TC/VA I TF will engage with ATM through the MET/ATM TF. Consequently, this new task will require the modification of the terms of reference of the TC/VA I TF, which may coincide with the transition of this task force to the MET Warnings Implementation discussed in the next paragraph.

Expand the Terms of Reference of VA/TC I TF and rename the TF

9.11 The meeting recalled that the MET part of the CNS/MET Sub-group has four task forces. The meeting noted a proposal to redefine one of these task forces, the VA/TC I TF, to cover all matters concerning meteorological advisories and warnings (including wind shear). The objective of this proposal is to assist in the implementation of SIGMET and other advisories and warnings along similar lines to the Meteorological Warnings Study Group (METWSG). It was suggested that the task force could be called the Meteorological Advisories and Warnings Implementation Task Force (METWARN/I TF) with an amended Terms of Reference, Work Plan and Composition as provided in [Appendix \(METWARN/I TOR and Working Paper\)](#) to the Report. In this regard the meeting adopted the following Decision.

Decision 14/xx – Rename VA/TC I TF to METWARN/I TF and Revise TORs and Work Programme

That, the VA/TC I TF be renamed to the METWARN/I TF and the TORs and Work Programme be revised as shown in the [Appendix \(METWARN/I TOR and WkPrgr\)](#) to the Report.

VAAC Wellington developments

9.12 The meeting was apprised of recent developments of the VAAC Wellington. In particular, an active volcano period from January to June 2010 was due to three active volcanoes in

Vanuatu that prompted 343 volcanic ash advisories, most of which were associated with *Gaua*. The advisories were issued based on AIREP and MODIS satellite imagery, however, normal special air report on volcanic ash dissemination did not occur for one of the events. Do to variability of wind, a box around *Gaua* with the forecast of wind in the remark section was provided in the advisories. Volcanic ash heights mainly remained under 10,000 feet, however, one event that drifted toward New Caledonia prompted an inquiry to provide volcanic ash cloud concentration maps, which is not currently provided by VAAC Wellington (note that VAAC London provided this information in response to the Icelandic Volcano in April 2010). Nevertheless, VAAC Wellington is investigating this user request. Significant changes to the operations at the VAAC include the use of MTSAT imagery in the tropical areas (bi-spectral analysis for geostationary satellite MTSAT) and MODIS imagery in non-real-time (several hour time lag) where possible.

9.13 The area of responsibility of VAAC Wellington has been expanded on 1 July 2010 to include the vacant area between VAAC Wellington and VAAC Buenos Aires. Furthermore, future developments include new forecaster tools for the production of VAA and SIGMETs including volcanic ash advisory information in graphical form (VAG) and graphical SIGMETs expected to be operational in November 2010. The meeting noted that the graphic volcanic ash SIGMET was for observation time only and forecasts in VAG expected in 2011 when WMO provides the necessary coding. Lastly, the meeting acknowledged the commissioning of a new radar at Mahia on the east coast of the North Island in November 2010. The VAAC Wellington website is available at <http://www.vaac.metservice.com/vaac>.

9.14 The VAAC Wellington papers resulted in a few points of general volcanic ash discussion such as Thailand's concern of which VAAC to reference for volcanic ash information in the Adaman Sea which is served partly by Tokyo and partly by Darwin. The meeting noted that the VAACs are coordinated in issuing advisories and that one responsible VAAC will manage and coordinate advisories with the adjacent VAAC and that a reference will be placed on the website of the passive VAAC. Operational concerns were noted by IATA in the south Pacific when information is scarce as it is treated with significant risk and optimal flight paths not achieved.

Information on the operations of VAAC Darwin

9.15 The meeting was apprised on the recent activities of the VAAC Darwin which covers more than 150 active volcanoes punctuated with convection and remote sensing difficulties in the region. The following activities were noted by the meeting:

- 1396 Volcanic Ash Advisories were issued from 1 July 2009 to 17 June 2010 with no major eruptions
 - Most were low-level ash plumes detected by satellite
- Rabaul in Papua New Guinea became inactive in December 2009 resulting in less advisories than the previous year
- pilot report of sulphur smell at cruising level northeast of Jakarta
 - No eruption clouds detected by satellite or sulphur dioxide emissions by AIRS and OMI imagery
 - Indonesian Centre for Volcanology and Geological Hazard Mitigation advised no unusual volcanic activity reported
- Comprehensive competency-based training and assessment program for VAAC meteorologists

- Darwin VAAC certified with ISO-9001:2008 in April 2010 Quality Management Standard
- Collaborated with New Zealand in the development of the *Guidance for State Volcano Observatories: The International Airways Volcano Watch*
 - Includes guidance on recovering the cost for providing volcanic activity information to aviation
 - <http://www.wovo.org/information-for-state-volcano-observatories-providing-services-to-aviation.html>
- Rabaul Volcano Observatory of PNG still needs to implement cost recovery
- Improvements to VAAC Darwin remote sensing capabilities
 - X-band satellite receiver installed near Darwin
 - High resolution MODIS, AIRS and related imagery will soon be available in real-time for detection of volcanic ash and/or SO₂
 - SO₂ and automatic ash detection systems to be implemented
- Developing concepts of coordination and provision of volcano situational awareness information
- Monitoring (and member of) IVATF developments for possible implementation of enhanced products

5th International Workshop on Volcanic Ash

9.16 The meeting noted the major actions and outcomes of the WMO 5th International Workshop on Volcanic Ash held in Santiago, Chile from 22 to 26 March 2010. The major actions include Airbus to inquire (1) with engine manufactures on safe particle size and (2) concentration of ash sustainable by engines on its aircraft, tolerance level of volcanic ash for turbine engines (will now be under IVATF). Furthermore, a subgroup/working group of VAAC members to examine the use/provision of uncertainty forecasting and probabilistic information, Volcanic Ash (VA) Science Steering Group (VASSG), was established under auspices of WMO. The major outcomes include the need for clear limits of ash content by the manufacturers and aviation licensing authorities, completion of eruption source parameters to dispersion models during eruption when real time observations were unavailable, and the need for applying research and new technology to operations. The full report of the 5th International Workshop on Volcanic Ash can be found at <http://www2.icao.int/en/anb/met-aim/met/iavwopsg/Lists/Workshops/AllItems.aspx>.

Agenda Item 10: Regional Implementation of International Tropical Cyclone Watch (ITCW)

10.1 The meeting noted that Amendment 75 to Annex 3 includes the introduction of tropical cyclone advisories in graphical form, which includes the horizontal extent of gale force winds and frequent CB. Suggested dissemination of the graphic advisories is Portable Network Graphic (PNG) via the Internet. Furthermore, no named storms forecast to become names will use the designator NN versus NIL to avoid confusion by the users. This designation change includes TC advisories and SIGMET alike.

10.2 The meeting also noted that MWOs in the MID Region that receive TC advisories from TCAC New Delhi will be included in the tropical cyclone SIGMET (WC SIGMET) test on 10 November 2010 at 0200 UTC for MWOs in ASIA/PAC Region and 0800 UTC for MWOs in MID Region. FASID Table MET 3A has been updated to include the MID Region MWOs that receive advisories from TCAC New Delhi. The text in italics in FASID Table MET 3A indicates outside the Region and helps formalize the plans for the test. In addition, the June 2010 amendment to the SIGMET Guide reflects the expanded coverage of the WC SIGMET test in Appendix J to the SIGMET Guide.

10.3 The meeting was briefed on the latest developments of a pilot project on Aviation-weather Disaster Risk Reduction (ADRR), under the lead of Hong Kong China, for aviation users in the Asia and South-West Pacific Regions. To assist in disaster risk reduction, forecasts of tropical cyclones beyond 24 hours (as provided by TCACs) and 24- or 30-hours (as provided by aerodrome forecasts) were deemed necessary by the Commission for Aeronautical Meteorology (CAeM) of the World Meteorological Organization (WMO). The website of ADRR provides tropical cyclone forecasts and warnings for 24-48 hours ahead and numerical weather prediction products on tropical cyclones from a suite of sources (IP/20). The website also includes forecasts of operational concern (e.g. cross and head winds) highlighted when thresholds are met. In addition, a weather summary includes synoptic information, alternative scenarios, an outlook to 48 hours, and as necessary, wind shear, cross winds and turbulence as they are not weather elements of TAF. User feedback is positive with suggestions for continued improvement in presentation, resolution, and accuracy of forecasts in addition to the inclusion of products from other centres. In response to the users, a tropical cyclone probability map and expansion of coverage area from 125E to 140E was performed. ADRR is expected to be operational by the end of 2010 based on the success of the pilot project. Furthermore, ADRR for the Bay of Bengal and Arabian Sea is underway.

Agenda Item 11: Implementation of SIGMET and warnings

- 1) review SIGMET tests
- 2) SIGMET and warnings implementation issues
- 3) Review METWSG SIGMET advisory
- 4) update on SIGMET Guide

11.1 Review SIGMET tests

11.1.1 The meeting reviewed the results of the WC, WV and WS SIGMET tests conducted on 10, 17, and 24 November 2009, and noted the increased participation of States and MWOs, which included 8 first time participants in the State and MWO categories for the WS SIGMET test. Incorrect MWO headers, SIGMET format errors and dissemination of SIGMET test messages to all RODBs have been documented in the OPMET exchange action item list for action by the Regional Office and States. In addition, some errors identified were due to the incorrect documentation (i.e. WMO headers incorrect or lack of entries) in Appendix H of the SIGMET Guide. The meeting also noted with accolades the RODBs continued improvement in the reception of SIGMET. One category (WS), however, had a slight decrease in reception rates due to the increased participation and the fact that some new participants did not send SIGMET test messages to all the RODBs. States have been informed to send SIGMET to all RODBs in accordance to the SIGMET Guide. Graphic results of the tests are provided here within.

11.1.2 The meeting noted the **next WC, WV and WS SIGMET tests** will be conducted on **10, 17 and 24 November 2010** and commended States for their participation and encouraged continued participation for the identification of communication and format errors. India reported that participation of VECC is expected and that the State letter inviting States to participate needs to be well in advance of the test for State coordination. ICAO informed the meeting that invitation letters would be sent in late August or early September with a reminder closer to the test dates.

11.1.3 The meeting learned that Japan would conduct an expanded volcanic ash SIGMET test (APANPIRG C20/68 refers) in later half of 2010 due to the volcanic activity experienced in the first half of the year.

11.2 SIGMET and warnings implementation issues

11.2.1 The meeting was apprised of utilizing climatology in determining the expected frequency of convective SIGMET. Specifically, the frequency of SIGMET by region (Southern, Southwestern and Northeastern) showed a response to El-Nino in that the number of convective SIGMET is higher for these regions except for the Northeast where they are lower.

11.3 Review METWSG SIGMET advisory

11.3.1 The meeting was apprised of the developments with regard to the feasibility study on the regional issuance of SIGMET advisories to assist the issuance of SIGMET by MWOs using regional centres. The Rapporteur of the METWSG SIGMET Advisory Ad Hoc Group described the inception of the ad hoc group as it was developed by the METWSG in response to long standing deficiencies related to the issuance, dissemination and/or format of SIGMET by MWOs identified in all regions (first action of

METWSG/2). Further problems identified with the issuance of SIGMET included inconsistencies observed at the FIR boundaries and non-issuance of SIGMET for States without designated MWOs. Despite the efforts made through regular SIGMET tests, bilateral arrangements, educational material (e.g. SIGMET posters), SIGMET seminars and regional guidance material, deficiencies as mentioned still exist.

11.3.2 The ad hoc group's main goal is to determine if SIGMET advisories issued by regional centres (in concept parallel to VAACs and TCACs) assist in the issuance of SIGMET by MWOs. To achieve this goal, four main tasks are assigned to the group and include: (1) establish the content and format of advisory information; (2) select appropriate regional centres; (3) propose arrangements for a trial in one or two regions, and (4) establish any further training requirements. The work plan mirrors the tasks to be performed with further details provided in IP/5.

11.3.3 Progress described includes determining weather phenomena to be used in the trial, frequency of advisories no greater than 4 hours for a validity of up to 6 hours, SIGMET format in textual format similar to existing advisories and graphical advisories allowing for multiple phenomena on a singular chart over multiple FIRs, dissemination via AFTN and Internet, location of trial in ASIA/PAC and AFI Regions, requirements of Host and recipient States, and consideration to training needs based on future changes to WMO training requirements. The trial is proposed for a 3 month period in the first half of 2011 with advanced notification to stakeholders. To assess the trial, airlines and RODB participation is expected in monitoring the issuance and format of SIGMET relative to the baseline (without advisories).

11.3.4 The meeting expressed concern that the regional advisories may not have access to local information and in particular to phenomena not depicted by satellite. Furthermore, limitations still exist with advisories such as non implementation of MWOs and the issuance of SIGMET in a few locations unlikely even with access to advisories. This discussion led to the resurrection of the concept of having regional SIGMET centres (instead of advisory centres), however, the subject was noted to be out of the scope of the meeting.

11.3.5 To assist the assessment of the SIGMET advisory trial, a SIGMET monitoring scheme to provide statistics on the impact of advisory information was deemed necessary by the ad hoc group. To facilitate in monitoring SIGMET issued by MWOs, the Hong Kong Observatory is expanding the current web-based SIGMET monitoring system (<http://www.sigmetmon.weather.gov.hk>) beyond the ASIA/PAC Region to all the other Regions, which will accommodate the monitoring of other selected regional centres that issue advisories (AFI and possibly CAR/SAM) by the first or second quarter of 2011.

11.3.6 The meeting took note of the enhancements to the global SIGMET and Advisory website and noted further input may be provided by the METWSG:

- Use of geographical information system (GIS) application
 - Regional information of SIGMETs and Advisories at a glance with zoom in capabilities
- Indication of SIGMET issuance
 - FIR shaded denoting valid SIGMET
 - FIR flashing denoting multiple valid SIGMET

- Indication of advisory issuance
 - Icon of meteorological element type shown at advisory centre
 - Icon flashes if multiple advisories are valid at advisory centre
 - TC and VA symbols at location of event
- Display of SIGMET/advisory message
 - Cursor over active FIR or active advisory will display respective message
- Statistics on SIGMET issuance for FIRs concerned during advisory trial

11.3.6 The meeting discussed advantages of overlaying the SIGMET on forecasting systems, but this concept is not currently feasible due to the lack of data format for data exchange. This gave further importance to the use of XML in delivering SIGMET and the meeting encouraged the likely WMO code on SIGMET in the future as XML and WXXL evolves. IATA expressed the need to have the SIGMET monitoring display in user friendly terms for easy interpretation by the airlines.

11.3.7 Currently the Hong Kong Observatory obtains SIGMETs and advisories via SADIS, ISCS and AFTN. The meeting noted that a number of FIRs are missing in the relevant tables of the SADIS and ISCS User Guides. Furthermore, verification of SIGMET reception received by the two WAFCs and disseminated via SADIS and ISCS broadcasts is necessary to develop accurate statistics in the SIGMET advisory trial. To verify SIGMET is received and disseminated, participation in the ASIA/PAC SIGMET test was encouraged and coordination between the ICAO Regional Office and the WAFCs expected. Given the aforementioned, the meeting formulated the following draft Conclusion.

Draft Conclusion 14/xx — Update of SADIS and ISCS User Guide

That,

The SADISOPSG and WAFSOPSG consider the need to update the SADIS and ISCS User Guides to reflect the global coverage of SIGMET bulletins.

11.3.8 The meeting agreed that a member of the METWSG will submit a study note to the METWSG/3 meeting requesting SADISOPSG and WAFSOPSG to consider monitoring of SIGMET based on details of monitoring related to reception and dissemination.

Development of a New Turbulence Index

11.3.9 The meeting was apprised of developments with regard to a new turbulence index, TBindex, by the Japan Meteorological Agency (JMA), which has been in test operations since February 2010 and will soon be used for SIGMET issuance and domestic SIGWX prognostic charts. The importance of such development was noted in that Japan has had several accidents caused by turbulence in this turbulent prone State. TBindex was constructed with multiple turbulence indices (independent 5 CAT and 5 non-CAT turbulence indices) derived from a numerical weather prediction model. TBindex predicts various kinds of turbulence (clear air turbulence, cloud related turbulences, mountain waves) for lower to upper levels in a comprehensive manner. The forecast accuracy of TBindex is significantly better than conventional turbulence indices due to the ability to forecast turbulence in convective clouds and

mountain waves as well as clear air turbulence. This product updates 8 times a day and provides forecasts up to 15 and 33 hours (depending on initial times).

11.4 Update on Regional SIGMET Guide

11.4.1 The meeting was informed of the updates to the ASIA/PAC Regional SIGMET Guide that resulted from its review of incorrect WMO SIGMET headings used in the SIGMET tests. Most changes to the SIGMET Guide were associated with Appendix H, WMO SIGMET headings, but also included updates that facilitate the participation of MID MWOs that are recipients of tropical cyclone advisories by the TCAC New Delhi in the WC SIGMET test scheduled in November 2010. In addition, SIGMET changes associated with Amendment 75 to Annex 3 applicable 18 November 2010 are highlighted in green to facilitate States in their implementation of the new related standards. A list of updates associated with the June 2010 amendment to the SIGMET Guide is provided in the attachment to WP/14. The June 2010 amendment to the ASIA/PAC Region SIGMET Guide is posted on the Asia/Pacific website at http://www.bangkok.icao.int/edocs/sigmet_guide4.pdf.

11.4.2 The meeting discussed whether or not the reissuance of SIGMET as per Appendix J, paragraph 3.2.3.1 to the SIGMET Guide should be modified to include the reissuance time of 0200 (immediately after the SIGMET test message is sent) and that the SIGMET be updated to reflect any changes to the SIGMET since the first issuance (e.g. geographic region may have changed). The meeting noted that the procedures as they are have advantages: cancelling the original SIGMET not necessary and for large FIRs reissuing all SIGMET with new attributes may not be possible in a limited amount of time. Furthermore, SIGMET would not have been reissued if it were not for the SIGMET test. The meeting agreed that the OPMET/M TF consider using “Z99” as the SIGMET number and verify that ingest systems can handle out of sequence characters such as Z99. If successful, the SIGMET Guide be updated before the SIGMET test in November 2010.

11.4.3 The meeting was informed of the upcoming MWO assignment changes for the responsibility of FIRs Kunming (ZPKM) and Lanzhou (ZLHW) in China. Specifically, the MWO serving the Kunming FIR will change from the Kunming MWO (ZPPP) to the Chengdu MWO (ZUUU) and the MWO serving the Lanzhou FIR will change from Lanzhou (ZLLL) to Xi’an (ZLXY) beginning 1 September 2010 at 0000 local time. This reassignment is to meet the demands of air traffic growth in these FIRs and utilize existing regional meteorological centres that have advantages in personnel, technology and resources compared with the existing arrangement with aerodrome meteorological offices. Changes to the agreement on the provision of SIGMET for the Phnom Penh FIR by the Kunming MWO are under consideration by China and Cambodia. Consequently, changes to FASID Tables MET 1B, MET 3A, MET 3B, the ROBEX Handbook, SIGMET Guide, ICD and SADIS Annex 3 are necessary. These changes will be made in due time through the ICAO established procedures.

11.4.4 The meeting noted that the ICAO location indicator for the Oakland Oceanic FIR, KZAK, has been in effect since 1 January 2010 and subsequently NOTAMs issued for this FIR reference KZAK. SIGMET, however, is using KZOA (used in the Oakland area) and affects SIGMET collection for airlines. As a result, KZAK will be referenced for SIGMET issued for the Oakland Oceanic FIR beginning 28 July 2010. Subsequently, FASID Table MET 1B, 3B and 3C and Appendix H to the SIGMET Guide will be updated using the proper ICAO location indicator for the Oakland Oceanic FIR.

Agenda Item 12: Implementation of the issuance of observation, TAF and OPMET exchanges

- 1) Review of OPMET/M TF/8 meeting
- 2) Implementation of Amendment 74
- 3) Other OPMET implementation issues
- 4) Update on ROBEX Handbook and ICD

12.1 Review of OPMET/M TF/8 meeting

12.1.1 The meeting was informed about the major outcomes of the Eighth Meeting of the ASIA/PAC OPMET Management Task Force (OPMET/M TF/8) held in Bangkok, Thailand, from 23 to 25 March 2010. The meeting was attended by 38 experts from Australia, China, Hong Kong China, Indonesia, Japan, Malaysia, Singapore, Thailand, Viet Nam, United States, and ICAO. The full meeting report was available on the ICAO Asia/Pacific website at http://www.bangkok.icao.int/meetings/2010/opmet_tf8/index.html. Highlights of the meeting include: the ability to send OPMET data by email to the Singapore RODB for further distribution globally, input to the ROBEX Handbook, efforts associated to issuing TAF in accordance to Amendment 74 to Annex 3, and monitoring results by IATA showing the increase in OPMET data from ASIA/PAC received at SADIS. A more extensive list is provided in WP/15. The status of deficiencies addressed by the OPMET/M TF/8 meeting is presented in Agenda Item 17(2). In addition, SIGMET test for tropical cyclone, volcanic ash and other weather phenomena was presented in Agenda Item 11(1).

Review of Terms of Reference (TOR)

12.1.2 The OPMET/M TF/8 meeting reviewed its Terms of Reference (TOR), which was last adopted by the CNS/MET SG/13 meeting (July 2009) which included continuous monitoring of the progress of XML. The OPMET/M TF/8 meeting did not provide any further updates. The CNS/MET SG/14 meeting recommended the TORs of the OPMET/M TF/8 meeting be aligned as to minimize overlap (e.g. SIGMET test) with the METWARN/I TF and adopted the following Decision.

Decision 13/34 – Revised TOR and Work Programme of the OPMET/M TF

That, the revised TOR and Work Programme for the OPMET/M TF as shown in the **Appendix A5** to the Report be adopted.

12.1.3 The group briefly referenced the OPMET exchange action items list developed at the RODB/4 meeting (held in Chiang Mai from 11 to 12 February 2010 where the full report can be accessed at <http://www.icao.or.th/meetings/2010/rodb4/Index.html>). This list was further updated at the OPMET/M TF/8 meeting and maintained at the Regional Office and provided in Attachment 2 to WP/15. This extensive list of OPMET exchange and deficiency issues is categorized by subject (e.g. SIGMET test issues, METAR/TAF format errors) and is updated at respective meetings and by consultation with task force members and States.

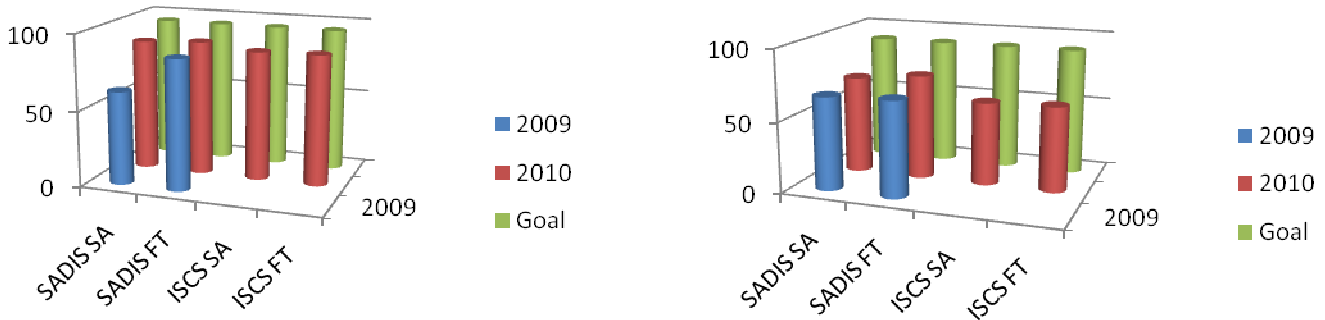
IATA OPMET data monitoring

12.1.4 IATA monitored the OPMET (METAR/TAF) reception for a 9 week period beginning 4 January 2010 against expected reception indicated in FASID Tables MET 1A and 2A (February 2010) (which also corresponds to SADIS SUG Annex 1) for AOP and non-AOP aerodromes. The statistics provided at the OPMET/M TF/8 meeting were encouraging and a summary provided here within.

OPMET Reception			
System	AOP aerodromes	Non-AOP aerodromes	Non-AOP aerodromes not

							listed in Tables		
	SA (%)	TAF	FC (#)	SA (%)	TAF	FC (#)	SA (#)	TAF (#)	FC (#)
ISCS	85.4	86.3	14	58.7	60.1	1	76	33	1
SADIS	87.3	89.3 (86-2009)	14	69.2 (66.1-2009)	74.1 (67.7-2009)	2	64	24	20 (18 only FC)
Goal	95	95	0	90	90	0			

**Graphical Representation of SADIS/ISCS
SA/TAF Reception for AOP (left) and non-AOP
(right) aerodromes**



12.1.5 Reception statistics of OPMET data for AOP aerodromes for two years were only available for SADIS, which revealed an improvement in reception of 25.6% for SA and 3.3% for TAF. Reception statistics for OPMET data for non-AOP aerodromes for two years were only available for SADIS, which revealed an improvement in reception of 3.1% for SA and 6.4% for TAF. Another observation noted was the lower reception OPMET data at ISCS versus SADIS in all categories. Specifically, SA/TAF reception at SADIS is 4/6 more than ISCS for AOP aerodromes and 15/20 more than ISCS for non-AOP aerodromes, which promotes the need for further harmonization of the two systems (SADISOPSG/15 Conclusion 15/9 refers), which is a continuous process as noted by the meeting.

12.1.6 The above shows a significant improvement in METAR reception at SADIS and modest improvements in the other categories. States are commended for this continued improvement in OPMET provisions. OPMET data missing from SADIS reception can be found in the attachments to WP/28 and WP/29. It is worth noting that the reception statistics may be significantly higher only months after this analysis for a number of reasons: distribution of OPMET in South Pacific by AFTN since April 2010 and many changes to the ROBEX Handbook June amendment that include the addition of numerous non-AOP aerodromes (e.g. Australia, Lao PDR, Japan, and Thailand). Furthermore, with relation to SADISOPSG/15 Conclusion 15/6, which calls for additional OPMET requirements for non-AOP aerodromes, more than 1/3 of the 86 non-AOP aerodromes for the ASIA/PAC Region are distributed via the ROBEX scheme, many associated with the ROBEX Handbook June 2010 amendment. For this reason, a new list of aerodromes that OPMET are not being received at SADIS or ISCS should be provided to the Regional Office to inform States of missing OPMET data.

12.1.7 The meeting noted that requirements for AOP aerodromes are detailed in FASID Table MET 1A. In addition, non-AOP aerodromes are not subject to the Regional Air Navigation Plan

requirements; however, IATA and States may concur on requirements and be reflected in FASID Table MET 2A.

12.1.8 With regard to FC issuance by India, the meeting noted that since the monitoring period, India does not distribute FC for international use, with an exception that has since been corrected (VOHY). India noted that the 3 hour TAF issuance before the start period of validity was due to the operators needs, though the issuance time requirements are 1 hour before the start period of validity of TAF. Another point made by the meeting was that the AMOFSG is investigating issuing TAF without a lead time.

12.1.9 Irregularities in OPMET data have been identified by IATA for the period from 05 June to 25 June 2010 considering various communication lines (SADIS, ISCS and German MET Office (DWD) as GTS/AFTN) as per the attachment to WP/30. Aerodromes whose METAR/TAF were received more than 10/30 minutes after reception times are provided in the attachment to WP/30. Note that the ROBEX Handbook section 7.5 details the METAR observation and TAF issuance to reception time of METAR and TAF. Specifically, total time to reception is up to 10 and 20 minutes for METAR and TAF (add 5 minutes if distance greater than 900 km). Suspect observations were also noted when METAR/TAF were received less than 3/10 minutes after observation/issuance times. Regularity was deemed unsatisfactory for METAR/TAF of less than 200 (of total expected 504) / 11 (of total expected 21) noting that accountability to partial operations was not factored.

12.1.10 The meeting was apprised of the recent update to the ROBEX Handbook that indicates availability times of OPMET data such as the non-AOP aerodromes in Thailand.

12.1.11 The meeting noted that the transmission times of States whose MET Services are ISO-9000 credited (New Caledonia, New Zealand and Hong Kong, China) also have unacceptable transmission times and missing OPMET data which raised a concern in the transmission of data. Coordination with the CNS group may be necessary to verify these transmissions times. In addition, the transmission times were greater for ISCS and OPMET data was missing on ISCS as noted by Hong Kong, China. Further investigation was suggested and noted by the two WAFCs. To assist in meeting the goals of OPMET availability of 95% and 90% for AOP and non-AOP aerodromes as referenced in APANPIRG Conclusions 20/63 and 20/64, the meeting formulated the following draft Conclusion.

Draft Conclusion 14/xx — Implementation of OPMET reception

That,

- a) IATA be invited to conduct another period of OPMET monitoring for reception of METAR and TAF at SADIS and ISCS and provide the Regional Office with a list of AOP and non-AOP aerodromes by State whose OPMET data are not available at SADIS and/or ISCS as well as a list of AOP aerodromes by State that distribute FC TAF; and
- b) the Regional Office urge States containing AOP aerodromes whose OPMET is not received at SADIS and/or ISCS of requirements in accordance to the Regional Air Navigation Plan (RANP); and
- c) the Regional Office remind States containing non-AOP aerodromes whose OPMET is not received at SADIS/ISCS of their commitment to provide OPMET data as already agreed upon; and

- d) the Regional Office inform States that FC TAF is no longer disseminated internationally in accordance with the RANP; and
- e) the slower transmission times and missing OPMET data associated with ISCS in relation to SADIS be investigated by RODBs Tokyo and Singapore; and
- f) the Regional Office inform States of OPMET observation, filing and transmission times as described in the ROBEX Handbook section 7.5; and
- g) the Regional Office inform States of OPMET availability and regularity as defined in the Regional Air Navigation Plan and ROBEX Handbook

Note: this Conclusion is intended to assist in achieving the OPMET data availability goals (95% AOP aerodromes and 90% non-AOP aerodromes) described in APANPIRG/20 Conclusions 20/63 and 20/64)

12.1.12 IATA reiterated its position with regards to OPMET availability, as formulated in the IATA METTF/14 meeting, is that all OPMET data currently available should be distributed. This does not mean modifying the airport status in the AOP table. The meeting noted, however, that procedurally, it is up to the State to decide what non-AOP OPMET is available for distribution through ICAO consultation with the State (this is not an amendment proposal, simply concurrence or non concurrence via consultation).

12.2 Implementation of Amendment 74

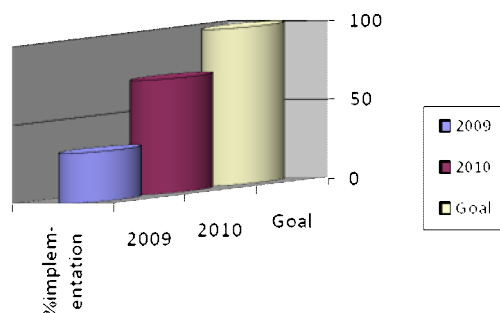
12.2.1 The meeting noted the various components of TAF requirements associated with Amendment 74 to Annex 3. In support to ultra-long haul flight planning, the introduction of 30-hour TAF was included in the Regional Air Navigation Plan. Specifically, FASID Table MET 1A details those aerodromes required to provide 30-hour TAF that may be selected based on alternate aerodrome use for ultra-long haul flights. In addition, only one TAF is valid at an aerodrome at any given time and that TAF in the ASIA/PAC Region is 24 or 30 hours and therefore, 9- and 12-hour TAF are not distributed for international use any longer. Also, TAF issuance time is one hour prior the start period of validity in the ASIA/PAC Region. Lastly, the inclusion of the day in the time elements of TAF was associated with Amendment 74 to Annex 3.

12.2.2 With regards to the format of TAF, the Region appears to have near full implementation. With regards to no longer disseminating 9- and 12-hour TAF, the Region is near full implementation with the exception of Mongolia and Pakistan. Isolated instances of short TAF are also issued for WIHH in Indonesia and VOHY in India. Indonesia plans to discontinue the dissemination of the shorter duration TAF in July 2010 and India has ceased sending the shorter duration TAF as of March 2010 and isolated reports of issuance have also ceased. Indonesia also plans to conform to the issuance time in accordance to the RANP as of July 2010.

12.2.3 The meeting noted that implementation of 30-hour TAF in accordance to FASID Table MET 1A is occurring at a steady pace. Implementation of 30-hour TAF at AOP aerodromes in the ASIA/PAC Region is approaching 3/4 as of July 2010, well more than double from a year ago. Indonesia has completed the implementation of 30-hour TAF as per the RANP in July 2010. Brunei Darussalam reported implementation occurred in November 2008 and India has implemented 30-hour TAF at all their aerodromes where required with additional aerodromes such as VOHS (AOP) and VOHY (non AOP), which was accepted by IATA. These new

requirements will be incorporated in the next amendment proposal of the FASID Table MET 1A. Implementation of 30-hour TAF in China (implementation for Beijing, Guangzhou, and Shanghai by end of 2010) and Japan (March 2012) will result in an implementation rate of near 90% and the Region is commended for its continued efforts of implementing these TAF requirements in support to ultra-long haul flights, noting that there is a significant amount of changes associated with this implementation such as manuals and extra man power required especially for larger States.

30-hour TAF implementation



12.3 Other OPMET implementation issues

Progress on XML

12.3.1 The meeting realized that the exchange of OPMET data and eventually SIGMET would likely utilize Extensible Mark-up Language (XML). The OPMET/M TF TORs include the monitoring of XML due to the impact it will have on implementation of the new exchange of OPMET data in the years to come. A status of XML developments as they relate to ICAO and WMO was provided to the meeting.

12.3.2 The meeting was informed of the recent WMO Commission for Aeronautical Meteorology (CAEM)/Commission for Basic Systems (CBS) Expert Team on OPMET Data Representation meeting held in Paris, France on 26 October 2009 for which the full report may be accessed at <http://www.wmo.int/pages/prog/www/WDM/ET-ODR-2/Documents.html>. Reference is made to section 2.4.1 and 2.4.2 to the report on attendance (by C/MET, ICAO) that include milestones such as the pilot project conducted by WMO in 2009, enabling bilateral exchange of OPMET via XML in 2013 (Amendment 76 to Annex 3), possible endorsement of the future use of Weather Information Exchange Model (WXXM) by the planned conjoint ICAO/WMO MET/AIM Divisional Meeting in 2014 and the possible implementation of WXXM in 2016.

12.3.3 The meeting was apprised that consideration to data volume and upgrades to communication systems (e.g. South Pacific) will be a significant undertaking and requires significant planning and coordination in due time. Furthermore, clarification on the term bilateral exchange is necessary and to be provided by the Secretariat.

Routine TAF amendments

12.3.4 Based upon feedback from the U.S. Meteorological Authority (Federal Aviation Administration) the NWS began routine TAF amendments for 35 higher trafficked airports that impact the National Air Space (NAS). This service accommodates air traffic management coordination calls by providing the most up to date information. In addition, it provides a more recent forecast for the critical airport push times

12.4 Update on ROBEX Handbook and ICD

12.4.1 The meeting noted the recent amendment to the ROBEX Handbook with regard to the new provisions associated with Amendment 75 to Annex 3 (e.g. routine aircraft voice reporting of weather no longer a requirement) that are highlighted in green for proper implementation planning. A new amendment in June 2010 included numerous updates by States on OPMET exchange that are detailed in the ROBEX Handbook list of updates in Attachment 1 to WP/17. In addition, these updates include changes associated with real time monitoring in March 2010 by RODB Singapore and for the most part, validated by States, particularly those present at the OPMET/M TF/8 meeting. The ROBEX Handbook is referenced in the Regional Air Navigation Plan for scheduled OPMET exchange and is used as reference (truth) in determining performance indices when RODBs monitor OPMET exchange and is therefore important to keep this document current on an annual basis. The June 2010 amendment to the ROBEX Handbook is posted on the Asia/Pacific website at http://www.bangkok.icao.int/edocs/robex2004_e12.pdf.

12.4.2 The meeting discussed section 9 of the ROBEX Handbook as it relates to the regional exchange of routine voice reports of weather by aircraft collected and disseminated by MWOs. Amendment 75 to Annex 3 applicable 18 November 2010 no longer requires routine reporting of weather by aircraft. Therefore the resources necessary for the exchange of this information by MWOs will no longer be applicable for cost recovery. Furthermore, special reports are disseminated in the same way as SIGMET and due to the urgent nature of these reports, hourly collectives deemed unnecessary. The meeting agreed that collection of air reports by the MWOs will no longer be applicable with the implementation of Amendment 75 to Annex 3 and that section 9 and Appendix D of the ROBEX Handbook be removed. The next amendment will be issued by the Regional Office in August 2010 for proper regional planning. This amendment will also include the recommended changes by Fiji (aerodromes added to METAR and TAF bulletins at the request of airlines in New Zealand) and contact information for Japan.

12.4.3 The meeting was informed of updates to the Asia/Pacific OPMET data banks interface control document (ICD) to reflect the current RODB operations of non scheduled exchange of OPMET data in the Region. Specifically, the RODBs Bangkok, Brisbane, Singapore and Tokyo updated their respective appendices A, B, D and E to the ICD. The June 2010 amendment to the ASIA/PAC ICD is posted on the Asia/Pacific website at http://www.bangkok.icao.int/edocs/OPMET_DataBanksICD2004.pdf.

Agenda Item 13: Review of regional procedures contained in the ANP/FASID

13.1 The meeting noted several amendment proposals during 2009 and early 2010 resulting in more stable FASID Tables MET. Since the CNS/MET SG/13 meeting, FASID Tables 4A, 4B and 4C were replaced by the ROBEX Handbook and ICD for reference of OPMET exchange in the Region in the Basic ANP and FASID text (APANPIRG/20 Conclusions 20/65 and 20/66 refers). FASID MET Tables 6 and 7 were removed in accordance to WAFSOPSG/5 Conclusion 5/2 as they are global in nature and documented in Annex 3. In addition, the RANP was adapted for the enabling of the public Internet in the retrieval of non-time critical OPMET data in accordance to WAFSOPSG/5 Conclusion 5/2. A more complete list of changes to the RANP during the past year is contained in WP/18. Clarity was also provided to the meeting with regard to the WAFS trial forecasts of CB, icing and turbulence in that they are trial forecasts for evaluation only and available only via SADIS FTP and WIFS (not by satellite broadcast until WAFSOPSG approval).

13.2 Of recent importance, the meeting noted the inclusion of VAAC Toulouse to reflect the issuance of volcanic ash to 11 MWOs in the western Asia Region. Furthermore, MID MWOs that are recipients of tropical cyclone advisories from TCAC New Delhi have been included in FASID Table MET 3A (MWO in italics – outside the ASIA/PAC Region) in preparation for the next WC SIGMET test (MID MET SG/2 draft Conclusion 2/4 refers). In addition, the expanded area of coverage of VAAC Wellington was reflected in FASID Table MET 3B in accordance with IAVWOPSG/5 Conclusion 5/2 beginning 1 July 2010. Lastly, Afghanistan was recently included in the RANP to reflect accreditation to the ASIA/PAC Region.

13.3 The meeting noted the importance of maintaining the Regional Air Navigation Plan and associated FASID Tables MET referenced whose purposes include: (1) regional planning by operators, (2) measurement of implementation which allows for proper focus in implementation strategies by many entities (Operations, States and ICAO); and (3) input to cost-recovery of MET Services provided for international aviation (as referenced in the *Manual on Air Navigation Services Economics*, Doc 9161, 4th edition, 2007). Therefore, an annual review of the latest Basic ANP and FASID Tables MET was strongly encouraged.

13.4 The meeting noted that the ICAO Regional Office (RO) Air Traffic Management (ATM) proposed transferring the responsibility of maintaining FASID Table ATS 2, HF Radiotelephony VOLMET broadcasts, from Air Traffic Service (ATS) to MET (draft Conclusion SG 20/14 of ATM/AIS/SAR/SG/20 refers). Requirements for VOLMET are contained in Annex 3, Meteorological Service for International Air Navigation. Historically, this table is maintained by ATS since this is considered an air traffic service. As this proposed transfer would involve all Regions, the meeting formulated the following draft Conclusion considering its global nature.

Draft Conclusion 14/xx — Transfer FASID Table ATS 2 from ATS to MET

That, ICAO consider the transfer of responsibility of maintaining FASID Table ATS 2, HF Radiotelephony VOLMET broadcasts, from ATS to MET, which would involve moving the tables related to VOLMET broadcasts from the ATS part to the MET part of all ANP/FASID where applicable.

Note 1: The ANP/FASID for other Regions would have to be amended accordingly.

Note 2: This draft Conclusion eliminates the need for APANPIRG consideration of draft Conclusion SG 20/14 of ATM/AIS/SAR/SG/20.

Agenda Item 14: Regional MET support to ATM

- 1) Review of MET/ATM TF/1 meeting
- 2) Exchange of information on MET support for operations at aerodromes, terminal areas and en-route

14.1 Review of MET/ATM TF/1 meeting

14.1.1 The meeting reviewed the highlights of the MET/ATM TF/1 meeting held in Bangkok, Thailand from 2-4 December 2009. The full report is located at the following website http://www.bangkok.icao.int/meetings/2009/metatm_tf1/index.html. Highlights of the meeting included a review of the previous survey on ATM requirements for MET, ASIA/PAC MET/ATM Coordination Seminar 2006 outcomes, States developments on coordination and services of MET for ATM, new Terminal Weather Forecast (now referenced as MET Services for the Terminal Area - MSTA). This task force meeting was essentially for the exchange of information and for planning for future exchanges.

14.1.2 The meeting noted that the MET/ATM TF/1 meeting proposed changes to the terms of reference (TORs) to take into account ingestion of MET information in decision support tools and sub-regional exchange of MET information to support ATM and adopted the following Decision.

Decision 14/xx – Update of MET/ATM TF TORs

That, the revised Terms of Reference of the MET/ATM TF provided in **Appendix (MET/ATM TF TORs)** to the Report be adopted.

14.1.3 The meeting briefly discussed the status of the upcoming MET/ATM Seminar and TF/2 meeting in Fukuoka, Japan during the fourth week of January 2011 and requested the meeting be held in coordination with WMO so that the WMO expert team and task team on MSTA be held back to back with the Seminar. Given the aforementioned, the meeting formulated the following draft Conclusion.

Draft Conclusion 14/xx – MET/ATM Seminar

That, ICAO in coordination with WMO conduct a MET/ATM Seminar in early 2011.

Note: This draft Conclusion reinstates APANPIRG Conclusion 19/53.

14.1.4 The meeting noted the results of the Air Traffic Flow Management (ATFM) survey that includes a MET component that was conducted in 2010 in accordance to APANPIRG/20 Conclusion 20/13. In particular, data from the flow control unit was available in more States than anticipated and useful to determining MET needs for ATM. IATA noted that strategic decisions with regard to operations is conducted in part using the available capacity versus the demand. The meeting agreed that further analysis is necessary by the MET/ATM TF and that the ATM use of the survey should be followed as well.

14.1.5 The meeting also discussed paragraph 1.1 of the MET/ATM TF/1 report with regard the concept of obtaining MET data for aviation purposes. The source of MET data was not explicit in this paragraph and clarification is requested. Furthermore, clarification on the reason and feasibility of the concept that Least Developed Countries obtains MET products through vendors was also requested. The interpretation presented to the meeting was that MET data for ATM seem to be supplied to States in a fashion similar to the WAFS model, though not explicit in the report and was not raised at the MET/ATM TF/1 meeting. Furthermore, it is doubtful that LDCs would have the financial viability to obtain MET products from commercial vendors where cost recovery mechanism is not in place. Clarification on the provision of MET Services to support ATM, including the role of Contracting States in the provision of MET data and MET products to support ATM, the applicability of global MET requirements for ATM to LDCs, and related charges were requested. In response, ICAO noted that a position on the delivery of future MET requirements for ATM is not yet known and that the position provided in the MET/ATM TF/1 meeting was that of one State. Since the CNS/MET SG meeting is focused on implementation issues, the meeting agreed that policy issues related to future MET requirements for ATM will be monitored by the MET/ATM TF and that if members of global MET study groups participate in these discussions, they may provide the information relevant to implementation to the future APANPIRG related meetings.

14.2 Exchange of information on MET support for operations at aerodromes, terminal areas and en-route

14.2.1 The meeting noted a summary of the NextGen concept for meteorological services in support to air traffic management for performance-based navigation (PBN). In particular, *Flight and Flow Information for a Collaborative Environment* is a document in response to Air Traffic Management Requirements Performance Panel (ATMRPP) to improve the efficiency of traffic flow with PBN. It is noted that documents mention of reference weather, but does not specify the meteorological services required for global ATM. NextGen will incorporate weather elements in space and time in Flight Management Systems, air transportation systems and decision-support systems utilizing a Single Authoritative Source (SAS) in support to optimizing capacity and flight trajectories given a set of user parameters (minimum criteria for operating – e.g. landing minima, aircraft weather avoidance limits, and risk tolerance). This concept also promotes common situational awareness. The development stages will progress from the current reactive mode to weather to proactive mode using probabilistic forecasts of weather that would allow ATM to respond iteratively and eventually be automated in providing optimum flight trajectories and operation choices would be provided (e.g. earlier departure time, changed trajectory). Four levels of Decision Support Tools (DST) include the following:

- Level 1 – stand alone (little to no weather integration)
- Level 2 – Over-lapping (high “glance value” weather impact information overlaid with decision support tool outputs)
- Level 3 – Minor human involvement (user-in-the-loop tools: Weather fully integrated within tool but separate weather information also provided for human understanding)
- Level 4 – Fully integrated (machine-to-machine: Weather and uncertainty fully integrated into decision tool outputs)

14.2.2 Weather information is expected to be automatically translated into probabilistic weather impacts on air traffic and be ingested into decision algorithms (ground and aircraft) by 2025. The AMOFSG established an ad hoc working group to formulate an initial set of requirements, elements and metrics for MET in support to global ATM and PBN where initial proposals are expected to be complete

by November 2010. This information may be reported by an ad-hoc member to the MET/ATM Seminar in Fukuoka in early 2011.

Wind shear

14.2.3 The meeting noted that the pilot reports of wind shear and turbulence are necessary for Air Traffic Control (ATC) to warn other aircrafts and to help validate automated wind shear systems. For example, an expanding network of Doppler weather radars in India is also being used to assist aviation in providing hazardous information such as thunderstorms, severe local storms and wind shear warnings. Chennai wind shear warnings generated from an S band Doppler radar could not be validated with high volume of data samples (several elevation scans utilized to cover the lowest 850m) as the feedback from Pilots are not encouraging. Though the aircraft reports are correlated with a meager sample, it is absolutely inevitable to report all types of wind shear experienced by the pilot not only for validation of Doppler Weather radar based algorithms but also for alerting incoming aircrafts where the Radar facility is not available. The meeting agreed that during adverse weather such as thunderstorms that produce wind shear or at high altitudes when significant turbulence is present, aircraft reports are essential in warning other aircraft and validating automated systems and is required in Annex 3 (5.6). IATA expressed concern of the few aircraft reports reported in a wind shear prone environment and encouraged further coordination. Also noted was that NULL wind shear cases are important for determining false alarm rates of a system.

Online Aviation Meteorological Briefing System (OLBS)

14.2.4 The meeting also noted that aviation users are pleased with the delivery of WAFS products and locally generated SIGWX charts in electronic form via an online aviation meteorological briefing system (OLBS) for all FIRs in India. Upgrades to the OLBS have allowed the user to access forecasts and current weather information for any desired route using a mouse. Since March 2010, this service has been extended to low-level flights (from FL030 to FL070) on a trial basis in Chennai and expected to expand to the whole FIR. Therefore, the member pointed out that to provide low level flight briefing service from all the airports throughout the world, low-level wind and temperature forecasts are desirable albeit the same are not provided below FL050, as of now, by WAFS.

14.2.5 The meeting noted that WAFS may not provide the spatial resolution desired in low levels and caution placed on the limitation of global numerical weather prediction models providing the desired high resolution wind and temperature information in the low levels. In addition, requirement changes to WAFS data should be raised to the WAFSOPSG where considerations to bandwidth availability and user requirements are factored. Information for FL070 may be the first achievable request. Further need for low level wind and temperature information was provided by New Caledonia on behalf of the South Pacific islands.

Aviation Thunderstorm Nowcasting System (ATNS)

14.2.6 The meeting was informed of the latest developments with regard to the aviation thunderstorm nowcasting system (ATNS) used in trial form since mid-2009 to support ATM and airline operators in the terminal area of the Hong Kong International Airport (HKIA). Based on user feedback the following new features have been developed:

- Extension of areal coverage of the 1-hour forecast of thunderstorms out to 256 km from HKIA
- Inclusion of lateral sector boundaries within HK FIR

- Automatic grouping of contiguous radar pixels into polygons overlaid with motion vectors

The latter is related to the development of the Meteorological Services for Terminal Areas (MSTA) (formerly the New Terminal Forecast) under the Commission for Aeronautical Meteorology (CAeM) of the World Meteorological Organization. This relation is specific to the nowcast category of MSTA which consists of nowcast (0-1 hour), short-term forecast (to 6 hours) and outlook of convective weather (to two days). Taking advantage of low bandwidth required, a trial of uplinking these polygons to aircraft via Electronic Flight Bag (EFB) was being explored with a local airline and could be expanded to other forecast products in the future.

14.2.7 Verification of ATNS in real-time is permissible utilizing archives up to 1 week and used for continued product improvement. Evaluation of how the product is used by ATM and airlines is conducted using flight tracks provided by ATFM overlaid onto the radar images and their derivatives (reflectivity, echo top, vertically integrated liquid, vertically maximum intensity core). Operating in trial mode for ATM and ATFM since mid-April 2010 provides insight on adjustments to alert levels of the radar parameters associated with severe convective weather. The users' desire for weather impact levels (avoidance) is also useful in the development of MSTA with the end goal of providing safety and efficiency (unnecessary closure of routes) without the need for interpretation. Further development such as growth and dissipation of thunderstorms is underway.

Significant Convective Forecast

14.2.8 The meeting was provided with latest developments on the significant convection forecast product by the Hong Kong Observatory and the weather briefing for ATC in support of ATFM. Knowledge of significant convection impacts on key ATC areas out to 6 hours in advance facilitates in decision making for use of flow control measures. To facilitate the weather briefings, an integrated web-based monitoring and forecast display was developed in consultation with the users that provide the following:

- Animation of previous hour radar images at 6 minute intervals overlaid with ATC sector boundaries and checkpoints (useful in monitoring the development of convection and potential impact to ATC)
- Animation of previous three hour radar images and ATC graphics combined with satellite image of potential deep convection highlighted in bright white at half hour intervals for the HKFIR and vicinity
- Forecasts for significant convection using numerical model outputs up to 12 hours every 3 hours that allows for manual adjustments (useful in including and excluding convection based on forecast skills and tools)

Understanding the forecast accuracy was one important outcome of the Joint Workshop conducted for ATC personnel and aviation forecasters. Future work will focus on forecasting runway capacity and airspace capacity (further relates to flight delay) based on user-defined thresholds of convective impacts to operations out to 9 hours that would be deduced in the weather briefings. Future weather product development entails inclusion of radar echo top, HKO tropical cyclone forecast track on the composite satellite and radar images.

14.2.9 IATA expressed their desire to access the MET services described above, which are currently available for ATC as these products are being developed. With regard to the various products provided, IATA also desires conformity of services and minimum interpretation. Providing these products to airlines and operators would be considered in the future.

Introduction of Significant Weather Briefing Sheet for ATMC

14.2.10 The meeting was briefed on developments with significant weather (SIGWX) briefing sheet issued by Air Traffic Meteorology Center (ATMetC) for the Air Traffic Management Center (ATMC) when significant weather is forecasted for some major aerodromes in Japan. The SIGWX briefing sheet was developed in response to the need of a greater than 6 hour forecast for air traffic impacts caused by strong wind at Tokyo International Airport and heavy snow at the New Chitose Airport. The period of validity is up to 16 hours and amended if necessary (for the first 12 hours of validity) with a tabular type form showing the air traffic flow impact (runway capacity, flight deviation), time interval of impact, severity level, significant weather conditions, and forecast comments.

Agenda Item 15: Other MET issues

- 1) Amendment 75 implementation issues
- 2) Implementation of QMS

15.1 Review Amendment 75 implementation issues

15.1.1 The meeting noted MET requirement changes associated with Amendment 75 to Annex 3 adopted by the ICAO Council on 22 February 2010, which are provided in the attachment to IP/13. These included, but are not limited to the following changes:

- improved horizontal, vertical and temporal resolutions for WAFS forecasts
- introduction of an enabling clause for the implementation of WAFS trial forecasts of cumulonimbus clouds, icing and turbulence (available on SADIS FTP and WIFS only – satellite broadcasts subject to WAFSOPSG approval)
- elimination of routine voice reports related to weather
- enabling the provision of graphical MET information in the cockpit
- enhancement of the provision of information on volcanic ash and toxic chemicals
- aerodrome observations enabling the use of fully automatic observing systems for the provisions of local reports and the replacement of km/h by m/s for the SI unit to report wind speed
- implementation of tropical cyclone advisory graphics that include the extent of gale force wind and frequent CB
- no name storms indicated as NN versus current NIL with regards to tropical cyclone advisories and WC SIGMET
- inclusion of the forecast time in the second line of SIGMET message
- inclusion of “headwind gain” and “headwind loss” information for wind shear warnings
- enable the use of the public Internet for the exchange of MET data that is used for flight planning
- MET elements requiring quality management system will be effective in 2012

15.1.2 The meeting expressed concern with the inclusion of the forecast time in the second line of SIGMET message. That is, the use of “FCST AT” and the time was not clear as to whether the time is the beginning time of the forecast or any time during the period of forecast is valid. Another point provided to the meeting is that the Volcanic Ash graphic SIGMET example provided by WMO was only for observed, not for forecast and as a result, New Zealand will issue a two-panel graphic depicting observed ash in an upper panel map and forecast ash in the lower map. (add comment by Australia with regard to VA and TC?)

15.1.3 The meeting discussed the inclusion of ‘moderate’ category in special aircraft observation of turbulence and icing and their reporting in special air report associated with Amendment 75 to Annex 3 (Table A4-2 of Appendix 4 and Table A6-1 of Appendix 6). It was noted that moderate and severe turbulence are defined for automatic systems in terms of Eddy Dissipation Rate (EDR), however the manual observation of turbulence remains subjective (Appendix 1 PANS-ATM). Pilots were sited that it may be difficult to differentiate between moderate and severe turbulence and consequently a report of ‘moderate to severe’ turbulence may be issued. Furthermore, IATA noted that turbulence reporting is largely a function of aircraft type and type of turbulence. In terms of the MWO, it is not certain what category to issue (moderate or severe). The categories selected by the METWSG are in accordance with those in PANS-ATM (Doc 4444) for simplicity reasons. The meeting sought clarity in defining moderate and severe turbulence to assist pilots and MWOs.

15.1.4 Before a long-term solution to the problem of interpreting a ‘moderate to severe’ turbulence is available, IATA deemed the use of ‘severe’ acceptable if the report is issued as ‘moderate to severe’ provided that the frequency of occurrence of this reporting is limited (e.g. less frequent than once an hour) and that caution was placed on the size of the SIGMET issued, if warranted (area defined be as concise as possible given the event). The meeting agreed that this information be provided in the SIGMET Guide after consultation with Headquarters and a select number of States (e.g. Hong Kong China, Australia and New Zealand). This was considered a pragmatic approach while the overall issue of determining the feasibility of providing guidance on manual observation and reporting of turbulence and icing as required in Amendment 75 be considered by ICAO.

15.1.5 The meeting agreed that the fastest route to bring this to the attention of ICAO (Headquarters) would be that a member of the METWSG submit a study note to the METWSG/3 meeting being held in November 2010 (an APANPIRG Conclusion would not be addressed by the Air Navigation Commission until January 2011 and the METWSG meeting in November 2010 would have passed). Determining the frequency of this occurrence would help the user further understand the implications of being conservative in issuing severe turbulence SIGMET (or SPECIAL AIREP) for a ‘moderate to severe’ turbulent air report.

15.2 Implementation of QMS

15.2.1 The meeting noted that requirements for Quality Management System (QMS) for all MET elements in Annex 3 associated with Amendment 75 will become a requirement in 2012, as opposed to 18 November 2010 for other changes associated with Amendment 75.

Quality control for aviation MET products in Republic of Korea

15.2.2 The meeting acknowledged the quality control programme for inspecting and managing factors that may adversely affect Aerodrome Meteorological Observation System (AMOS) and the quality of aviation meteorological information (METAR, MET REPORT, TAF, WARNING, SIGMET and AIRMET) operating at 13 aviation meteorological offices in the Republic of Korea since December 2009. Quality inspection is based on Amendment 74 to Annex 3 and error occurrences are provided by pop-up windows to reduce transmitted errors. Quality control check list for AMOS includes continuity, limits, intervals based on seasonal norms, and sudden variations. Quality control checklist for aviation meteorological information includes timeliness, format conformity, typo/omission, and observing standards (i.e. SPECI). The result of this inspection is increased accuracy of MET data necessary for operation efficiency.

Aerodrome Climatological Summaries

15.2.3 The meeting acknowledged the establishment of aerodrome climatological summaries for selected Australian airports consistent with ICAO and WMO recommendations. These summaries assist in aerodrome forecasting and aviation industry strategic and operational planning. Climatological summaries of the frequency of threshold weather elements at given times of the day for a particular month were given for visibility and cloud-base height combination, visibility, cloud-base height, surface temperature range, and concurrent wind direction and speed. Criteria in developing these tables include a minimum of 5 continuous years of record and only aerodrome observations used. Meteorological data from automated sensors will be considered in the future. The initial set of climatological summaries for 233 sites is expected to be available to users through a customized web interface in the second half of 2010.

Meteorological satellite launch

15.2.4 The meeting acknowledged the first launch of a meteorological satellite, Communication, Ocean and Meteorological Satellite (COMS) by the Korea Meteorological Administration (KMA) on 27 June 2010 which is located 36,000 km above longitude 128.2 degrees East. COMS is expected to be operational in early 2011 after 6 months of trial operation. Observation products from meteorological data processing system consist of 16 elements such as cloud top temperature/cloud top height (list provided in IP/6). Observation products are provided every 3 hours for the hemisphere, every 15 minutes for the East Asia Region, and every 8 minutes during severe weather phenomenon for the Korean Peninsula and vicinity as opposed to the current 30 minute updates. Relevant to aviation, future developments by the Korea Aviation Meteorological Agency (KAMA) in cooperation with the National Meteorological Satellite Centre (NMSC) include analysis methods of hazardous weather on air spaces such as typhoons, lightning, and turbulence that impact air routes, monitor natural disasters, and improved forecast technology for aviation. Further developments that improve MET services to aviation include the implementation of Electronic-Aeronautical Information for Meteorology (E-AIM) in 2015, advance issuance of weather information for navigation safety (e.g. SIGMET, warnings), and prediction of potential Clear Air Turbulence (CAT) areas based on upper-level water vapor data. COMS products may be made available via FTP service while extension of coverage of image for the East Asia Region to southeast Asia is a possibility.

Agenda Item 16: Review Regional Performance Framework Objectives and forms:

- 1) CNS related Performance Framework Forms
- 2) MET related Performance Framework Forms
- 3) review and update CNS/ATM Implementation Planning Matrix

16.2 MET related Performance Framework Forms

The meeting reviewed the regional Performance Framework Forms (PFFs) for the MET field that were adopted by APANPIRG/20 via Conclusion 20/2 in support to the ICAO planning objective to achieve a performance based global air traffic management (ATM) system through the implementation of air navigation systems and procedures in a progressive, cost-effective and cooperative manner. Four objectives and associated forms are provided in [Appendix \(PFFs\)](#) to the Report. The meeting updated the performance framework forms to include monitoring of the IVATF developments in order to develop a framework for a ASIA/PAC contingency plan for volcanic ash events. In addition, the renaming of the task force VA/TC I TF to METWARN/I TF with broader responsibilities was accounted for. Lastly, the ISCS Provider State decision to terminate ISCS-G2 broadcast on 30 June 2012, provide WAFS data via WIFS instead but not ISCS-G3 is reflected in the forms. Given these changes, the meeting adopted the following decision.

Draft Decision 14/xx - Updated Regional Performance Framework Forms (PFFs) for the MET field

That, the revised regional PFFs in the MET field provided in [Appendix \(PFFs\)](#) to the Report be adopted.

17.2 Status of MET deficiencies (APANPIRG deficiency list)

17.2.1 The meeting recalled APANPIRG/20 Conclusion 20/74 which resulted in the removal of the deficiency (AP-MET-15) on the provision of SIGMET for the Phnom Penh FIR. The Kunming MWO provides SIGMET for the Phnom Penh FIR since June 1, 2009 in accordance to a bilateral agreement between China and Cambodia. The establishment of an MWO (AP-MET-11) still exists for Cambodia since other provisions (e.g. dissemination of radioactive material information) are necessary for a MWO. Note that the bilateral agreement is being updated to reflect the MWO responsibility change from Kunming to Chengdu for consideration by Cambodia.

17.2.2 Myanmar has informed the Regional Office (February 2010) that SIGMET is provided by the Yangon MWO. The meeting also noted that Myanmar participated in the SIGMET tests in November 2009 (except for WC SIGMET since an advisory was not issued by TCAC New Delhi). As a result of the RODB/4 meeting, Myanmar was recently informed by the Regional Office to issue SIGMET to all RODBs in the Region via AFTN. SIGMET monitoring by RODB Bangkok was conducted from 18-31 May 2010, which revealed approximately a dozen SIGMET issued, however, some were not justified as they referenced tropical depression, which is not a SIGMET phenomenon element. In addition, format errors were identified and Myanmar notified on 10 June 2010. The issuance of SIGMET is now a part of the normal duties of the Yangon MWO and there are improvements (format of period of validity, the use of TS instead of CB), however, some errors still noted (e.g VYYY Yangon FIR missing on second line of SIGMET). The meeting was encouraged, but agreed (along with IATA) that another monitoring period in August was needed to prove a high degree of compliance for removal of AP-MET-13 at APANPIRG/21. In light of the above, the meeting formulated the following draft Conclusion.

Draft Conclusion 14/xx – Removal of the APANPIRG Air Navigation Deficiency AP-MET-13

That, the air navigation deficiency AP-MET-16 be removed from the APANPIRG air navigation deficiencies list.

Provided remaining errors identified in the issuance of SIGMET are resolved and proven in the next monitoring period in early August 2010.

17.2.3 The meeting also noted that Myanmar notified the Regional Office (February 2010) of an action plan on obtaining SADIS FTP in 2010 that would provide the required WAFS information in flight briefings (AP-MET-10). Confirmation of WAFS information in flight documentation is needed for removal of this deficiency.

17.2.4 The meeting noted that Lao PDR plans to establish a MWO responsible for the provision of SIGMET in 2010 and that Lao PDR participated in the November 2009 SIGMET tests. The meeting agreed that once this is achieved, a RODB monitor for the issuance of SIGMET for the removal of the related deficiency (AP-MET-12).

17.2.5 The meeting recalled that DPR Korea notified the Regional Office on 30 March 2009 of the establishment of an MWO at Sunan (published in AIP) and has participated in the WS SIGMET test on 24 November 2010. Furthermore, DPR Korea acknowledged the request to send SIGMET to all RODBs in the Region and planned to follow this request beginning 10 March 2010. As a result, FASID Table MET 1B reflects the establishment of the MWO (approved amendment proposal - SN: APAC 10/06 - MET).

17.2.6 The meeting noted that the removal of the deficiency (AP-MET-16) on SIGMET for DPR Korea is contingent upon sufficient evidence of SIGMET issuance through monitoring by RODB Tokyo. RODB Tokyo monitored the issuance of SIGMET for the period 1 April to 20 June 2010 for the Sunan FIR and neighboring FIRs (Shenyang, Incheon, and Vladivostok) which revealed dozens of SIGMET in the neighboring FIRs, but none from Sunan FIR. SYNOP and TAF data from DPR Korea were also used in the analysis which revealed thunderstorm observed at one of the SYNOP stations in a three hour period over 100 times and 8 TAF with thunderstorm in the forecast. Note that the strength and aerial coverage of thunderstorms were not verified. Nevertheless, the meeting agreed that there is not enough sufficient evidence for the removal of this air navigation deficiency.

17.2.7 The meeting recalled APANPIRG/20 Conclusion 20/75 which resulted in the addition of 5 deficiencies to the APANPIRG list of deficiencies. These deficiencies were a result of findings from the ICAO Technical Co-operation Project *Cooperative Agreement for Enhancement of the Meteorological Service for Aviation in the South Pacific (CAEMSA-SP)*. Specifically, lack of WAFS forecasts in flight briefings for Nauru, Kiribati, and Solomon Islands (AP-MET-18, -19 and -20), lack of meteorological observing station for Nauru (AP-MET-21), and lack of volcano monitoring for the Kingdom of Tonga (AP-MET-17) were included in the list of APANPIRG deficiencies.

17.2.8 With regards to AP-MET-18, -19 and -20, States are encouraged to obtain WAFS forecasts via WIFS, which would mitigate this deficiency. The cost of acquiring WIFS will be provided by the United States and added in the proposal to obtain a sponsor to assist States in acquiring WAFS products. With regards to AP-MET-21, assistance is likely needed from a Donor to provide the necessary equipment and possible training for maintenance or a maintenance contract, which is expected to be discussed at the ICAO TCB CAEMSA-SP Phase II Donor Workshop in Vanuatu in October 2010. This Workshop is expected to secure donations and develop and assign tasks necessary in mitigating the MET deficiencies identified in CAEMSA-SP. With regards to AP-MET-17, an agreement between the Ministry of Transport of the Kingdom (MTKT) of Tonga and the Ministry of Lands, Survey and Natural Resources of the Kingdom of Tonga (MLSNRKT) on the dissemination of volcanic ash information from MLSNRKT to MTKT for distribution to ACCs, MWOs and VAACs is under consideration.

17.2.9 The meeting noted that coordination with States on formalizing inter State MET Services in the South Pacific was conducted to address recommendation six, safety oversight, of the CAEMSA-SP Project Terminal Report. Agreements on the provision of TAF by Fiji for several Island States (Kiribati, Niue, Samoa, Cook Islands and Tonga) were drafted for States' consideration. In addition, a draft agreement was developed for the provision of SIGMET by Papua New Guinea on behalf of the Solomon Islands.

17.2.10 IATA made tribute to the efforts being made with the deficiencies referenced above and encouraged continued effort in mitigating these deficiencies. IATA further noted that aerodromes in the South Pacific are critical to safety of operations, in particular to ETOPS.

Cost Recovery Proposal

17.2.11 To partly address recommendation eleven, cost recovery, of the CAEMSA-SP Project Terminal Report, the meeting reviewed the dilemma of providing necessary MET services for international aviation when cost recovery is not sufficient in certain States, particularly those with minimal air traffic (e.g. South Pacific Island States), yet their location for alternate aerodrome planning is crucial to the overall planning by airlines. To assist in finding an option for providing the necessary MET services based on cost recovery, the meeting agreed that larger air space blocks would need to be determined to develop and maintain a level of MET service that satisfies Annex 3 provisions. Since the

current documentation, in particular the *Manual on Air Navigation Services Economics* (Doc 9161, 4th edition, 2007) is limited in addressing this dilemma, the meeting agreed to formulate the following draft Conclusion.

Draft Conclusion 14/xx – Cost Recovery Guidance Material Update

That, ICAO be invited to consider updating the cost recovery guidance material that would take into account States whose air traffic volume is not sufficient in obtaining the cost recovery for the necessary MET services required in Annex 3 and consider shared services in airspace blocks that are based on the number flights needed in obtaining the necessary cost for the services required for that airspace block.

17.2.12 The meeting noted that tracking of and reporting on the above Conclusion would be useful and that the development should be in concert with WMO documents that provide guidance on cost recovery. Furthermore, to make cost recovery successful, other legislative matters such as the establishment of a MET Authority is necessary and that the establishment of MET in the Pacific Aviation Safety Oversight (PASO) would assist in these matters (as recommended by TCB CAEMSA-SP).

17.2.13 One member State expressed a view that consideration for charging airlines and ATM for cost recovery can be vastly different in view of the difference in the nature of their ‘business’.