
TERMS OF REFERENCE OF ASIA/PAC OPMET MANAGEMENT TASK FORCE**ASIA/PAC OPMET MANAGEMENT TASK FORCE (OPMET/M TF)****1. Terms of Reference**

- Review the OPMET exchange schemes in the ASIA/PAC Region and develop proposals for their optimization taking into account the current trends in the global OPMET exchange;
- Develop monitoring and management procedures related to the ROBEX exchange and other exchanges of OPMET information;
- Keep up-to-date the regional guidance material related to OPMET exchange;
- liaise with similar groups in other ICAO Regions.

2. Work Programme

The work to be addressed by the ASIA/PAC OPMET Exchange Task Force includes:

- (a) to examine the existing requirements and any new requirements for the OPMET exchange in ASIA/PAC regions and to assess the feasibility of satisfying these requirements, taking into account the availability of the data;
- (b) to review the ROBEX scheme and other OPMET exchange schemes and based on this review to prepare proposal for updating and optimizing of the schemes;
- (c) to review and update the procedures for interregional exchange and for transmission of the regional OPMET data to the satellite broadcasts providers (ISCS and SADIS);
- (d) to review and amend the regional guidance materials on the OPMET exchange and to include procedures for the exchange of all required OPMET message types: SA, SP, FC, FT, WS, WC, WV, FK, FV, UA;
- (e) to develop procedures for monitoring and management of the OPMET information, based on the procedures used at the OPMET data banks; EUR OPMET update procedure to be used as the bases for development of similar procedure for the ASIA/PAC Regions.

3. Composition

- (a) The Task Force is composed by experts from:

Australia (Rapporteur), China, Fiji, Japan, Singapore, Thailand, United Kingdom and United States.
- (b) IATA is invited to participate in the work of the Task Force

INTERNATIONAL CIVIL AVIATION ORGANIZATION



ASIA/PACIFIC REGIONAL SIGMET GUIDE

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1. Introduction

1.1 The main purpose of this document is to provide guidance for standardization and harmonization of the procedures and formats related to the aeronautical meteorological warnings, known as SIGMET information. The guidance is complementary to the Annex 3 standards and recommended practices regarding SIGMET and to the SIGMET related provisions of the ASIA/PAC Basic ANP and FASID, ICAO Doc 9673.

1.2 It has been recognized that problems existed in the implementation of the SIGMET service by the States. These problems fall into two main groups:

- a) SIGMETs are not issued as required by some of the meteorological watch offices (MWOs) designated by the States;
- b) Where SIGMETs are issued, their format is not fully compliant with the format specified by Annex 3 and this creates problems in processing and interpretation of SIGMET by the users.

1.3 In noting the above implementation problems, the MET Divisional Meeting held in Montreal from 9 to 26 September 2002, formulated a recommendation which stated, *inter alia*:

Recommendation 1/12 - Implementation of SIGMET requirements

That ICAO,

.....

- b) review the regional SIGMET guides to ensure that all are up to date, and draw States/Members' attention to these guides, together with a request that States/Members review the operations of the MWOs they have designated for inclusion in the regional air navigation plans to ensure that SIGMET messages are being issued as required;*

.....

The current version of the ASIA/PAC SIGMET Guide is a follow-up of this recommendation.

1.4 The SIGMET Guide is intended mainly to assist the MWOs in the Asia/Pacific Region in preparing and disseminating SIGMET messages. It provides detailed information on the format of SIGMET messages as specified by Annex 3. The explanations of the format are accompanied by a number of examples based on region-specific meteorological phenomena. The guide provides also information regarding the necessary coordination between the MWOs, the ATS units and the pilots, and their respective responsibilities.

1.5 This document is prepared by the ICAO Regional Office. It should be reviewed and updated regularly in order to be kept in line with other ICAO documents and regional procedures.

PART 2. RESPONSIBILITIES AND COORDINATION

2.1 SIGMET is warning type of information and hence it is of highest priority. SIGMET is also mainly in-flight service, which requires timely transmission of the SIGMET information to pilots by the ATS units and/or through VOLMET and D-VOLMET. One of the most valuable sources of information in preparation of SIGMETs is provided through the special air-reports transmitted by pilots to the ATS units and forwarded to MWOs. As it is seen, the SIGMET service involves MET, ATS and pilots, that is why, close coordination between them, as well as mutual understanding of the needs and responsibilities, is essential for successful implementation of the SIGMET service.

2.2 In the next paragraphs, the main responsibilities and coordination links between MET, ATS and pilots are described.

2.3 Meteorological Watch Office - responsibilities and procedures related to SIGMET

2.3.1 SIGMET information shall be issued by the meteorological watch offices (MWO) in order to provide timely warning for occurrence or expected occurrence of specified en-route weather phenomena, which may affect the safety of the flight operations in the MWO's area of responsibility (AOR). SIGMET shall provide information concerning the location, extent, intensity and expected evolution of the specified phenomena.

2.3.2 All designated MWOs in ASIA/PAC Region are listed in the FASID Table MET 1B of the ASIA/PAC FASID, which is reproduced as Appendix 1 to this Guide.

2.3.3 If for some reason a MWO is not able to meet its obligations including the provision of SIGMET, arrangements shall be made between the meteorological authorities concerned, that another MWO takes over these responsibilities for certain period of time. Such delegation of responsibilities shall be notified by a NOTAM and a letter to the ICAO Regional Office.

2.3.4 Since the MWO is normally not a separate administrative unit, but part of the functions of an aerodrome meteorological office or other meteorological office, the meteorological authority concerned shall ensure that the MWO obligations and responsibilities are clearly defined and assigned to the unit designated to serve as MWO. Corresponding operational procedures should be established and the meteorological staff should be trained accordingly.

2.3.5 In preparing SIGMET information the MWOs shall follow strictly the format determined by Annex 3. SIGMET shall be issued only for those weather phenomena listed in Annex 3 and only when specified criteria for intensity and spatial extent are met.

Note: MWOs shall refrain from issuing SIGMET for weather phenomena of lower intensity or such of transient nature or smaller scale, which do not affect significantly the flight safety, and their transmission to users may lead to unnecessary precaution measures.

2.3.6 The MWOs shall be adequately equipped in order to be capable to identify, analyze and forecast (to the extent required) those phenomena for which SIGMET is required. The meteorological authority concerned shall determine to what extent the MWO makes use of the WAFS products, as well as other sources of information, such as special air-reports, information from meteorological satellites or weather radars.

2.3.7 On receipt of a special air-report from the associated ACC or FIC, the MWO shall:

- a) issue corresponding SIGMET information; or
- b) decide that the issuance of SIGMET information is not warranted and to so inform the ACC/FIC (e.g., the phenomenon concerned is of transient nature).

2.3.8 Appropriate telecommunication means shall be available at the MWO in order to ensure timely dissemination of SIGMETs according to a dissemination scheme, which should include transmission to:

- Local ATS users;
- Aeronautical MET offices within its AOR;
- Other MWOs concerned; it should be ensured that SIGMETs are sent to all MWOs whose AORs are, at least partly, within the 2000 km (1100 NM) range from the observed phenomenon;
- Centres designated for transmission of VOLMET or D-VOLMET and SIGMET is required for those transmissions;
- Responsible ROBEX centre and Regional OPMET Data Bank; it should be arranged that through the ROBEX scheme SIGMETs are sent to the designated OPMET data banks in the other ICAO regions, to the WAFCs and to the SADIS and ISCS providers;
- Responsible TCAC or VAAC (if applicable).

2.3.9 In issuing SIGMETs for tropical cyclones or volcanic ash, the MWOs shall follow the advisory information received from the responsible TCAC or VAAC.

2.4 Responsibilities of ATS units

2.4.1 Close coordination shall be established between the MWO and the corresponding ATS unit (ACC or FIC). Arrangements shall be made in order to ensure:

- receipt without delay and display at the relevant ATS units of SIGMETs issued by the associated MWO;
- receipt and display at the ATS unit of SIGMETs issued by MWOs responsible for the adjacent FIRs/ACCs if these SIGMETs are required according to p. 2.4.3 below;
- transmission without delay of special air-reports received through voice communication to the associated MWO.

2.4.2 SIGMET information shall be transmitted to aircraft with the least possible delay on the initiative of the responsible ATS unit, by the preferred method of direct transmission followed by acknowledgement or by a general call when the number of aircraft would render the preferred method impracticable.

2.4.3 SIGMET information passed to aircraft shall cover a portion of the route up to two hours flying time ahead of the aircraft.

2.5 Responsibilities of pilots

2.5.1 Timely issuance of SIGMET information is largely dependant on the prompt receipt by MWOs of special air-reports. That is why, it is essential that pilots prepare and transmit such reports to the ATS units whenever any of the specified en-route conditions are encountered or observed.

2.5.2 It should be emphasized that, even when automatic dependent surveillance (ADS) is being used for routine air-reports, pilots shall continue to make special air-reports.

2.6 Coordination between MWOs and the TCACs and VAACs

2.6.1 Amongst the phenomena for which SIGMET information is required, the volcanic ash clouds and tropical cyclones are of particular importance for the planning of long-haul flights. That is why, SIGMETs for volcanic ash and tropical cyclones contain an outlook part, which goes 12 hours beyond the validity period of the “normal” SIGMET. For the same reason, the requirement for dissemination of SIGMETs for tropical cyclone and volcanic ash goes beyond the two hours flying time to cover the whole route to be flown.

2.6.2 Since the identification, analysis and forecasting of volcanic ash and tropical cyclones requires considerable technical and human resource, normally not available at each MWO, a number of advisory centres for volcanic ash (VAAC) and tropical cyclones (TCAC) have been designated in order to assist MWOs in the preparation of the outlook part of the SIGMETs for those phenomena. Close coordination shall be established between the MWO and its responsible TCAC and/or VAAC.

2.6.3 Information regarding the VAACs and TCACs serving ASIA/PAC region with their corresponding areas of responsibility and lists of MWOs to which advisories are to be sent is provided in FASID Tables MET 3A and MET 3B of ASIA/PAC FASID. These tables are reproduced as appendices to this Guide.

2.6.4 TC and VA advisories are required for global exchange through the satellite distribution systems, SADIS and ISCS. Thus they can be used directly by the operators during the preflight planning. Notwithstanding, it should be emphasized that SIGMET information is still of higher operational status and required especially for in-flight re-planning. SIGMETs should be transmitted to aircraft in flight through voice communication or VOLMET or D-VOLMET thus providing vital information for making in-flight decisions regarding large-scale route deviations due to existence of volcanic ash cloud or tropical cyclone.

PART 3. RULES FOR PREPARATION OF SIGMET INFORMATION

3.1 General

3.1.1 SIGMET information is prepared in abbreviated plain language using approved ICAO abbreviations, a limited number of non-abbreviated words, geographical names and numerical values of self-explanatory nature. All abbreviations and words to be used in SIGMET are given in Appendix 1.

3.1.2 In contrast to other MET messages, like aerodrome reports and forecasts, for which WMO codes (METAR and TAF) have been developed, SIGMET looks less formalized and allowing more freedom to the forecaster. However, the increasing use of automated systems for handling the MET information by the MET offices and the users makes it essential that all types of OPMET information, including SIGMET, are prepared and transmitted in the prescribed standardized formats. That is why, Amendment 72 to Annex 3, which became applicable in November 2001, provided a well defined structure and format of the SIGMET message that shall be followed strictly by the MWOs. Appendix 5 to Annex 3 provides detailed information regarding the content and order of elements in the SIGMET message.

3.1.3 It should be remembered that SIGMET is intended for transmission to aircraft in flight either by ATC or by VOLMET or D-VOLMET. That is why, SIGMET messages should be kept short and clear, without additional descriptive material other than that prescribed by Annex 3.

3.1.4 After issuing a SIGMET the MWO should follow the evolution of the phenomenon for which the SIGMET is issued and issue updates whenever the evolution of the phenomenon ... so. The TC and VA SIGMETs shall be updated at least every 6 hours. SIGMETs should be promptly cancelled when the phenomenon is no longer occurring or no longer expected to occur in the area.

3.2 Types of SIGMET

3.2.1 Although Annex 3 provides one general SIGMET format, which encompasses all weather phenomena, it is convenient when describing the structure and format of the messages to distinguish between three types of SIGMET, as follows:

- SIGMET for SIGWX phenomena other than VA and TC (this includes TS, CB, TURB, ICE, MTW, DS and SS);
- SIGMET for volcanic ash, which will be hereafter denoted as VA SIGMET;
- SIGMET for tropical cyclones, which will hereafter be denoted as TC SIGMET.

3.2.2 The three types of SIGMET can be identified by the data type designator included in the WMO abbreviated heading of the SIGMET message, as explained below.

3.3 Structure of the SIGMET message

3.3.1 A SIGMET message consists of:

- *WMO heading* – all SIGMETs are preceded by an appropriate WMO heading;
- *First line*, containing location indicators of the relevant ATS unit and MWO, sequential number and period of validity;
- *Meteorological part*, containing meteorological information concerning the phenomenon for which the SIGMET is issued;

- *Outlook part* – forecast part to be included only in SIGMETs for volcanic ash and tropical cyclones.

3.3.2 The first two parts of the SIGMET message are common for all types of SIGMETs. The other two parts are different in content and format; that is why, in the following paragraphs the meteorological part of the three types of SIGMET are described separately.

3.4 Format of SIGMET

Note: In the following text, square brackets - [] - are used to indicate an optional or conditional element, and angled brackets - < > - for symbolic representation of a variable element, which in the real SIGMETs accepts concrete numerical values.

3.4.1 WMO Header

T₁T₂A₁A₂ii CCCC YYGGgg [CCx]

3.4.1.1 The group **T₁T₂A₁A₂ii** is the bulletin identification for the SIGMET message. It is constructed in the following way:

T₁T₂	Data type designator	WS – for SIGMET WC – for SIGMET for tropical cyclone WV – for SIGMET for volcanic ash
A₁A₂	Country or territory designators	Assigned according to Table C1, Part II of Manual on the Global Telecommunication System, Vol I – Global Aspects (WMO - No. 386)
ii	Bulletin number	Assigned on national level according to p 2.3.2.2, Part II of Manual on the Global Telecommunication System, Vol I – Global Aspects (WMO - No. 386)

3.4.1.2 **CCCC** is the ICAO location indicator of the communication centre disseminating the message (could be the same as the MWO).

3.4.1.3 **YYGGgg** is the date/time group, where YY is the date and GGgg is the time in hours and minutes UTC, of the transmission of the SIGMET (normally this is the time assigned by the AFTN center which disseminates the message).

3.4.1.4 The group **CCx** shall be used only when sending a correction of a SIGMET, which has already been transmitted; the third letter “x” takes the value A for the first correction, B for the second correction, etc. In this, the MWOs shall try to minimize the corrections of the SIGMETs, taking into account their importance to the flight planning including in-flight re-planning.

Examples:

WSTH31 VTBD 121200
WVJP01 RJTD 010230
WCNG21 AYPY 100600 CCA

3.4.2 First line of SIGMET

CCCC SIGMET [nn]n VALID YYGGgg/YYGGgg CCCC-

3.4.2.1 The meaning of the groups in the first line of the SIGMET is as follows:

CCCC	ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET refers
SIGMET (SIGMET SST)	Message identifier; SIGMET SST is used for SIGMETs containing information for supersonic aircraft during transonic or supersonic flight
[nn]n	Daily sequence number (see p.3.4.2.2)
VALID	Period of validity indicator
YYGGgg/YYGGgg	Validity period of the SIGMET given by date/time group of the beginning and date/time group of the end of the period (see p.3.4.2.3)
CCCC	ICAO location indicator of the MWO originating the message
-	hyphen to separate the preamble from the text

3.4.2.2 The numbering of SIGMETs shall start every day at 0001 UTC. The sequence number shall consists of up to three symbols and may be a combination of letters and numbers, like:

- 1, 2, ...
- 01, 02, ...
- A01, A02, ...

Examples:

**RPM SIGMET 3 VALID 121100/121700 RPLL-
RJTG SIGMET A04 VALID 202230/210430 RJAA-**

Note 1: No other combinations shall be used, like “CHARLIE 05” or “NR7”.

Note 2: Some States in the Region, like Australia, use more than 3 symbols, e.g., two letters and two figures. In the case of Australia this difference is due to the fact that more than one MWO serves one FIR and 4 characters are used to identify the part of the FIR for which the SIGMET is issued.

Note 3: Correct numbering of SIGMET is very important since the number is used for reference in communication between ATC and pilots and in VOLMET and D-VOLMET.

3.4.2.3 The following considerations should be taken into account when determining the validity period:

- The period of validity of a SIGMET should be not more than 6 hours and preferably not more than 4 hours;
- In case of a SIGMET for an observed phenomenon the filing time (date/time group in the WMO header) shall be same or close to the date/time group indicating the start of the SIGMET validity period;
- When the SIGMET is for an expected phenomenon, the beginning of validity period is the time of expected commencement (occurrence) of the phenomenon;
- In case of a SIGMET for an expected phenomenon, the lead time (the time of issuance of the SIGMET) should be not more than 6, and preferably not more than 4 hours before the start of validity period (i.e., expected time of occurrence of the phenomenon); for TC and VA SIGMETs the lead time should be up to 12 hours.

Examples:

1. SIGMET for an observed phenomenon:
WSTH31 VTBD 241120
VTBD SIGMET 3 VALID 241120/241500 VTBD-
2. SIGMET for a forecast phenomenon (expected time of occurrence 1530)
WSSG31 WSSS 311130
WSSS SIGMET 1 VALID 1530/1930 WSSS-

3.4.3 *Format of the meteorological part of SIGMET messages for weather phenomena other than TC and VA*

3.4.3.1 The meteorological part of a SIGMET for SIGWX consists of seven elements as shown in the table below.

Start of the second line of the message

1	2	3	4	5
Name of the FIR/UIR or CTA	Description of the phenomenon	Observed or forecast	Location	Level
<name> FIR CTA	<Phenomenon >	OBS [AT <GGggZ>] FCST OBS [AT <GGggZ>] AND FCST	Geographical location of the phenomenon given by coordinates, or geographical objects, or location indicators	FL<nnn> FL<nnn/nnn> [TOP, ABV, BLW]

6	7
Movement or expected movement	Changes in intensity
MOV <direction, speed>, or STNR	INTSF or WKN or NC

3.4.3.1.1 Name of the FIR/UIR or CTA

<name> **FIR/[UIR]**
or
<name> **CTA**

The name is given followed by the appropriate abbreviation: FIR, FIR/UIR or CTA.

Examples:

BANGKOK FIR

3.4.3.1.2 Phenomenon

The phenomenon description consists of a qualifier and a phenomenon abbreviation. SIGMET shall be issued only for the following phenomena:

A) for subsonic cruising levels:

- thunderstorms – if they are OBSC, EMBD, FRQ or SQL with or without hail;
- turbulence – only SEV
- icing – only SEV with or without FZRA
- mountain waves – only SEV
- dust storm – only HVY
- sand storm – only HVY

B) for transonic and supersonic levels:

- cumulonimbus – if they are ISOL, OCNL or FRQ
- hail
- turbulence – MOD or SEV

The appropriate abbreviations and combinations, and their meaning are given in Appendix 2.

3.4.3.1.3 Indication if the phenomenon is observed or forecast

**OBS [AT <GGggZ>]
or FCST
or OBS [AT <GGggZ>] AND FCST**

The indication whether the information is observed or forecast is given by the abbreviations OBS and FCST. OBS is optionally followed by a time group in the form AT GGggZ, where GGgg is the time of the observation in hours and minutes UTC. If the exact time of the observation is not known the time is not included. When FCST is used, it is assumed that the time of occurrence or commencement of the phenomenon coincides with the beginning of the period of validity included in the first line of the SIGMET. Finally, the combination OBS AND FCST indicates that the phenomenon is observed and expected to continue.

Examples:

**OBS AT 0140Z
OBS AT 1030Z AND FCST
FCST**

3.4.3.1.4 Location of the phenomenon

The location of the phenomenon is given with reference to geographical coordinates or with reference to geographical features well known internationally. The MWOs shall try to be as specific as possible in reporting the location of the phenomenon and, at the same time, to avoid overwhelming geographical information, which may be difficult to process or perceived.

The following are the most common ways to describe the location of the phenomenon:

- Indication of a part of the FIR with reference to a parallel:
N OF or S OF <Nnn[nn]> or <Snn[nn]>
- Indication of a part of the FIR with reference to a meridian:
E OF or W OF <Ennn[nn]> or <Wnnn[nn]>
- Indication of a part of the FIR with reference to a parallel and meridian:
any combination of the above two cases;
- with reference to a location with ICAO location abbreviation CCCC (normally, this should be the case of SIGMET based on special air-report in which the reported phenomenon is given with reference to an airport or another object with ICAO location indicator CCCC);
- with reference to geographical features well known internationally.

More details on reporting the location of the phenomenon are given in Appendix 3.

3.4.3.1.5 Vertical extent or level

FL<nnn>
or FL<nnn/nnn>
or TOP FL<nnn>
or [TOP] ABV FL<nnn>
or [TOP] BLW FL<nnn>

The location or extent of the phenomenon in the vertical is given by one or more of the above abbreviations, as follows:

- reporting of single level – **FL<nnn>**
- reporting a layer – **FL<nnn/nnn>**, where the lower level is reported first; this is used particularly in reporting turbulence and icing;
- reporting a level or layer with reference to one FL using ABV or BLW
- reporting the level of the tops of the TS clouds using the abbreviation TOP.

Examples:

EMBD TS ... TOP ABV FL340
SEV TURB ... FL180/210
SEV ICE ... BLW FL150
SEV MTW ... FL090

3.4.3.1.6 Movement

MOV <direction> <speed>
or
STNR

Direction of movement is given with reference to one of the eight points of compass. Speed is given in KMH or KT. The abbreviation STNR is used if no significant movement is expected.

Examples:

MOV NW 30KMH
MOV E 25KT

3.4.3.1.7 Expected changes in intensity

The expected evolution of the phenomenon's intensity is indicated by one of the following abbreviations:

INTSF – intensifying

WKN – weakening

NC – no change

3.4.4 Structure of the meteorological part of VA SIGMET

3.4.4.1 The general structure of the meteorological part of the SIGMET message is given in the table below:

Start of the second line of the message

1	2			3
FIR/UIR or CTA	Phenomenon	Volcano		Volcanic ash cloud observed
		Name	Location	
	VA	[ERUPTION] [MT <name>]	[LOC <location>]	VA CLD OBS AT <GGggZ>

4			5
Extent of the cloud			Expected movement
Vertical	Horizontal	Position	
FL <nnn/nnn>	APRX <nnn> BY <nnn> KM	<lat,lon> - <lat,lon> - ...	MOV <direction> <speed>

6	
Volcanic ash cloud forecast at the end of the period of validity	
FCST time	Position
FCST <GGggZ>	VA CLD APRX [FL<nnn/nnn>] <lat,lon> - <lat,lon> - ...

Start of the outlook line of the message

7	8	
Outlook	Volcanic ash cloud trajectory	
	Date/time	Position
OTLK	<YYGGggZ>	VA CLD APRX <lat,lon> - <lat,lon> - ...

9	
Volcanic ash cloud trajectory	
Date/time	Position
<YYGGggZ>	VA CLD APRX <lat,lon> - <lat,lon> - ...

3.4.4.2 Name and location of the volcano and/or indicator for VA cloud

VA [ERUPTION] [MT <name>] [LOC <lat,lon>] VA CLD
or
VA CLD

3.4.4.2.1 The description of the volcano injecting volcanic ash consists of the following elements:

- starts with the abbreviation **VA** – volcanic ash;
- the word **ERUPTION** is used when the SIGMET is issued for a known volcanic eruption;
- geographical/location information:
 - i. if the name of the volcano is known, it is given by the abbreviation **MT** – mountain, followed by the name;
e.g., **MT RABAUL**
 - ii. location of the volcano is given by the abbreviation **LOC** – location, followed by the latitude and longitude in degrees and minutes;
e.g., **LOC N3520 E09040**
- this section of the message ends with the abbreviation **VA CLD** – volcanic ash cloud.

3.4.4.2.2 If the FIR is affected by a VA cloud with no information about the volcanic eruption which generated the cloud, only the abbreviation **VA CLD** shall be included in the SIGMET.

3.4.4.3 Time of observation or expected commencement of the VA CLD

VA CLD OBS AT <GGgg>Z
or
VA CLD FCST

The time of observation is taken from the source of the observation – satellite image, special air- report, report from a ground volcanological station, etc. If the VA cloud is not yet observed over the FIR but the volcanic ash advisory received from the responsible VAAC indicates that the cloud is affecting the FIR after certain time, SIGMET shall be issued, according to p.2.4 above, and the abbreviation **VA CLD FCST** shall be used.

Examples:

VA CLD OBS AT 0100Z
VA CLD FCST

3.4.4.4 Level and extent of the volcanic ash cloud**FL<nnn/nnn> [APRX <nnn>KM BY <nnn>KM] <P1(lat,lon) - P2(lat,lon) - ... >****or****FL<nnn/nnn> [APRX <nnn>NM BY <nnn>NM] <P1(lat,lon) - P2(lat,lon) - ... >**

FL<nnn/nnn>	The layer of the atmosphere where the VA cloud is situated, given by two flight levels from the lower to the upper boundary of the cloud
[APRX <nnn>KM BY <nnn>KM] or [APRX <nnn>NM BY <nnn>NM]	Approximate horizontal extent of the VA cloud in KM or NM
<P1(lat,lon) - P2(lat,lon) - ... >	Approximate description of the VA cloud by a number of points given with their geographical coordinates ¹ ; the points shall be separated by hyphen

If the VA cloud spreads over more than one FIR, separate SIGMETs shall be issued by all MWOs whose FIRs are affected. In such a case, the description of the volcanic ash cloud by each MWO should encompass the part of the cloud, which lies over the MWO's area of responsibility. The MWOs shall try and keep the description of the volcanic ash clouds consistent by checking the SIGMET messages received from the neighboring MWOs.

Examples:

FL100/180 APRX 10KM BY 50KM N0100 E09530 – N1215 E11045
FL 150/210 S0530 E09300 – N0100 E09530 – N1215 E11045

3.4.4.5 Movement or expected movement of the VA cloud**MOV <direction> <speed>****or****STNR**

The direction of movement is given by the abbreviation **MOV** – moving, followed by one of the eight points of compass: N, NE, E, SE, S, SW, W, NW. The speed of movement is given in KMH or KT.

Examples:

MOV E 35 KMH
MOV SW 20 KT
STNR

3.4.4.6 Forecast position of the VA cloud at the end of the validity period of the SIGMET message**FCST <GGggZ> VA CLD <P1(lat,lon) - P2(lat,lon) - ... >**

¹ The format of geographical coordinates reporting in SIGMET is given in Appendix 3

The **GGggZ** group shall indicate the end of validity period given in the first line of the SIGMET message. The description of the expected position of the volcanic ash cloud is given by a number of points forming a simplified geometrical approximation of the cloud.

3.4.4.7 Outlook providing information beyond the period of validity of the trajectory of the volcanic ash cloud

OTLK <YYGGgg>₊₆ VA CLD APRX [FLnnn/nnn] <P1(lat,lon) - P2(lat,lon) - ... >
 [[FLnnn/nnn] <P1(lat,lon) - P2(lat,lon) - ... >] ...
 <YYGGgg>₊₁₂ VA CLD APRX [FLnnn/nnn] <P1(lat,lon) - P2(lat,lon) - ... >
 [[FLnnn/nnn] <P1(lat,lon) - P2(lat,lon) - ... >] ...

3.4.4.7.1 The abbreviation **OTLK** indicates the start of the outlook part of the SIGMET. It consists of two sub-parts, each providing description of the approximate position of the volcanic ash cloud at 6 and 12 hours after the end of the period of validity of the SIGMET. Each sub-part begins with a date/time group <YYGGgg>₊₆ and <YYGGgg>₊₁₂ indicating the date and time of the +6 and +12 forecast respectively. The expected approximate position of the VA cloud is given by the geographical coordinates of a number of points P1, P2, etc.

3.4.4.7.2 In describing the VA cloud up to four different layers can be used, indicated by flight levels in the form FL<nnn/nnn>. The use of more than one level is necessary when the wind direction distribution with height determines that the cloud is spread horizontally into different directions at different height layers.

3.4.5 Structure of the meteorological part of TC SIGMET

3.4.5.1 The general structure of the meteorological part of the TC SIGMET is given in the table below:

Start of the second line of the message

1	2	3		4
FIR/UIR or CTA	TC name	Observed		Extent
		Location	Time	
	TC <name>	OBS <...>	AT <GGggZ>	CB TOP FL<nnn> WI <nnn>KM OF CENTRE

5	6	7
Expected movement	Intensity change	Forecast of the centre position at the end of the validity period
MOV <dir> <speed>	INTSF or WKN or NC	FCST <GGggZ> TC CENTRE < ... >

Start of the outlook line of the message

8	9		10	
Outlook	Position of the centre		Position of the centre	
	Date/time	Location	Date/time	Location
OTLK	<YYGGggZ >	TC CENTRE < ... >	<YYGGggZ >	TC CENTRE < ... >

3.4.5.2 Name of the tropical cyclone

TC <name>

The description of the tropical cyclone consists of the abbreviation TC followed by the international name of the tropical cyclone given by the corresponding WMO RSMC.

Examples:

**TC GLORIA
TC 04B**

3.4.5.3 Time of observation

OBS AT <GGggZ>

The time in UTC is given in hours and minutes, followed by the indicator Z. Normally, time is taken from own observations or from a TC advisory received from the responsible TCAC.

Examples:

OBS AT 2330

3.4.5.4 Location of the TC centre

TC CENTRE <location>

The location of the TC centre is given by its lat,lon coordinates in degrees and minutes.

Examples:

TC CENTRE N1535 E14230

3.4.5.5 Vertical and horizontal extent of the CB cloud formation around TC centre

CB TOP [ABV or BLW] <FLnnn> WI <nnnKM or nnnNM> OF CENTRE

Examples:

**CB TOP ABV FL450 WI 200NM OF CENTRE
CB TOP FL500 WI 250KM OF CENTRE**

3.4.5.6 Movement or expected movement

MOV <direction> <speed>
or
STNR

Direction of movement is given with reference to one of the eight points of compass. Speed is given in KMH or KT. The abbreviation STNR is used if no significant movement is expected.

Examples:

MOV NW 30KMH
MOV E 25KT

3.4.5.7 Forecast location of the TC centre at the end of the validity period of the SIGMET message

FCST <GGggZ> TC CENTRE <location>

Normally, the time given by GGggZ should be the same as the end of validity period indicated in the first line of the SIGMET message. Since the period of validity is up to 6 hours (normally, 6 hours), this is a 6-hour forecast of the position of the TC centre.

Location of the TC centre is given by lat,lon coordinates as in p.

Examples:

FCST 1200Z TC CENTRE N1430 E12800

3.4.5.8 Outlook providing information of positions of the TC centre beyond the period of validity of the SIGMET

OTLK <YYGGgg>+6 TC CENTRE <location> <YYGGgg>+12 TC CENTRE <location>

The outlook provides information of the expected positions of the TC centre beyond the validity period of the SIGMET indicated in the first line of the SIGMET message. Normally, the outlook shall include “end of validity +6 hours” and “end of validity +12 hours” information based on the TC advisory issued by the responsible TCAC.

Note: Together with the OUTLOOK the TC SIGMET includes up to 3 forecasts of the position of the TC centre: +6 hour position is given in the FCST part of the SIGMET itself, and the OUTLOOK provides +12 and +18 hour position forecasts, based on the TC advisory received from the responsible TCAC.

Examples:

OTLK 081900 TC CENTRE S1230 E15500 090100 TC CENTRE S1200 E15630

3.4.6 Cancellation of SIGMET

3.4.6.1 If during the validity period of a SIGMET the phenomenon for which the SIGMET had been issued is no longer occurring or no longer expected, this SIGMET should be cancelled by the issuing MWO. The cancellation is done by issuing same type of SIGMET with the following structure:

- WMO heading with the same data type designator
- First line
- Second line, which contains the name of the FIR or CTA, the combination CNL SIGMET, followed by the sequential number of the original SIGMET and its validity period.

Examples:

1. Cancellation of a SIGWX SIGMET with the following first line

**WSXY31 YUSO 101200
YUDD SIGMET 5 VALID 101200/101600 YUSO-
SHANLON FIR ...**

Cancellation SIGMET:

**WSXY31 YUSO 101430
YUDD SIGMET 6 VALID 101430/101600 YUSO-
SHANLON FIR CNL SIGMET 5 101200/101600=**

2. Cancellation of a VA SIGMET

**WVXY31 YUSO 131518
YUDD SIGMET 03 VALID 13151500/132115 YUSO-
SHANLON FIR ...**

Cancellation SIGMET:

**WVXY31 YUSO 132000
YUDD SIGMET 04 VALID 132000/132115 YUSO-
SHANLON FIR CNL SIGMET 03 13151500/132115 VA MOV TO YUDO FIR=**

Note: The above example is subject to final approval of the Amendment 73 of Annex 3.

4. Communications

4.1 SIGMETs are part of the operational meteorological (OPMET) information. According to Annex 3 the telecommunication facilities used for the exchange of the operational meteorological information should be the aeronautical fixed service (AFS).

4.2 The AFS consists of two segments – a ground-to-ground links segment, AFTN, and a satellite distribution segment which is composed by the SADIS and ISCS services provided by UK and USA respectively.

4.3 AFTN links shall be used by the MWOs to send their SIGMETs, in the following way:

- SIGMETs shall be sent to the adjacent MWOs using direct AFTN addressing;
- When required for VOLMET or D-VOLMET SIGMETs shall be sent to the relevant communication centre;
- SIGMETs shall be sent to the responsible ROBEX centre and forwarded without delay to the responsible regional OPMET Data Bank (RODB);
- It shall be arranged that through the ROBEX scheme SIGMETs are relayed to the SADIS and ISCS providers for satellite dissemination.

4.4 Through SADIS and ISCS SIGMETs are disseminated to all users authorised and equipped to receive OPMET information via the satellite distribution. In this way, SIGMETs are available on global basis, meeting the aeronautical requirement.

4.5 The requirements for SIGMET exchange, as specified by States, are given in FASID Table MET 2A.

APPENDIX 1

TABLE MET 1B – METEOROLOGICAL WATCH OFFICES

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplacement OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplacement OACI Indicador de lugarde la OACI	
1	2	3	4	5
AUSTRALIA				MWOs have areas of responsibility (AOR) defined by specific forecast area boundaries. These boundaries are not aligned with FIR boundaries
ADELAIDE/Adelaide	YPRM	Melbourne FIR limited by the coordinates: 27°S/128°E;27°S/135°E;26°S/138°E; 2806°S/14012°E;29°S/142°E; 3414°S/14205°E;3345°S/14045°E; 40°S/14045°E;45°S/14045°E; 45°S/129°E;33°S/129°E;30°S/129°E; 2715°S/12830°E.	YMMM	
BRISBANE/Brisbane	YBRF	Brisbane FIR outside the AOR of YBTL MWO and limited by the coordinates: 0937°S/14102°E;0916°S/14203°E; 0913°S/14206°E;0911°S/14214°E; 0914°S/14217°E;0922°S/14230°E; 0922°S/14230°E;0923°S/14236°E; 0919°S/14248°E;0908°S/14352°E; 0924°S/14414°E;0957°S/14405°E; 1130°S/14402°E;1144°S/14404°E; 12°S/144°E;12°S/155°E;14°S/155°E; 14°S/16115°E;1740°S/163°E; 2830°S/163°E;2830°S/155°E; 2850°S/15316°E;29°S/150°E; 29°S/14330°E;26°S/138°E; 14°S/138°E;0937°S/14102°E.	YBBB	
DARWIN/Darwin	YDRM	Melbourne FIR limited by the coordinates: 26°S/138°E;29°S/143°E;29°S/142°E; 2806°S/14012°E;26°S/138°E. Brisbane FIR limited by the coordinates: 1055°S/12447°E;0920°S/12650°E; 07°S/135°E;0950°S/13940°E; 0950°S/141°E;14°S/138°E; 18°S/138°E;2215°S/138°E; 26°S/138°E;2218°S/13638°E; 2128°S/13609°E;2111°S/13134°E; 2151°S/13058°E;2313°S/12828°E; 2322°S/12629°E;2327°S/12415°E; 2250°S/12330°E;2030°S/12330°E; 20°S/129°E;16°S/12915°E; 1528°S/12806°E;1450°S/12825°E; 14°S/12730°E;1345°S/12609°E; 14°S/124°E;1055°S/12447°E.	YMMM YBBB	

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplacement OACI Indicador de lugar de la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplacement OACI Indicador de lugar de la OACI	
1	2	3	4	5
HOBART/Hobart	YMHF	Melbourne FIR limited by the coordinates: 2250°S/12330°E;2327°S/12415°E; 2322°S/12629°E;2313°S/12828°E; 2151°S/13058°E;2111°S/13134°E; 2128°S/13609°E;2218°S/13638°E; 26°S/138°E;27°S/135°E; 2715°S/12830°E;25°S/12815°E; 25°S/12330°E;2250°S/12330°E.	YMMM	
		Melbourne FIR limited by the coordinates: 40°S/14045°E;40°S/143°E; 3953°S/14353°E;4006°S/14759°E; 40°S/150°E;45°S/150°E; 45°S/14045°E;40°S/14045°E.	YMMM	
MELBOURNE/Melbourne	YMRF	Brisbane FIR limited by the coordinates: 3730°S/15033°E;3730°S/163°E; 45°S/163°E;45°S/150°E; 4434°S/150°E;4351°S/15040°E; 43°S/151°E;3811°S/15019°E; 3730°S/15033°E.	YBBB	
PERTH/Perth	YPRF	Melbourne FIR limited by the coordinates: 3345°S/14045°E;3414°S/14205°E; 3510°S/14728°E;3730°S/150°E; 3730°S/15033°E;3811°S/15019°E; 43°S/151°E;4351°S/15040°E; 4434°S/150°E;40°S/150°E; 4006°S/14759°E;3953°S/14353°E; 40°S/143E;40°S/14045E; 3811°S/14045°E;3345°S/14045°E.	YMMM	
		Brisbane FIR limited by the coordinates: 12°S/110°E;12°S/12320°E; 1055°S/12447°E;14°S/124°E; 1345°S/12609°E;14°S/12730°E; 1450°S/12825°E;1528°S/12806°E; 16°S/12915°E;20°S/129°E; 2030°S/12330°E;2250°S/12330°E; 2153°S/12226°E; Thence along the major arc of a circle of 15 NM radius centred on 2143°S 12213°E; 2133°S/12201°E;2026°S/12045°E; Thence along the minor arc of a circle of 120NM radius centred on 2023°S 11837°E; 1823°S/11825°E;1753°S/11822°E; Thence along the minor arc of a circle of 150NM radius centred on 2023°S 11837°E; 1934°S/11606°E;1931°S/11331°E; 12°S/110°E.	YBBB	

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplacement OACI Indicador de lugar de la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplacement OACI Indicador de lugar de la OACI	
1	2	3	4	5
SYDNEY/Sydney	YSRF	Melbourne FIR limited by the coordinates: 06°S/75°E;02°S/78°E;02°S/92°E;12°S/107°E;12°S/110°E;1931°S/11331°E;1934°S/11606°E; thence along the minor arc of a circle of 120NM radius centred on 2023°S 11837°E; 1753°S/11822°E;1823°S/11825°E; thence along the minor arc of a circle of 120NM radius centred on 2023°S 11837°E; 2026°S/12045°E;2133°S/12201°E; thence along major arc of a circle of 15.0NM radius centred on 2143°S 12213°E; 2153°S/12225°E;2250°S/12330°E; 25°S/12330°E;25°S/12815°E; 2715°S/12830°E;30°S/129°E; 30°S/129°E;33°S/129°E;45°S/129°E; 45°S/75°E;06°S/75°E.	YMMM	
		Brisbane FIR limited by the coordinates: 29°S/14632°E;29°S/150°E; 2850°S/15328°E;2830°S/155°E; 2830°S/163°E;3730°S/163°E; 3730°S/15033°E 3657°S/15045°E; then east of the minor arc of a circle of 120NM radius centred on 3457°S/15032°E; 3519°S/15256°E;3421°S/15140°E; 3359°S/15201°E;3351°S/15154°E; 3328°S/15148°E;3315°S/15126°E; 3312°S/15114°E;3320°S/15042°E; 3327°S/15033°E;3206°S	YBBB	
		Melbourne FIR limited by the coordinates: 29°S/142°E;29°S/14330°E; 29°S/14632°E;3206°S/14850°E; 3327°S/15033°E;3320°S/15042°E; 3312°S/15114°E;3315°S/15126°E; 3328°S/15148°E;3351°S/15154°E; 3359°S/15201°E;3421°S/15140°E; 3519°S/15256°E; then east of the minor arc of a circle of 120NM radius centred on 3457°S 15032°E; 3657°S/15045°E;3730°S/15033°E; 3730°S/150;3510°S/14728°E; 3414°S/14205°E;29°S/142°E.	YMMM	
TOWNSVILLE	YBTL	Brisbane FIR limited by the coordinates: 14°S/138°E;10°S/141°E;09°S/142°E; 09°S/144°E;13°S/145°E;15°S/147°E; 1817°S/148°E;2309°S/15252°E; 2334°S/14811°E;1818°S/14332°E; 18°S/138°E;14°S/138°E.	YBBB	
BANGLADESH DHAKA/Zia Intl	VGZR	Dhaka FIR and SRR	VGFR	

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicateur d'emplacement OACI Indicador de lugar de la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicateur d'emplacement OACI Indicador de lugar de la OACI	
1	2	3	4	5
CAMBODIA				
PHNOM-PENH/Pochentong	VDPP	Phnom-Penh FIR and SRR	VDPP	
CHINA				
BEIJING/Capital	ZBAA	Beijing FIR and SRR	ZBPE	
GUANGZHOU/Baiyun	ZGGG	Guangzhou FIR and SRR	ZGZU	
KUNMING/Wujiaba	ZPPP	Kunming FIR and SRR	ZPKM	
LANZHOU/Chongchuan	ZLLL	Lanzhou FIR and SRR	ZLHW	
SHANGHAI/Hongqiao	ZSSS	Shanghai FIR and SRR	ZSHA	
SHENYANG/Taoxian	ZYTX	Shenyang FIR and SRR	ZYSH	
TAIBEI/Taibei Intl	RCTP	Taibei FIR and SRR	RCTP	
URUMQI/Diwopu	ZWWW	Urumqi FIR and SRR	ZWUQ	
WUHAN/Tianhe	ZHHH	Wuhan FIR and SRR	ZHWH	
HONG KONG/Hong Kong Intl	VHHH	Hong Kong FIR and SRR	VHHK	
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA				
PYONGYANG/Sunan	ZKPY	Pyongyang FIR and SRR	ZKKK	
FIJI				
NADI/Nadi Intl	NFFN	Nadi FIR and SRR	NFFF	
FRENCH POLYNESIA				
TAHITI/Faaa	NTAA	Tahiti FIR and SRR	NTTT	
GUAM				
GUAM I./Agana NAS	PGUM	Oakland Oceanic FIR West of 160°E; Guam SRR	KZOA	
INDIA				
CALCUTTA/Calcutta	VECC	Calcutta FIR and SRR	VECF	
CHENNAI/Chennai	VOMM	Chennai FIR and SRR	VOMF	
DELHI/Indira Ghandi Intl	VIDP	Delhi FIR and SRR	VIDF	
MUMBAI/Jawaharlal Nehru Intl	VABB	Mumbai FIR and SRR	VABF	
INDONESIA				
BIAK/Frans Kaisieppo	WABB	Biak FIR and SRR	WABZ	
DENPASAR/Ngurah Rai (Bali Intl)	WRRR	Bali FIR and SRR	WRRZ	
JAKARTA/Soekarno-Hatta Intl	WIII	Jakarta FIR/UIR and SRR	WIIZ	
UJUNG PANDANG/Hasanuddin	WAAA	Ujung Pandang FIR/UIR and SRR	WAAZ	

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplacement OACI Indicador de lugar de la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplacement OACI Indicador de lugar de la OACI	
1	2	3	4	5
JAPAN NAHA/Naha TOKYO/New Tokyo Intl	ROAH RJAA	Naha FIR Tokyo FIR/SRR	RORG RJTG	
LAO PEOPLE'S DEMOCRATIC REPUBLIC VIENTIANE/Wattay	VLVT	Vientiane FIR and SRR	VLVT	
MALAYSIA KOTA KINABALU/Kota Kinabalu Intl KUALA LUMPUR/Kuala Lumpur Intl	WBKK WMKK	Kota Kinabalu FIR and SRR Kuala Lumpur FIR and SRR	WBFC WMFC	
MALDIVES MALE/Hulule	VRMM	Male FIR and SRR	VRMM	
MONGOLIA ULAN BATOR/Ulan Bator	ZMUB	Ulan Bator FIR and SRR	ZMUB	
MYANMAR YANGON/Yangon Intl	VYYY	Yangon FIR and SRR	VYYY	
NAURU NAURU I./Nauru	ANAU	Nauru FIR and SRR	ANAU	
NEPAL KATHMANDU/Tribhuvan Intl	VNKT	Kathmandu FIR and SRR	VNSM	
NEW ZEALAND NEW ZEALAND/Wellington Intl ²	NZWW	Auckland Oceanic FIR and SRR New Zealand FIR AND SRR	NZZO NZZC	
NORTHERN MARIANA ISLANDS (United States) SAIPAN I. (OBYAN)/Saipan I.(Obyan) Intl	PGSN	Guam SRR		
PAKISTAN KARACHI/Quaid-E-Azam Intl LAHORE/Lahore	OPKC OPLA	Karachi FIR and SRR Lahore FIR and SRR	OPKR OPLR	

² Operational monitoring coverage south of 60°S is limited due to the lack of information

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicateur Indicateur d'emplacement OACI Indicador de lugar de la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicateur Indicateur d'emplacement OACI Indicador de lugar de la OACI	
1	2	3	4	5
PAPUA NEW GUINEA PORT MORESBY/Jacksons	AYPY	Port Moresby FIR and SRR	AYPY	
PHILIPPINES MANILA/Ninoy Aquino Intl	RPMMRPLL	Manila FIR and SRR	RPMMRPHI	
REPUBLIC OF KOREA INCHEON/Incheon Intl	RKSI	Daegu FIR and SRR	RKRR	
SINGAPORE SINGAPORE/Singapore Changi	WSSS	Singapore FIR and SRR	WSJC	
SOLOMON ISLANDS HONIARA/Henderson	AGGH	Honiara FIR and SRR	AGGG	
SRI LANKA COLOMBO/Katunayake	VCBI	Colombo FIR and SRR	VCBI	
THAILAND BANGKOK/Bangkok Intl	VTBD	Bangkok FIR and SRR	VTBB	
UNITED STATES ANCHORAGE/Anchorage Intl	PANC	Anchorage Oceanic FIR; portion of Anchorage Continental FIR South of a line between approximately 62°N 141°W and approximately 6230°N 175°W and West of a line between approximately 59°N 13730°W and approximately 5530°N 145°W; Juneau SRR.	PZAN	
FAIRBANKS/Fairbanks Intl	PAFA	Anchorage Arctic FIR; portion of Anchorage Continental FIR North of a line between approximately 62°N 141°W and approximately 6530°N 175°W; Honolulu SRR.	PZAN	
HONOLULU/Honolulu Intl	PHNL	Oakland Oceanic FIR South of 30°N, East of 160°E and West of 140°W; Honolulu SRR.	KZOA	
(JUNEAU, Alaska)	PAJN	Portion of Anchorage Continental FIR East of a line between approximately 59°N 13730°W and approximately 5530°N 145°W.	PZAN	
(KANSAS CITY/Missouri) (National Aviation Weather Advisory Unit)	KMKC	Oakland Oceanic FIR North of 30°N.	KZOA	

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace- ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
VIET NAM HANOI/Noibai HO-CHI-MINH/Tan-Son-Nhat	VVNB VVTS	Hanoi FIR and SRR Ho-Chi-Minh FIR and SRR	VVNB VVTS	

APPENDIX 2

LIST OF THE ABBREVIATIONS AND CODE WORKS USED IN SIGMET

ABV	Above
AND*	And
APRX	Approximate or approximately
AT	At <i>(followed by time)</i>
BLW	Below
BY*	By
CB	Cumulonimbus
CENTRE*	Centre <i>(used to indicate tropical cyclone centre)</i>
CLD	Cloud
CNL	Cancel or cancelled
CTA	Control area
DS	Duststorm
E	East or eastern longitude
ERUPTION*	Eruption <i>(used to indicate volcanic eruption)</i>
EMBD	Embedded in layer <i>(to indicate CB embedded in layer of other clouds)</i>
FCST	Forecast
FIR	Flight information region
FL	Flight level
FRQ	Frequent
FZRA	Freezing rain
GR	Hail
HVY	Heavy <i>(used to indicate intensity of weather phenomena)</i>
ICE	Icing
INTSF	Intensify or intensifying
ISOL	Isolated
KM	Kilometers
KMH	Kilometers per hour
KT	Knots
MOD	Moderate <i>(used to indicate intensity of weather phenomena)</i>
MOV	Move or moving or movement
MT	Mountain
MTW	Mountain waves
N	North or northern latitude
NC	No change
NE	North-east
NM	Nautical miles
NW	North-west
OBS	Observed
OBSC	Obscured
OCNL	Occasional
OF*	Of ... <i>(place)</i>
OTLK	Outlook <i>(used in SIGMET messages for volcanic ash and tropical cyclones)</i>
RA	Rain
S	South or southern latitude
SE	South-east

SEV	Severe <i>(used e.g. to qualify icing and turbulence reports)</i>
SIGMET	SIGMET <i>(used to indicate SIGMET information)</i>
SQL	Squall line
SS	Sandstorm
SST	Supersonic transport <i>(used to indicate a SIGMET for supersonic levels)</i>
STNR	Stationary
SW	South-west
TC	Tropical cyclone
TO	To ... <i>(place)</i>
TOP	Cloud top
TS	Thunderstorm
TURB	Turbulence
UIR	Upper flight information region
VA	Volcanic ash
VALID*	Valid
W	West or western longitude
WI	Within
Z	Coordinated Universal Time <i>(used in meteorological messages)</i>

* not in the ICAO Doc 8400, ICAO Abbreviations and Codes

APPENDIX 3

METEOROLOGICAL PHENOMENA TO BE REPORTED BY SIGMET

	Phenomenon	Description	Meaning
Subsonic cruising level	TS	OBSC ² TS EMBD ³ TS FRQ ⁴ TS SQL ⁵ TS OBSC TSGR EMBD TSGR FRQ TSGR SQL TSGR	Obscured thunderstorm(s) Embedded thunderstorm(s) Frequent thunderstorm(s) Squall line thunderstorm(s) Obscured thunderstorm(s) with hail Embedded thunderstorm(s) with hail Frequent thunderstorm(s) with hail Squall line thunderstorm(s) with hail
	TC	TC (+ TC name)	Tropical cyclone (+ TC name)
	TURB	SEV TURB ⁸	Severe turbulence
	ICE	SEV ICE SEV ICE FZRA	Severe icing Severe icing due to freezing rain
	MTW	SEV MTW ⁹	Severe mountain wave
	DS	HVY DS	Heavy duststorm
	SS	HVY SS	Heavy sandstorm
	VA	VA (+ volcano name, if known)	Volcanic ash (+ volcano name)
Transonic levels and supersonic cruising levels	TURB	MOD TURB ⁸ SEV TURB ⁸	Moderate turbulence Severe turbulence
	CB	ISOL ⁶ CB OCNL ⁷ CB FRQ CB	Isolated cumulonimbus Occasional cumulonimbus Frequent cumulonimbus
	GR	GR	Hail
	VA	VA (+ volcano name, if known)	Volcanic ash (+ volcano name)

Notes:

- 1 Only one of the weather phenomena listed should be selected and included in each SIGMET
- 2 Obscured (**OBSC**) indicates that the thunderstorm (including, if necessary, CB-cloud which is not accompanied by a thunderstorm) is obscured by haze or smoke or cannot be readily seen due to darkness
- 3 Embedded (**EMBD**) – indicates that the thunderstorm (including, if necessary, CB-cloud which is not accompanied by a thunderstorm) is embedded within cloud layers and cannot be readily recognized
- 4 Frequent (**FRQ**) indicates an area of thunderstorms within which there is little or no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75% of the area affected, or forecasts to be affected, by the phenomenon (at a fixed time or during the period of validity)

5. *Squall line (**SQL**) indicates thunderstorms along a line with little or no space between individual clouds*
6. *Isolated (**ISOL**) indicates an area of individual CB and/or thunderstorms with a maximum spatial coverage less than 50% of the area affected, or forecasts to be affected, by the phenomenon (at a fixed time or during the period of validity)*
7. *Occasional (**OCNL**) indicates an area of well-separated CB and/or thunderstorms with a maximum spatial coverage between 50 and 75% of the area affected, or forecasts to be affected, by the phenomenon (at a fixed time or during the period of validity)*
8. *Severe (**SEV**) and moderate (**MOD**) turbulence (**TURB**) refers only to:*
 - *low-level turbulence associated with strong surface winds;*
 - *rotor streaming;*
 - *turbulence whether in cloud or not in cloud (CAT) near to jet streams. Turbulence is considered:*
 - *severe – whenever the turbulence index is between 15 and 27 (i.e., the peak value of the eddy dissipation rate (EDR) exceeds 0.5); and*
 - *moderate - whenever the turbulence index is between 6 and 14 (i.e., the peak value of the eddy dissipation rate (EDR) exceeds 0.3 while not exceeding 0.5).*
9. *A mountain wave (**MTW**) is considered:*
 - *severe – whenever an accompanying downdraft of 3.0 m/s (600 ft/min) or more and/or severe turbulence is observed or forecast.*

APPENDIX 4**STANDARD FOR REPORTING GEOGRAPHICAL COORDINATES IN SIGMETS**

When reporting geographical coordinates of points in SIGMET the following shall apply:

1. Each point is represented by a latitude/longitude coordinates in whole degrees or degrees and minutes in the form:

N(S)nn[nn] W(E)nnn[nn]

Note: There is a space between the latitude and longitude value.

Examples: **N3623 W04515**
 S1530 E12500
 N42 E023

2. In describing lines or polygons, the lat,lon values of the respective points are separated by the combination space-hyphen-space, as in the following examples:

S0530 E09300 – N0100 E09530 – N1215 E11045 – S0820 E10330

S05 E093 – N01 E095 – N12 E110 – S08 E103

Note: It is not necessary to repeat the first point when describing a polygon.

3. When describing a volcanic ash cloud approximate form and position, a limited number of points, which form a simplified geometric figure (a line, or a triangle, or quadrangle, etc.) shall be used in order to allow for a straightforward interpretation by the user.

APPENDIX 5

EXAMPLES

Note: Most of the examples are based on real SIGMETs mainly from Asia/Pacific region with some exceptions. The real SIGMETs have been corrected in order to make them compliant to the Annex 3 format.

1. SIGMET

1.1 SIGMETs for thunderstorms

WSSR20 WSSS 091131
WSJC SIGMET 3 VALID 091140/091540 WSSS-
SINGAPORE FIR EMBD TS OBS AT 1130Z N OF N01 E OF E106 W OF E114 STNR NC=

WSNT03 KPCI 032340
KZNY SIGMET C17 VALID 032345/040345 KPCI-
NEW YORK OCEANIC FIR FRQ TS OBS WI AREA N2400 W05500 - N2300 W04930 - N1845
W05645 - N2100 W05800 - N2400 W05500 TOP FL450 MOV E 15KT INTSF=

WSVS31 VVGL 122305
VVTG SIGMET 9 VALID 122330/130230 VVVV-
HOCHIMINH FIR EMBD TS OBS S OF LINE N1420 E10930 - N1000 E10400 TOP FL280 MOV
W 10KMH WKN=

WSUK31 EGGY 121120
EGTT SIGMET 01 VALID 121125/121525 EGRR-
LONDON FIR EMBD TS GR OBS AT 1115Z SE OF LINE N5130 E00200 - N5000 W00400
TOPS FL220 MOV NE 30KT NC=

1.2 SIGMET for severe turbulence

WSAU21 AMMC 280546
YBBB SIGMET BS02 VALID 280600/281200 YMMC-
BRISBANE FIR SEV TURB FCST WI S3900 E15100 - S4300 E15100 - S4300 E16000 -
S4100 E16300 - S3700 E16300 - S3900 E16000 FL260/370 MOV E 20 KT NC=

WSNZ21 NZKL 280003
NZZC SIGMET 01 VALID 280002/280402 NZKL-
NEW ZEALAND FIR SEV TURB OBS AND FCST NE OF THE SOUTH ISLAND BLW FL100
STNR NC=

1.3 SIGMET for severe icing

WSFR31 LFPW 280400
LFMM SIGMET 2 VALID 280500/280900 LFMM-
FIR MARSEILLE SEV ICE OBS AT 0400Z OVER LION GULF FL040/100 STNR NC=

WSIY31 LIIB 032152
LIMM SIGMET 07 VALID 032200/040200 LIMM-
MILANO FIR SEV ICE FCST OVER ALPS AND N PART APPENNINIAN AREA FL030/120 MOV E
NC=

1.4 **SIGMET for heavy duststorm**

WSAW31 LOWM 160530
OEJD SIGMET 4 VALID 160600/161000 OEJN-
JEDDAH FIR HVY DS OBS AND FCST N OF N2200 S OF N3100 E OF E04440 W OF E04800
MOV E 10KMH NC=

1.5 **SIGMET for severe mountain wave**

WSUK31 EGGY 150550
EGTT SIGMET 03 VALID 150600/151000 EGRR-
LONDON FIR SEV MTW FCST N OF N5100 FL090/140 STNR WKN=

2. **VA SIGMET**

2.1 **VA SIGMET - full**

WVPH01 RPLL 211110
RPHI SIGMET 2 VALID 211100/211700 RPLL-
MANILA FIR VA ERUPTION MT PINATUBO LOC S1500 E07348
VA CLD OBS AT 1100Z FL310/450 APRX 220KM BY 35KM S1500 E07348 - S1530 E07642
MOV SE 65KMH FCST 1700Z VA CLD APRX S1506 E07500 - S1518 E08112 - S1712
E08330 - S1824 E07836
OTLK 212300Z VA CLD APRX S1600 E07806 - S1642 E08412 - S1824 E08900 - S1906
E08100 220500Z VA CLD APRX S1700 E08100 - S1812 E08636 - S2000 E09224 - S2130
E08418

Notes:

1. *It is recommended that the OTLK part starts on a new line to make the message easier to read.*
2. *The coordinates used in describing the VA cloud are fictitious.*

2.2 **“Short” first SIGMET (no OUTLOOK)**

YUDD SIGMET 2 VALID 211100/211700 YUSO-
SHANLON FIR/UIR VA ERUPTION MT ASHVAL LOC S1500 E07348
VA CLD OBS AT 1100Z FL310/450 APRX 220KM BY 35KM S1500 E07348 - S1530 E07642
MOV SE 65KMH FCST 1700Z VA CLD APRX S1506 E07500 - S1518 E08112 - S1712
E08330 - S1824 E07836=

or

YUDD SIGMET 2 VALID 211100/211700 YUSO-
SHANLON FIR/UIR VA ERUPTION MT ASHVAL LOC S1500 E07348
VA CLD OBS AT 1100Z FL100/180 APRX 220KM BY 35KM S1500 E07348 - S1530 E07642=

WVFJ01 NFFN 090900

NFFF SIGMET 03 VALID 090915/091515 NFFN-
 NADI FIR VA ERUPTION MT LOPEVI LOC S1630 E16820 VA CLD OBS AT 0330Z FL090
 APRX 10NM BY 10 NM MOV SE 25 KT FCST 1515Z VA CLD APPRX S1630 E16820 - S1900
 E17600 - S1930 E17030=

2.3 SIGMET for VA CLD in the FIR but the volcano information is unknown

YUDD SIGMET 2 VALID 211100/211700 YUSO-
 SHANLON FIR/UIR VA CLD OBS AT 1100Z FL310/450 APRX 220KM BY 35KM S1500
 E07348 - S1530 E07642 MOV SE 65KMH FCST 1700Z VA CLD APRX S1506 E07500
 - S1518 E08112 - S1712 E08330 - S1824 E07836
 OTLK 212300Z VA CLD APRX S1600 E07806 - S1642 E08412 - S1824 E08900 -
 S1906 E08100 220500Z VA CLD APRX S1700 E08100 - S1812 E08636 - S2000
 E09224 - S2130 E08418=

2.4 SIGMET for VA CLD forecast to affect the FIR

We assume that the responsible VAAC has issued an advisory at 0200Z with forecast positions of the VA CLD for 0800Z, 1400Z and 2000Z. From this forecast it is seen that the VA CLD will enter the YUDD FIR before 0800Z. The responsible MWO, YUSO receiving this advisory prepares a SIGMET for the expected penetration of the VA cloud in its FIR and this SIGMET is sent at 0230Z.

WVXY01 YUSO 210230
 YUDD SIGMET 2 VALID 210800/211400 YUSO-
 SHANLON FIR/UIR VA CLD FCST FL310/450 APRX 220KM BY 35KM S1500 E07348
 - S1530 E07642 MOV SE 65KMH FCST 1400Z VA CLD APRX S1506 E07500 -
 S1518 E08112 - S1712 E08330 - S1824 E07836
 OTLK 212000Z VA CLD APRX S1600 E07806 - S1642 E08412 - S1824 E08900 -
 S1906 E08100

Notes:

1. *The forecast position at 0800Z and 1400Z is taken from the VA advisory*
2. *The outlook part is limited to the +6 hour forecast because at the moment of issuing the SIGMET there is no information available beyond this period from the VAAC.*

3. TC SIGMET

WCOC31 APRF 280453
 YBBB SIGMET PH01 VALID 280500/281100 YPRF-
 BRISBANE FIR TC GRAHAM OBS S1806 E12145 AT 0400Z CB TOP
 FL450 WI 120 NM OF CENTRE MOV SE 7 KT INTSF FCST 1100Z TC CENTRE S1808 E12150
 OTLK 281700Z TC CENTRE S1835 E12218 010400Z TC CENTRE S1910 E12240=

EXAMPLES OF PROPOSED CHANGES TO THE SIGMET FORMAT

Proposals for amendment of the format of location information in SIGMETs

1. It is felt that the current SIGMET format given in Annex 3, Appendix 5, Table A5-1, does not provide complete guidance regarding the format of the location information. The following typical cases are proposed for review and amendment of the current SIGMET format:

Example 1a: Description of a sector of a FIR referring to a meridian, given by its longitude:
E OF Ennn[nn] or Wnnn[nn] or
W OF Ennn[nn] or Wnnn[nn]

Example 1b: Description of a sector of a FIR referring to a parallel, given by its latitude:
N OF Nnn[nn] or Snn[nn] or
S OF Nnn[nn] or Snn[nn]

Note: These two cases are covered by the current provisions.

Example 2: Description of a sector of a FIR referring to a parallel and a meridian, given by their latitude and longitude respectively, for instance:
N OF Nnn[nn] [AND] W OF Ennn[nn]

Note: In this case, the word “AND” should be added to the SIGMET format.

Example 3: Description of a sector of a FIR referring to an arbitrary line given by lat/lon coordinates of 2 (or 3 points in case of a non-straight line), for instance:
NW OF [LINE] Nnn[nn]Ennn[nn][-]Nnn[nn]Ennn[nn]

Note: In this case, the word “LINE” should be added to the SIGMET format.

Example 4: Description of an arbitrary area of a FIR referring to up to 5 points forming a polygon, given by lat/lon coordinates of these points, for instance:

WI [AREA] Nnn[nn]Ennn[nn][-]Nnn[nn]Ennn[nn][-]
Nnn[nn]Ennn[nn][-][Nnn[nn]Ennn[nn][-]]
[Nnn[nn]Ennn[nn]]

Notes: 1) The limitation of “up to 5 points” should be imposed to avoid too lengthy SIGMET messages.

2) In this case, the word “AREA” should be added to the SIGMET format.

2. It is necessary to standardize the format of reporting the geographical coordinates in the SIGMETs and the volcanic ash and tropical cyclone advisories. The exact format for latitude/longitude information should be clearly stated and used in all examples in the Annex 3.

3. In the case of reporting location by means of “geographic features well known internationally”, the words “OVER” and “PART” could be added to the SIGMET format, to facilitate the description of the phenomenon location.

RECENT ACTIVITIES OF THE VOLCANIC ASH TASK FORCE (VA TF)

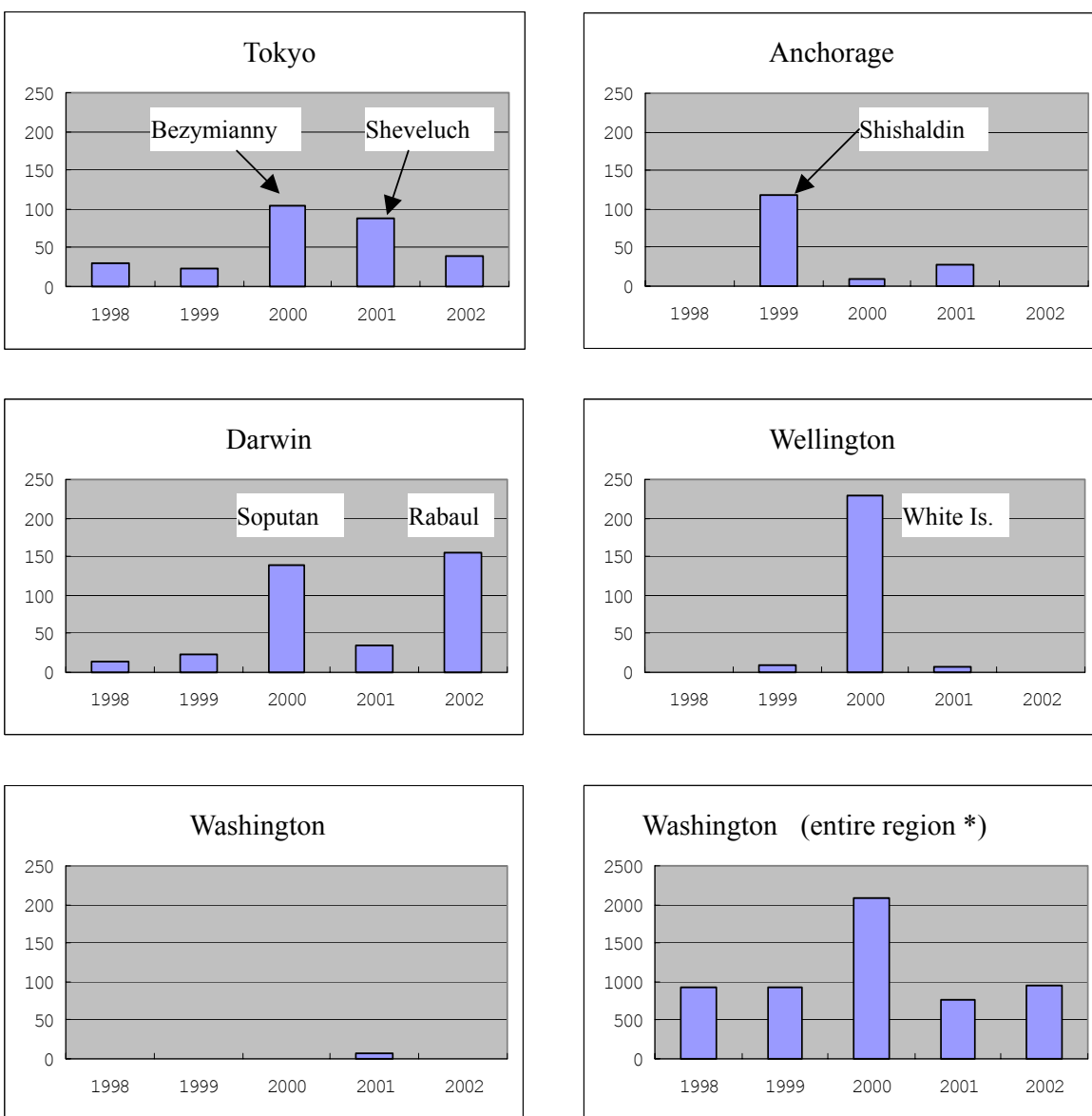


Figure 1 The number of VAAs issued for the ASIA/PAC region from 1998 to 2002. Some bars are labeled with volcano names for which the most VAAs were issued in the year. These statistics are based on the data supplied by VAACs and the database of JMA. The numbers of Darwin VAAs are counted in the fiscal year of Australia (July to next June).

* VAAs issued for the Central or South America volcanoes are also included.

Table 1 : Preliminary result of the questionnaire survey (item 2)

Number of Answers	12	
2. Have you ever issued SIGMET triggered by VAA?		
Yes	4	
No	8	
N/A	0	
3. How frequently have you issued SIGMET?		
(1) occasionally	1	
(2) every time after VAA arrives	3	
N/A	0	
4. How long, in average does it take to issue SIGMET after VAA arrives?		
(1) less than 10 minutes	3	
(2) less than 20 minutes	2	
(3) less than 30 minutes	1	
(4) less than 40 minutes	0	
N/A	6	
5. When you issue SIGMET, do you need to get permission from supervisor?		
Yes	3	
No	6	
N/A	3	
6. Please choose your satisfaction with VAA?		
6.1 Timing		
(1) very good	1	
(2) Good	7	
(3) fair	1	
(4) poor	0	
(5) very poor	0	
N/A	3	
6.2 Ease		
(1) very good	2	
(2) Good	5	
(3) fair	2	
(4) poor	0	
(5) very poor	0	
N/A	3	
6.3 Contents		
(1) very good	1	
(2) Good	7	
(3) fair	1	
(4) poor	0	
(5) very poor	0	
N/A	3	
6.4 If you chose "poor" in any question, please state the reason.		
No comments		

7. Comments and/or requirements for VAA
In situations where we receive Aircraft Observations and/or Air Traffic Reports of Eruptions/Ash, before the advisories, we can issue sigmets immediately, especially if advisories are delayed. However, once advisories arrive, sigmets already issued are duly updated. (Fiji)
So far, we have not issued any SIGMET related to VAA as volcanic ash occurred outside FIR of responsibility. VAA received were disseminated to aviation users with flight documentation through "aviation briefing terminals". (Malaysia)
MALDIVES IS NOT AFFECTED BY VOLCANIC ASH (Republic of Maldives)
Every there (Everywhere?) there is active volcanic activity and eruption. (Papua New Guinea)

**ASIA/PAC TASK FORCE ON THE IMPLEMENTATION OF VOLCANIC ASH
AND TROPICAL CYCLONE ADVISORIES AND SIGMET
(VA/TC IMPLEMENTATION TF)**

1. Terms of Reference

- (a) Monitor the implementation of the tropical cyclone (TC) and volcanic ash (VA) advisories and SIGMETs within the ASIA/PAC Regions and identify any deficiencies.
- (b) Coordinate operational issues related to the issuance of the VA and TC advisories and SIGMETs.
- (c) Continually seek ways to improve the operational effectiveness of the IAVW and the TC advisory and warning system;
- (d) Provide advice to the CNS/MET Sub-group on the above issues.

2. Work Programme

The work to be addressed by the ASIA/PAC VA/TC Implementation Task Force includes:

- (a) review procedures for the issuance of VA and TC advisories and SIGMETs in the region and propose actions for their improvement;
- (b) investigate the deficiencies in the format and dissemination of the VA and TC advisories and SIGMETs and propose actions for their elimination;
- (c) investigate the need of the States for guidance and/or training related to the implementation of IAVW and tropical cyclone warning system;
- (d) follow the developments in the States related to the improvement of the VA and TC advisories and warnings and provide regional input on these matters to the IAVW Operations Group (through APANPIRG);
- (e) report on its work to the CNS/MET Sub-group of APANPIRG.

The work is expected to be carried out primarily by correspondence.

3. Composition

- (a) The Task Force is composed by experts from:

Australia, Japan (Rapporteur), New Zealand, United Kingdom, United States, China, Tonga and Maldives.

- (b) IATA is invited to participate in the work of the Task Force.

AMENDMENT PROPOSAL TO ASIA/PAC FASID TABLE MET 1B

APAC FASID – MET

6-1B-5

TABLE MET 1B – METEOROLOGICAL WATCH OFFICES

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplacement OACI Indicador de lugar de la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplacement OACI Indicador de lugar de la OACI	
1	2	3	4	5
NAURU NAURU I./Nauru	ANAU	Nauru FIR and SRR	ANAU	
NEPAL KATHMANDU/Tribhuvan Intl	VNKT	Kathmandu FIR and SRR	VNSM	
NEW ZEALAND NEW ZEALAND/Wellington Intl	NZWW	Auckland Oceanic FIR and SRR New Zealand FIR AND SRR	NZZO NZZC	
NORTHERN MARIANA ISLANDS (United States) SAIPAN I. (OBYAN)/Saipan I.(Obyan) Intl	PGSN	Guam SRR		
PAKISTAN KARACHI/Quaid-E-Azam Intl LAHORE/Lahore	OPKC OPLA	Karachi FIR and SRR Lahore FIR and SRR	OPKR OPLR	
PAPUA NEW GUINEA PORT MORESBY/Jacksons	AYPY	Port Moresby FIR and SRR	AYPY	
PHILIPPINES MANILA/Ninoy Aquino Intl	RPMR RPLL	Manila FIR and SRR	RPMR RPHI	
REPUBLIC OF KOREA INCHEON/Incheon Intl	RKSI	Daegu FIR and SRR	RKRR	
SINGAPORE SINGAPORE/Singapore Changi	WSSS	Singapore FIR and SRR	WSJC	
SOLOMON ISLANDS HONIARA/Henderson	AGGH	Honiara FIR and SRR	AGGG	
SRI LANKA COLOMBO/Katunayake	VCBI	Colombo FIR and SRR	VCBI	

* Operational monitoring coverage south of 60°S is limited due to the lack of information

CNS/ATM Implementation Planning Matrix
Implementation Status of CNS Elements

State/ Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	GNSS		ADS-B	ADS-C	Remarks
				NPA Supplemental Means (S) Primary means (P)	En-route Supplemental Means (S) Primary means (P)			
AUSTRALIA	ATN tests were conducted. BIS Router and Backbone BIS Router will be implemented by 2005 and AMHS in 2005.	AFTN based AIDC Implemented between Brisbane and Auckland.	Implemented to support FANS1/A equipped aircraft.	Implemented (S) 260 GPS NPA Final 26 aerodromes to be completed 2002.	Developed en-route as (P) for approval to use in domestic airspace.	ADS-B trial being conducted.	FANS 1/A ADS-C implemented.	
BANGLADESH	ATN BIS Router and AMHS planned for 2005							
BHUTAN	ATN BIS Router planned for 2005			Procedures developed for NPA as (S)				
BRUNEI DARUSSALAM	ATN BIS Router planned for 2005							
CAMBODIA								
CHINA	ATN BIS Router will be implemented by 2005.	IDC between ACCs within China are being implemented.	Implemented to support ATS Route L888 and polar routes. Trial on HF data link conducted for use in western China.		Implemented in certain airspace as (S).		FANS 1/A ADS-C implemented to support L888 and polar routes.	

CNS/ATM Implementation Planning Matrix
Implementation Status of CNS Elements

State/ Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	GNSS		ADS-B	ADS-C	Remarks
				NPA Supplemental Means (S) Primary means (P)	En-route Supplemental Means (S) Primary means (P)			
HONG KONG, CHINA	-AMHS trial with Australia conducted in late 2002; - Tripartite BBIS trial with Beijing and Bangkok conducted in end of 2002; -BBIS/AMHS trials with Thailand and Japan are conducted in 2003. Implementation in 2003/2004; - An operational AMHS planned for commissioning by end of 2003.	Trial on the AFTN based AIDC with Guangzhou China commenced. Implementation planned for 2003/2004. AIDC trial with Sanya commenced in mid 2003.	Trials continuing for CPDLC. D-ATIS D-VOLMET and PDC implemented. VDL Mode-2 trial commenced Sep. 2002 and further trials being conducted.		Implemented in certain airspace as (S).	ADS-B trial scheduled for 2004.	FANS I/A Trials continuing for ADS-C.	
MACAO, CHINA	ATN BIS router planned for 2005. Planning for trial with China and Hong Kong , China going on							ATZ within Hong Kong and Guangzhou FIRs. In ATZ full VHF coverage exist. Radar coverage for monitoring purposes.
COOK ISLANDS								
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA								

CNS/ATM Implementation Planning Matrix
Implementation Status of CNS Elements

State/ Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	GNSS		ADS-B	ADS-C	Remarks
				NPA Supplemental Means (S) Primary means (P)	En-route Supplemental Means (S) Primary means (P)			
FIJI	AMHS in-house trials planned for 2003. AMHS trials with USA in 2004. ATN BIS Router will be implemented in 2005.	Implementation of AFTN based AIDC with Brisbane and Auckland in 2003.	FANS-1. Implemented since 1997.	NPA procedures for (S) completed in Dec. 2002.	Implemented as (S).	ADS-B trials planned for 2004. Implementation in 2005/2006.	ADS-C implemented in oceanic airspace using EUROCAT 2000 X.	
FRANCE French Polynesia Tahiti		Implementation of limited message sets with adjacent centres under discussion.	FANS-1. Implemented since 1996.				FANS 1/A ADS-C implemented since March 1999.	
INDIA	ATN BIS Router and BBIS router planned for implemented at Mumbai in 2005.		FANS-1 limited Implemented at Kolkata and Chennai. Planned for Mumbai and Delhi.		SBAS (S). Planned for 2005.		FANS 1/A ADS-C implemented at Kolkata and Chennai. Plan to implement in Delhi and Mumbai.	
INDONESIA	ATN BIS Router planned implementation in 2005.	AFTN based AIDC planned for implementation between Brisbane and Jakarta in 2004.	FANS-1/A. CPDLC in Jakarta, Ujung Pandang FIRs planned for 2004.	Procedure to be completed in 2006 for NPA (S).			FANS 1/A ADS-C trial planned for Jakarta and Ujung Pandang FIRs for 2004.	

CNS/ATM Implementation Planning Matrix
Implementation Status of CNS Elements

State/ Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	GNSS		ADS-B	ADS-C	Remarks
				NPA Supplemental Means (S) Primary means (P)	En-route Supplemental Means (S) Primary means (P)			
JAPAN	ATN BBIS already implemented. AMHS implementation between Japan, USA and Hong Kong planned for 2004.	AIDC based. AFTN procedure implemented with Oakland USA.	FANS1/A system Implemented in Tokyo FIR.				FANS 1/A. ADS-C implemented in Tokyo FIR.	
KIRIBATI								
LAO PDR	ATN BIS Router planned for implementation with Bangkok in 2005.		FANS-1/A Planned for Bay of Bengal and South China Sea areas. Equipment is under test operation.		Implemented as (S).		FANS-1/A. ADS-C planned for Bay of Bengal and South China Sea areas. Equipment under test operation.	
MALAYSIA	ATN BIS Router planned for 2005.		Planned for Bay of Bengal and South China Sea areas.	NPA (S) at KLIA planned for 2003.			FANS 1/A ADS-C planned for Bay of Bengal and South China Sea areas.	
MALDIVES	BIS Router/AMHS trial planned for 2003 – 2005 and implementation in 2005.	Planned for 2006.	FANS1/A planned for 2006.		Trials planned for 2005-2008. Implementation in 2008.	Trials planned for 2004-2006. Implementation in 2006.		
MARSHALL ISLANDS				NPA (S) implemented at Majuro Atoll.				

CNS/ATM Implementation Planning Matrix
Implementation Status of CNS Elements

State/ Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	GNSS		ADS-B	ADS-C	Remarks
				NPA Supplemental Means (S) Primary means (P)	En-route Supplemental Means (S) Primary means (P)			
MICRONESIA FEDERATED STATES OF								
Chuuk				NPA(S) implemented				
Kosrae				NPA(S) implemented				
Pohnpei				NPA(S) implemented				
Yap				NPA(S) implemented				
MONGOLIA	ATN BIS Router planned for 2005. Trial with Bangkok planned for 2003.		Function available. Regular trials are conducted.	GPS procedures are being developed and implemented at 10 airports.	Implemented as (P).	ADS-B trial in progress implementation planned for 2006.	FANS 1/A ADS-C implemented since August 1998.	
MYANMAR	Trial for ATN BIS Router with Thailand planned for 2003. Test with China planned for 2005.		Implemented since August 1998				Implemented since August 1998	
NAURU								
NEPAL	BIS Router planned for 2005.			Development of arrival procedure and NPA as (S) completed. Departure procedure is being developed.	Implemented as (S).			

CNS/ATM Implementation Planning Matrix
Implementation Status of CNS Elements

State/ Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	GNSS		ADS-B	ADS-C	Remarks
				NPA Supplemental Means (S) Primary means (P)	En-route Supplemental Means (S) Primary means (P)			
NEW ZEALAND	BIS Router planned for 2005. Implementation will be confirmed based on operational requirement.	AFTN based AIDC implemented between New Zealand, Australia and USA. Tests with Fiji planned by the end 2003.	FANS/1A. Implemented	42 NPA implemented presently.	will be implemented as required.	Trials planned 2006-2008. National coverage starts 2008 to be completed by 2010.	FANS 1/A Implemented.	
PAKISTAN	Implementation of ATN considered for Phase II (2005-2010).	Implemented between Karachi and Lahore ACCs	Implementation planned from 2005-2010.	Arrival and departure NPA procedure as (s) are being developed.	Planned for 2005-2010.	Planned for 2005 – 2010.	Planned for 2005-2010	RADAR coverage provided in Karachi and Lahore FIRs.
PAPUA NEW GUINEA								
PHILIPPINES	ATN BIS Router planned for 2005. Implementation for AMHS also planned.		D-ATIS and CPDLC Planned for 2006.				FANS 1/A ADS-C planned for 2006.	
REPUBLIC OF KOREA	ATN BIS planned for 2005.	FTN based AIDC implemented between Incheon ACC and Seoul APP.					FANS 1/A ADS-C planned for 2003.	

CNS/ATM Implementation Planning Matrix
Implementation Status of CNS Elements

State/ Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	GNSS		ADS-B	ADS-C	Remarks
				NPA Supplemental Means (S) Primary means (P)	En-route Supplemental Means (S) Primary means (P)			
SINGAPORE	ATN BBIS Router trial with Hong Kong conducted between April and June 2003. Trial with Thailand planned for 2004.		Implemented since 1997. Integrated in the ATC system in 1999. D-ATIS implemented since February 2000.	NPA (S) procedure developed and is being published in the AIP.	Implemented (S).	Trial planned for 2005.	FANS 1/A ADS-C implemented since 1997. Integrated with ATC system in 1999.	
SRI LANKA	ATN BIS Router Planned for 2005. AMHS planned along with BIS in 2005.		CPDLC implemented since November 2000.	NPA (S) planned for 2005.			FANS 1 /A ADS-C implemented since November 2000.	GPS based domestic route structure being developed.
THAILAND	ATN G/G system implemented for domestic services. BBIS/BIS Routers already implemented. AMHS 2005.	ATN based AIDC Implemented in Domestic Sector.	FANS-1/A Implemented.		Implemented as (S).		FANS 1/A ADS-C Implemented.	
TONGA								
UNITED STATES								

CNS/ATM Implementation Planning Matrix
Implementation Status of CNS Elements

State/ Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	GNSS		ADS-B	ADS-C	Remarks
				NPA Supplemental Means (S) Primary means (P)	En-route Supplemental Means (S) Primary means (P)			
Anchorage				NPA(S) implemented	En-route (P) implemented	ADS-B trials continuing.	FANS/1-ADS-C 2004.	
Fairbanks				NPA(S) implemented				
Guam (Agana NAS)				NPA(S) implemented				
Guam (Anderson)				NPA(S) implemented				
Honolulu Intl.				NPA(S) implemented	En-route (P) implemented		FANS 1/A ADS-C planned for Dec. 2004	
Johnston Atoll				NPA(S) implemented				
Kahului				NPA(S) implemented				
Oakland	AMHS implementation between Japan and USA scheduled for March 2004. Acceptance testing Sept. 2003 – Feb. 2004. US/China and US/Fiji AMHS testing scheduled for 2004.	Implemented using AFTN procedure. ATN AIDC planned for 2005.	FANS-1 2001. Phase I ATN CPDLC implemented in Sept 2001. Phase IA planned for implementation at 20 en-route centres in USA for en-route function in 2006/2007 time frame.	NPA (S) implemented	En-route (P) implemented		FANS-1/A ADS-C planned for Dec. 2004.	
Saipan				NPA (S) implemented				

CNS/ATM Implementation Planning Matrix
Implementation Status of CNS Elements

State/ Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AIDC	CPDLC	GNSS		ADS-B	ADS-C	Remarks
				NPA Supplemental Means (S) Primary means (P)	En-route Supplemental Means (S) Primary means (P)			
VANUATU								
VIETNAM	ATN BIS Router planned for 2005 and AMHS in 2005.	ATN based AIDC planned between Ho- Chi-Minh and Bangkok in 2005.	Planned for 2005.	Planned for NPA (S) for 2004.	Implementation as (S) planned for 2004.		FANS 1/A ADS-C planned for 2005.	Most of air space in Hanoi and Ho-Chi- Minh FIRs covered by RADAR.

REPORT OF THE CHAIRMAN OF THE METATM TF

1. Background

1.1 Decision 5/30 of the Fifth Meeting of CNS/MET Sub-Group of APANPIRG, Bangkok, July 2001 established a METATM task force to investigate the MET requirements for ATM.

1.2 The Task Force terms of reference are –

a) Evaluate the current status of implementation, capabilities and developments of meteorological systems in the ASIA/PAC Region.

b) Evaluate the operational needs and emerging capabilities of meteorological systems in the ASIA/PAC Region, and develop proposals/requirements for changes necessary to meet those needs.

c) Develop the Regional plan for the implementation of meteorological services and facilities for the new CNS/ATM systems.

d) Report to the CNS/MET Sub-Group of APANPIRG for further co-ordination through the ICAO Secretariat with other relevant bodies.

2. Introduction

2.1 The meteorological information/products (MET) specified in Annex 3 in the majority of cases have been developed to cater for flight planning requirements. Traditionally ATM has used these products which are adequate for a range of uses. In recent times however, the advancement of ATM systems and procedures brought about by increased traffic and user expectations has generated demand for more user focussed meteorological information. This demand has been approached on a number of fronts and scales. On the global scale we have seen the development of the WAFS while at the local scale a wide range of MET information is being provided by States to satisfy the specific requirements of ATM. This report will concentrate on the MET being provided by a number of States in the Asia/PAC region with respect to user requirement, content and systems.

3. Meteorological Requirements of ATM

3.1 ATM requires the provision of MET over a range of spatial and temporal scales. Generally speaking ATM requires MET for airspace organisation and management, flow and capacity management, en-route ATC and terminal and airport ATC.

3.2 A brief discussion on the specific uses of individual MET elements for ATM follows.

Surface Wind determines runway selection and hence approach procedures and airport capacity. Critical thresholds relate to downwind (typically 0 to 5 knots) and crosswind components (typically 20 to 30 knots). Strong headwinds (greater than about 35 knots) slow acceptance rates due to the use of distance in aircraft separation minima.

Upper Winds are used in flow planning and sequencing. The accuracy of upper winds is perceived to be adequate for most uses however some ATM services are investigating the development of conflict resolution systems that may require greater accuracy.

Visibility affects airport capacity and is critical to flow planning. It may also have a significant impact on ground operations/procedures.

Cloud base and location is a major component in approach procedures and airport capacity.

Weather such as freezing precipitation and snow can impact greatly on airport ground operations (such as de-icing and runway clearing) while strong winds, lightning and heavy rain can cause long delays in ground operations.

3.3 The impacts of the weather have to be dealt with by ATM, obviously the greatest benefit can be gained by the provision of accurate and timely MET. There is generally a range of contingencies available to ATM to manage the weather component of their work. It is important to keep ATM informed of any developments and possible developments to assist them planning and eliminate any weather “surprises”.

3.4 ATM service providers will have specific requirements dependant on their ‘system’ (procedures, infrastructure, technology). This often means weather dependent ATC operations and procedures are based upon different weather thresholds to those focussed on by traditional Met products particularly with respect to aerodrome weather information. An example of this is the significance of cloud bases as high as 2000 and 3000 feet to determine approach procedures and airport capacity while alternate and circling minima for operations are well below these values.

3.5 These specific MET requirements for ATM are being addressed locally and a number of products and specific information is being provided to meet these requirements.

3.6 There is an obvious requirement for consultation between MET and ATM providers to determine an appropriate service however due the limitations of MET it has often been under-utilised and only now beginning to be more fully exploited by ATM providers.

4. MET Currently Provided in Support of ATM in the Asia/Pac Region

4.1 A range of information being is provided by a number of Asia/Pacific States in support of ATM that is in addition to the requirements of Annex 3 (supplementary information). The following Table provides an overview of some of the information being provided and its use in ATM.

Product/Information/Service	ATM Use*	Usual Source	Format/Delivery
1. OPMET – TAF/Landing Forecasts	A, B	Local Met office**	Text - web, AFTN, FTP
2. OPMET – Winds/Temps	A	WAFS	Grib
3. Winds/Temp	A	Local Models	Graphical - web
4. Tropical Cyclone Advisories/Volcanic Ash Advisories	A	TCAC/VAAC	Text – web, AFTN, FTP , fax
5. TC/VA information - Enhanced (graphical/extended/more detailed)	A	Local met office/TCAC	In-Person Briefing, verbal, text, graphical – web, fax, in person, telephone.
6. SIGMET/AIRMET	A, B, C	Various	Text, graphical – AFTN, FTP, web
7. Routine Tailored Briefing products***	A	Local met office	Text, verbal/graphical – web, FTP, fax, telephone
8. Ad hoc briefings	A	Local met office	Verbal, in-person – phone, in-person
9. Met presence in ATS Unit	A, B, C, D	Local met office	Verbal, graphical - In-person
10. OPMET – METAR/SPECI	B	Local met office	Text - web, FTP, AFTN
11. Current/recent surface conditions	B	Local met office	Text, graphical – web, FTP, dedicated displays
12. Weather Radar	B	Local met office	Graphical – web, local area network
13. Derived radar thunderstorm nowcasts	B, C	Local met office	Graphical – web, local area network
14. Satellite cloud imagery	B, C	Local met office	Graphical - web
15. Aircraft/Pilot reports	B, C	Aircraft	Text, graphical – AFTN, FTP, web
16. SIGWX – High	C	WAFS	Graphical - web
17. Medium	C	Local/regional	Graphical - web/fax
18. Icing Charts	C	Local model	Graphical - web, FTP
19. Extended range forecasts	D	Local met office	In-Person Briefing, verbal, text, graphical – In-person, telephone, fax, web, FTP.
20. Climatological information	D	Various	Graphical, text – web, mail.

*A – Capacity/flow management, B – Terminal/Airport ATC, C – En-route ATC, D – Airspace organisation and management

** The expression “local met office” is used to represent a meteorological office responsible for the provision of MET for a given location or airspace.

***Tailored briefing products refer to a number of products providing MET related to critical thresholds relevant to ATC operations.

5. Discussion

5.1 The supplementary information listed above is generally being used by ATM as an input to Collaborative Decision Making.

5.2 The routine tailored briefing (text/graphical) products provided by some states are tailored to operationally significant ATM thresholds and offer confidence levels of different scenarios that may impact on ATM. Forecast scenarios for a particular ports are then considered in the context of the ATM network with ATM decisions being made after consideration of the impact on the network. A Met presence and in-person briefings (often performed routinely) are of tremendous benefit by allowing direct focussed consultation.

5.3 The most prevalent supplementary information routinely provided for ATM is satellite and radar information. To an educated user this information is excellent for identifying existing hazardous weather, principally thunderstorms. A number of States in the region are also providing thunderstorm nowcasts. ATM procedures regarding the use of this information vary as they are developed locally.

5.4 Displays of current weather observations in the vicinity of aerodromes are often provided to offer ATM a better understanding and monitoring capacity of the local meteorological situation. The provision of recent weather information also assists in this capacity.

6. Systems

6.1 The provision of supplementary products such as weather radar, satellite imagery and other graphical products is predominantly via the web (inter/intra net). Integration of this information into ATM systems is obviously dependent on the system. More work is required to determine the best way to integrate weather information into ATM systems.

6.2 Although somewhat ad hoc, the provision of most of the supplementary information in the region has been integrated into ATM systems by local arrangement. The variance of ATM systems does not at this stage allow any formal format specifications of this supplementary type information.

7. Short Term Strategies

7.1 It is clear that existing information supplementary to that provided by traditional OPMET data can be utilised by ATM.

7.2 The type of supplementary information described is currently available for many locations in the region however may not be provided specifically to ATM.

7.3 The simple provision of information relating to ATM specific weather criteria at aerodromes can greatly increase the efficiency ATM. This information should be readily available as a consequence of the aerodrome forecasting process. The provision of confidence levels and possible alternative forecast scenarios can also greatly aid the decisions of ATM.

8. Longer Term Strategies

8.1 Consultation with appropriate ATM authorities is critical in understanding local ATM requirements. It is also important for the ATM authority to understand the limitations of meteorological information and the resources required to provide a particular level of service.

8.2 Utilisation of new information or products by ATM often requires development of new ATM procedures.

8.3 The advancement of ATM systems has seen a greater reliance on the accuracy of meteorological products, it is important that the design of future ATM systems considers the likely limitations of meteorological input. This will require co-ordination between Met and ATM authorities at the planning stage.

9. Recommendations

9.1 The task force recommends that Met Authorities/providers consider the supplementation of information provided for ATM with the type of information discussed in this paper that can be provided with little development. To expedite its provision the task force suggests the utilisation of readily available systems such as inter/intra net, fax, or telephone.

9.2 The task force recommends that Met Authorities/providers continually assess with ATM authorities ATM MET requirements with the aim of developing new products/information for use in ATM bearing in mind the potential costs and benefits involved.

9.3 The task force recommends that individual Met Authorities/providers be involved with the development of future ATM systems to ensure their MET requirements are taken into account.

TERMS OF REFERENCE OF THE METATM TASK FORCE**Terms of Reference**

- a) Evaluate the current and future requirements for MET in support of ATM in the ASIA/PAC Region and provide guidance material to assist States to develop MET services to meet these requirements.
- b) Monitor the emerging capabilities and developments of MET and as necessary update regional plans for the implementation of MET services and facilities.
- c) Promote communication between MET and ATM communities in the ASIA/PAC Region to enhance the level of understanding of MET requirements and capabilities in support of ATM.
- d) Report to the CNS/MET Sub-group of APANPIRG for further co-ordination through the ICAO Secretariat with other relevant bodies.

Key Priorities for CNS/ATM Implementation in the Asia/Pacific Region

NO.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS
1	ATN Transition ATN Implementation	The development of an ATN transition plan is required. Implementation of Ground-to-Ground element of ATN is required.	2004 2005	CNS/MET ATN Transition Task Force	Completed Completed development of the Plan 2005
2	Incorporation of CNS/ATM Material into Regional ANP & FASID	Incorporation of CNS/ATM Material into Regional ANP & FASID	APANPIRG/13	ATS/AIS/SAR CNS/MET SG	On-going CNS/MET SG/5 established Working Group to incorporate CNS/ATM materials in the Regional Procedure Part CNS FASID. The material developed by the WG was adopted by APANPIRG/13 and a proposal for amendment to the Basic ANP FASID has been processed to reflect the approved material in the two documents. Action completed.
3	Revised South China Sea ATS Route Implementation	Successful implementation of this important route structure alleviates airspace congestion and provides a project model for similar route structure activity elsewhere in the Region.	1 November 2004	ATS/AIS/SAR	Implemented

CNS/MET SG/7 & CNS/ATM IC SG/10
Key Priorities for CNS/ATM Implementation in the Asia/Pacific Region

NO.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS
4	WGS-84 Implementation	To achieve uniformity in aeronautical data publication across the Region in order to ensure a standard reference system for CNS/ATM.	Immediate (Effective Date was 1 Jan 1998)	ATS/AIS/SAR	Implementation is monitored at each meeting using the uniform format for the reporting of WGS-84 implementation. Report progress to APANPIRG/13 14
5	RVSM Implementation	To provide more efficient flight profiles and to increase airspace capacity in conjunction with the implementation of CNS/ATM.	Phase 1: 21 Feb 2002 Western Pacific/South China Sea Phase 2: 31 Oct 2002 Hong Kong FIR and Sanya AOR Vientiane, Hanoi, Jakarta, Ujung Pandang, Bali Bay of Bengal – 27 November 2003	ATS/AIS/SAR	Phased implementation. RVSM Implemented in the Pacific 24 Feb 2000. Completed
6	RNP Implementation <i>En-route RNP 10 & 4 Terminal RNP 4 & 1 Approach RNP 0.3</i>	Global standard for navigation is seen as a prerequisite for many CNS/ATM implementation activities. <i>Implement RNP based navigation, operation and procedures to improve the efficiency and flexible use of airspace.</i>	RNP 10/South China Sea 2001. RNP 10/ Australia-Indonesia 29 Nov 2001 RNP 10/Bay of Bengal/Arabian Sea 28 Nov 2002 On Going Report to APANPIRG	ATS/AIS/SAR & CNS/ATM/IC	Phased implementation. RNP 10 is implemented in NOPAC, CENPAC, CEP & Tasman Sea. Implemented Phased implementation.
7	ADS <i>ADS-C</i>	The implementation of ADS in oceanic or remote areas in accordance with the Regional CNS/ATM Plan is required for the enhancement of safety and	APANPIRG/13 APANPIRG	ATS/AIS/SAR	-Phased implementation. Revised Regional CNS/ATM Guidance Material developed containing ADS section.

CNS/MET SG/7 & CNS/ATM IC SG/10
Key Priorities for CNS/ATM Implementation in the Asia/Pacific Region

Appendix Z - 3

NO.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS
		ATM.			-Implementation focus and timetable need to be developed. -States are gaining experience in the use of ADS.
8	Technical Co-operation in Regional CNS/ATM Planning & Implementation	The continuation and enhancement of ICAO's co-ordinating role of technical co-operation in CNS/ATM planning and implementation, in close co-operation with all partners and taking into account the regional approach, is required.	APANPIRG/13 APANPIRG/14	All	Sub-groups to identify requirements.
9	Preparation for WRC-2007	The co-operative participation of States is required with their respective telecommunications regulatory authorities, regional groups such as the APT and at the WRC, preparatory meetings and study groups to ensure that aviation spectrum requirements are fulfilled including GNSS spectrum requirements are protected.	WRC-2007	All	
10	GNSS Implementation - ABAS - SBAS - GBAS	To implement GNSS in accordance with the Asia Pacific Regional Strategy. Develop regional GNSS Augmentation requirements Ensure region wide awareness of developing GNSS systems	Phase 1 – 2003 On Going. Report to APANPIRG	All	Phased implementation Sub-groups to develop plan and report progress to APANPIRG/13 GNSS Implementation Workshop was held in May 2001. • States are encouraged to implement GNSS for En-route and NPA functions.

CNS/MET SG/7 & CNS/ATM IC SG/10
Key Priorities for CNS/ATM Implementation in the Asia/Pacific Region

NO.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS
		integrate into Regional Plan.			- States advised to participate in the GNSS Measurement Campaign and the result of the campaign presented to the CNS/ATM/IC/SG9. - GNSS Implementation checklist was developed and forwarded to States. - GNSS strategy was reviewed. SBAS – WAAS IOC announced on 10 July 2003 TSO C145/6 receivers now available GBAS – FAA LAAS contract for delivery in 2006
11	Airspace Management ATS route implementation	To implement revised ATS route structures for the major traffic flows. To review and develop new requirements for ATS routes.	Phase I – November 2001 Phase II – 28 November 2002 Phase III – 2004 APANPIRG/15	ATS/AIS/SAR CNS/MET	Completed Completed 2004 2004

CNS/MET SG/7 & CNS/ATM IC SG/10
Key Priorities for CNS/ATM Implementation in the Asia/Pacific Region

Appendix Z - 5

NO.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS
12	Final phase of WAFS	To implement transition to the final phase of WAFS to support the CNS/ATM system.	2004	CNS/MET SG	• WAFS Transition Plan and Procedures has been developed and is being successfully implemented. • Transfer of responsibility of RAFCs to WAFCs London and Washington has been implemented. • Closure of RAFCs has been implemented.
13	MET Chapter 8 of the ASIA/PAC Regional Plan for New CNS/ATM System	To develop MET components of the ASIA/PAC CNS/ATM concept/strategy To develop MET Chapter of the Regional CNS/ATM Plan	2003 2004	CNS/MET SG with assistance of the ATS/AIS/SAR SG METATM TF	• The first draft of MET Chapter of the Regional CNS/ATM Plan has been developed. • METATM TF to develop MET components of the ASIA/PAC CNS/ATM concept/strategy.
14	Data – link Communications	Implementation of CPDLC. (with HF and/or SATCOM back up) in oceanic or remote airspace. AIDC to be introduced where ATS automated systems are implemented.	2002 On -going 2005	All All	Sub – Groups to review progress of implementation. Implementation focus and time table need to be developed.

CNS/MET SG/7 & CNS/ATM IC SG/10
Key Priorities for CNS/ATM Implementation in the Asia/Pacific Region

NO.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS
15	ADS-B	Validate the selection of an ADS-B link in the Asia/Pacific by conducting a cost benefit study including a) the cost impact on avionics of mandatory carriage of the ADS-B link selected b) identified and quantified specific benefits such as reduced separation standards, optimum altitude. c) note the development of separation standards. d) determined a date for the mandatory carriage of the selected ADS-B link by aircraft in the Asia Pacific again. e) encourage standardization of the selected ADS-B link with transmit only systems that include integrated GPS capability.	APANPIRG/14	All ATS/AIS/SAR ATS/AIS/SAR CSN/MET	<i>Progressed by ADS-B TF/I March 2003. 1090 ES was selected as the Data link in the near term.</i>
16	Implementation of APV and RNP Approaches	<i>Review applicability of APV and RNP Approach Design Standards for Asia Pacific.</i> <i>Develop implementation strategy.</i>	<i>On Going.</i> <i>Report to APANPIRG</i>	ATS/AIS/SAR	<i>APV and RNP Design standards now in PANS OPS.</i> <i>Aircraft certified for RNP and APV approaches.</i>

CNS/MET SG/7 & CNS/ATM IC SG/10
Key Priorities for CNS/ATM Implementation in the Asia/Pacific Region

Appendix Z - 7

NO.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS
17	Data Link Flight Information Services (DFIS) applications	To implement the following applications via request/response mode of data link in the Asia and Pacific Regions: a) Data link –automatic terminal information services (D-ATIS); b) VOLMET data link service (D-VOLMET); c) Pre-Departure Clearance (PDC) delivery via data-link;	2008	All	<i>Trials and demonstrations are conducted and some operational services are provided by States;</i> <i>D-VOLMET to be implemented by VOLMET Broadcast Stations specified in the FASID.</i>
18	Safety Management Systems	States to establish national safety management systems and effective application of safety programmes which are required for the provision of air traffic services.	APANPIRG/14	CNS/ATM/IC RASMA/SG (Subject to APANPIRG/14)	Annex 11 provision effective 27 November 2003.

AIR NAVIGATION DEFICIENCIES IN THE CNS FIELD IN THE ASIA/PAC REGION

Identification		Deficiencies			Corrective action			
Requirements	States/facilities	Description	Date first reported	Remarks	Description	Executing body	Target date for completion	Priority for action**
VHF coverage to be provided in the Southern Part of Dhaka FIR and withdrawal of HF	Bangladesh	No requirement for HF except for smaller portion of FIR. HF used for ground-to-ground COM due to lack of ER VHF and reliable ATS DSCs.	1992	Relevant sector of ATS routes has been delegated to adjacent ACC.	An action item was developed by a COM coordination meeting held in June 03 to expedite implementation of RCAGs included in a Project. An interim arrangement has been made for implementation of one RCAG site in the southern part of Dhaka FIR.	Civil Aviation Authority of Bangladesh	Target date is set by end of 2003.	A
Reliable AFS communications between Kolkata and Dhaka FIRs.	Bangladesh and India	HF RTT AFTN circuit had been operating far below the required reliability of 97%. ATS DSC not implemented. IDD service used for ATS coordination not meeting operational requirement. Agartala/Dhaka and Dhaka/Guwahati. ATS DSCS not implemented.	ATS DSC 1993 AFTN 1995	HF RTT circuit was required to be to be upgraded to LTT. Corrective action required to improve performance of the IDD services initially. A dedicated circuit should be established between Kolkata and Dhaka. IDD service to be provided for Agartala/Dhaka and Dhaka/Guwahati ATS DSC.	HF RTT circuit was withdrawn. Alternate routing was established via Bangkok/Mumbai/Kolkata for AFTN traffic between Dhaka and Kolkata. In accordance with action agreed at a COM coordination meeting held in June 03 implementation of a 64 Kbps data circuit is planned to support both AFTN and DSC requirements. Agartala/Dhaka, Dhaka/Guwahati and Dhaka/Kolkata ATS DSCs implemented on IDD hotlines.	CAA Bangladesh and Airports Authority of India	November 2003 for upgrading AFTN circuit; and December 2003 for establishment of DSC between Dhaka/Kolkata	A

Identification		Deficiencies			Corrective action			
Requirements	States/facilities	Description	Date first reported	Remarks	Description	Executing body	Target date for completion	Priority for action**
Adequate and reliable VHF COM	Myanmar	Quality and reliability of RCAG VHF inadequate and unavailability of required coverage	1998	Improvements in the quality of link to RCAG stations and power supply system are required.	Action should be taken to provide reliable links between the RCAG stations and Yangon ACC. Power supply to the RCAG sites needs improvement.	DCA Myanmar	Revised target date is end of 2003	A

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PACIFIC REGION

Identification		Deficiencies			Corrective action			
Requirements	States/ facilities	Description	Date first reported	Remarks	Description	Executing body	Target date for completion	Priority for action *
Meteorological observations and reports. Provision of Annex 3, Chapter 4	Solomon I.	Weather information is inadequate and not provided on a regular basis	1996	Reported by airlines operating to Solomon I.	Equipment to be upgraded and arrangements to be made for regular observations	Ministry of Transport, Works and Aviation, Solomon I. OPMET/E TF to carry out survey on availability	2003	A
a) Requirements for forecasts to be provided. ASIA/PAC ANP, Part IV Meteorology. Table MET 1A. Meteorological observations and reports. Provision of Annex 3, Chapter 4.	Kiribati	a) TAFs for Kiribati not regularly provided by MET Centre of Fiji. MET observations from Kiribati not available on regular basis.	1998	Reported by the National Weather Service concerned during introduction of the new flight operations.	Fiji reported that TAFs for Tarawa, Kiribati have been provided regularly.	Directorate of Civil Aviation, Kiribati. Civil Aviation Authority, Fiji CNS/MET SG OPMET/E TF to carry out survey on availability	a) Completed b) To be determined	A
a) Reporting of information on volcanic eruptions to civil aviation units. Provision of Annex 3. b) International airways volcano watch (IAVW) operational	Indonesia Philippines	Information on volcano activities not always reaches civil aviation units due to lack of fixed communications with volcano observatories.	1995	a) Observed by States concerned. b) Reported at the WMO/ICAO Workshop on Volcanic Ash Hazards (Darwin, 1995)	a) MOU will be signed between Department of Transportation and Department of Mining and Energy, Indonesia b) Volcano observations and warnings will be made available on the Internet by Department	a) Volcanic Ash Warning Study Group (VAWSG) to develop proposal. b) ICAO Regional Office to monitor developments on this subject.	To be determined 2003	A

Identification		Deficiencies			Corrective action			
Requirements	States/ facilities	Description	Date first reported	Remarks	Description	Executing body	Target date for completion	Priority for action *
procedures.					of Mining and Energy. c) It is expected that MOU between Air Transportation Office and the Philippines Institute of Volcanology and Seismology will be considered.			
a) Service for operators and flight crew members Provision of Annex 3, Chapter 9. b) Requirements for WAFS products for flight documentation. ASIA/PAC ANP, Table MET 1A.	Cambodia Myanmar	VSATs for reception of the ISCS and SADIS satellite broadcasts not installed.	1999	Expected lack of products for flight documentation due to forthcoming implementation of the final phase of WAFS and cease of RAFCs operations.	States consider urgent action to be taken for installation of SADIS or ISCS VSATs.	Civil Aviation Administrations in co-ordination with Met. Authorities of the States concerned. CNS/MET SG to monitor and coordinate.	To be determined	A
a) Aerodrome meteorological office; meteorological watch office provisions of Annex 3, Chapter 3. b) Requirement for aerodrome meteorological office to be established; ASIA/PAC ANP, Table MET 1A; c) Requirements for MWO to be established, ASIA/PAC ANP, Table MET 2A.	Cambodia	Requirements for Aerodrome meteorological office and meteorological watch office (MWO) to be established at Phnom-Penh international airport have not been met.	1992 2003 (MET mission from ICAO RO)	Requirements have not been met due to staffing and funding problems. MET briefing and flight documentation for return flights provided by the MET offices of other aerodromes.	The Authority concerned to take urgent actions to meet requirements of ANP. If MWO is not able to meet all its obligations, proposal to be considered for temporary transfer of its responsibilities to another MWO and a NOTAM to be issued to indicate such a transfer.	State Secretariat of Civil Aviation, Cambodia.	To be determined	A

Identification		Deficiencies			Corrective action			
Requirements	States/ facilities	Description	Date first reported	Remarks	Description	Executing body	Target date for completion	Priority for action *
a) SIGMET information Provision of Annex 3, Chapter 7. b) Requirements for dissemination of SIGMETs, including SIGMETs for volcanic ash. ASIA/PAC ANP (FASID) Table MET 2A. c) International airways volcano watch (IAVW) operational procedures.	Bangladesh Cambodia India Indonesia Lao PDR Myanmar Nepal Papua New Guinea Philippines Sri Lanka	Requirements for issuance and proper dissemination of SIGMETs, including SIGMET for volcanic ash, have not been fully implemented.	2000	a) Reported by airlines b) Noted by Volcanic Ash Advisory Centres	a) ICAO to consider proposal for Special Implementation Project be established with the primary objective to improve implementation of SIGMET procedures. a) ICAO SIP (on-going in 2003) b) States to take urgent actions to implement the procedures. (Sri Lanka informed that the deficiency is dealt with immediate effect)	a) ICAO to establish and implement the SIP. b) ICAO to update the Regional SIGMET Guide c) ICAO Regional Office to co-ordinate. d) Volcanic Ash Task Force to assist Secretariat with development of SIP and its implementation e) CNS/MET SG to monitor.	2003 by means of a SIP and a new edition of the Regional SIGMET Guide (Malaysia notified deficiency was resolved, 2002)	A
Annex 3 provisions for Tropical Cyclone Advisory Centres (TCAC) and for the format of tropical cyclone advisories for aviation ASIA/PAC Basic ANP (p.6.2) and FASID Table MET 3A	India	TCAC New Delhi does not issue tropical cyclone advisories for aviation	2003	Reported by airlines and identified during ICAO attendance to ESCAP/WMO Panel on Tropical Cyclones, 2002 and 2003	The Authority concerned to take urgent actions to meet requirements of Annex 3 and ASIA/PAC BANP and FASID for provision of tropical cyclone advisory for aviation.	India Directorate General of Civil Aviation; India Meteorological Department	2004	A

**TERMS OF REFERENCE OF THE
COMMUNICATIONS, NAVIGATION, SURVEILLANCE/METEOROLOGY
(CNS/MET) SUB-GROUP OF APANPIRG**

TERMS OF REFERENCE

1. Ensure the continuing and coherent development of the ASIA/PAC Regional Air Navigation Plan and the ASIA/PAC Regional Plan for the New CNS/ATM Systems in the CNS/MET fields.
2. Review and identify deficiencies that impede the implementation or provision of efficient CNS/MET services in the ASIA/PAC Region.
3. Monitor CNS/ATM systems research and development, trials and demonstrations in the fields of CNS/MET and facilitate the transfer of this information and expertise between States.
4. Make specific recommendations aimed at improving CNS/MET services by the use of existing procedures and facilities and/or through the evolutionary implementation of CNS/ATM systems.
5. Review and identify inter-regional co-ordination issues in the fields of CNS/MET and recommend actions to address those issues.

SUBJECT/TASKS LIST IN THE CNS/MET FIELDS

The priorities assigned in the list have the following connotation:

A = Tasks of a high priority on which work should be expedited;

B = Tasks of medium priority on which work should be under taken as soon as possible but not to the detriment of Priority "A" tasks; and

C = Tasks of medium priority on which work should be undertaken as time and resources permit but not to the detriment of priority "A" and "B" tasks.

TOR = Terms of Reference of the Sub-Group

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
1	RAN/3 C.8/6	Subject: Shortcomings in volcanic ash colour codes Task: Aviation volcanic ash color code		Study proposal by IFALPA to modify the aviation volcanic ash code.	COM/MET IFALPA	Completed
2	RAN/3 C.14/24	Subject: Relevance of the content of the table of navigation and surveillance services Task: a) To provide information for the update of the ANP taking into account required additions and deletions. b) Provide the above information in an informal document that can also be used as a planning instrument for action o other tasks.		a) Undertake a comprehensive review of the table of radionavigation aids at appropriate intervals in consultation with States and international organisations b) Develop a document to indicate the current ANP requirements, the implementation status of those requirements and future planning requirements Task completed: Review completed On-going review mechanism established	NAV/SUR	Completed
3	RAN/3 R.9/3b)	Subject: Procedures for exchange of METARS between regions Task: Exchange of METARS to support operations between ASIA/PAC and other regions.		Establish procedures for exchange of METARS between ASIA/PAC and other regions with a view of developing appropriate proposals to amend the ANP.	COM/MET	Completed
4	RAN/3 R.9/4	Subject: Designation of International OPMET data banks Task: Designation of international OPMET data bank to serve the Asia and Pacific Regions.		Recommend an international OPMET data bank or banks to be designated to serve the ASIA/PAC region.	COM/MET	Completed

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
5	RAN/3 C.10/12	Subject: Standard Protocols Task: Harmonization of ground-ground data links.		Consider harmonization of ground-ground data link protocols and procedures that will be inter-operable with the ATN.	COM/MET AFTN Mgmt. TF	Completed
6	RAN/3 R.10/18	Subject: WAFS satellite coverage in Asia Region Task: Areas to be covered by World Area Forecast System (WAFS) satellite broadcast.		Co-ordination with WAFS satellite broadcast provider States to ensure access for States in western part of Asia/Pac Region completed.	ICAO WAFS provider State	Completed
7	RAN/3 C.10/20	Subject: Alpha numeric data on WAFS satellite broadcast Task: Inclusion of alphanumeric data on ASIA/PAC World Area Forecast System (WAFS) satellite broadcast.		Consider inclusion of alphanumeric format OPMET and AIS messages on WAFS satellite broadcast.	COM/MET WAFS provider States	Completed
8	RAN/3 C.11/9	Expansion of Communication Tables Legends.		Develop terminology and legends to represent elements used in ATN.	COM/MET	Completed
9	APANPIR G C.2/27	Subject: Frequency congestion on SEA-1 network Task: Aeromobile Communications Improvements - resolution of deficiencies		Identify aeromobile communications deficiencies in the region and develop appropriate solutions	ICAO States	Completed
10	APANPIRG C. 3/15	Subject: Regional radar data exchange Task: Standardize radar data formats		1) Gather information on formats used in the Region 2) Encourage the use of standardized and automated exchange of radar cross FIR boundaries 3) Consult with Eurocontrol on the use of ASTRIX 4) Consider ATN/ADS compatability issues	NAV/SUR ICAO US	Completed
11	RAN 3 C. 12/1	Minimum value of field strength for NDB's		Action on this subject completed.	NAV/SUR C.2/2	Completed

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
12	RAN/3 C. 12/6	Subject: Provision of cost effective and operationally acceptable approach and landing guidance Task: 1) ILS/MLS transition planning 2) Action on the outcome of the Spec. om/Ops		Develop an ILS/MLS transition plan taking into account; 1) cost benefit studies conducted by states in the Region 2) studies and trials on MLS development and other relevant systems 3) progress achieved on technical and operation issues on MLS 4) progress in ILS/MLS transition planning in other regions 5) current plans of individual States in the Region on ILS/MLS an 6) outcome of the COM/OPS Div 95 Meeting. Task completed: ILS/MLS transition issues resolved by outcome of Spec. Com/Ops Div95 Meeting. Regional strategy review completed.	NAV/SUR	Completed
13	APANPIRG D.7/28	Subject: Non-implementation of carriage of ACAS in ASIA/PAC region Task: To examine the application of ACAS in the ASIA/PAC region and to develop a time-table for implementation		Review the benefits to be gained through carriage of ACAS in the region and develop a programme of implementation of carriage of ACAS	COM/MET/NAV/SUR	Completed
14	RAN/3 C.14/4 RAN/3 C.5/2 (TOR 1)	Development of detailed description for the contents of the ASIA/PAC Facilities and Services Implementation Document (FASID) Ensure harmonised Regional Com/Met/Nav/Sur plan development		Develop detailed format and content for the COM/MET/NAV/SUR part of the Facilities and Services Implementation Document (FASID) as a matter of priority. Take into account global CNS/ATM plans as adopted by APANPIRG.	COM/MET/NAV/SUR AFS MGT TF NAV/SUR TF	Completed
15	RAN/3 C.8/17 (TOR 3)	Subject: Lack of WAFS data for long-haul operations Task: WAFS support to long-haul operations		1) Study the development of interim arrangements to provide WAFS support to long haul operations. 2) India to rebroadcast WAFS charts received from Tokyo RAFC. 3) WAFC Washington provide wind/temp charts for 36 hours range.	COM/MET USA	Completed Completed Completed

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
16	APANPIRG D. 9/31	Problem : Revision of GNSS RAS Task : Development of an alternative strategy for the provision of GNSS RAS	A	Review the existing strategy and an alternative strategy be developed with a view to focus on ensuring appropriate service provision from the space-based system and alternative technology available	COM/MET/NAV/ SUR SG	Completed
17	RAN/3 C.14/19 (TOR 3)	Subject: Lack of AIDC procedures Task: Development of on-line data interchange procedures and table for use in the Region	B	1) Develop on-line data-interchange procedures to support CNS/ATM applications. (AFTN AIDC) 2) Develop a logical connectivity table for the exchange of flight data information using the ATN. (ATN AIDC Table)	ICD Task Force COM/MET/NAV/SUR (ATN Trans. TF)	Completed Completed
18	APANPIRG D. 4/46 RAN/3 C.12/3 APANPIRG 5/33 (TOR 3)	Subject: Provision of adequate COM/NAV/SUR services Task: Monitor the development and implement new com/nav/sur services eg ATN,GNSS, ADS with minimal transitional impact	A	1) Encourage States to conduct R&D, Trials & demonstrations of new com/nav/sur services eg. ATN, GNSS, ADS 2) Monitor global developments that may have beneficial impact on regional planning activities eg. ATN, WADGNSS, LADGNSS 3) Consolidate information on new capabilities in the CNS/ATM system, eg. FANS 1 avionics package, oceanic display systems etc. for the Sub-Groups review and action 4) Serve as a focal point for review of ongoing work of Regional formal and informal working groups that is relevant to Com/Nav/Sur eg RNP compatibility 5) Provide for co-ordinated training/seminars to keep all States informed on developments of trials and demonstrations 6) Establish a GNSS Task Force to develop a Regional Strategy for GNSS augmentation 7) Develop transition planning consistent with Regional requirements	COM/MET/NAV/SUR	Completed Completed Completed

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
19	RAN/3 C.9/7 (TOR 3)	Subject: Lack of adequate procedures for Exchange of OPMET data between regions Task: Exchange of OPMET data between the ASIA/PAC and other Regions.	A	1) Develop procedures and delivery scheme for exchange of OPMET data between ASIA and EUR regions Via Singapore ODREP. 2) Develop a draft proposal for amendment of the ANP and arrange amendment of the ROBEX handbook to reflect the new arrangements. 3) To develop procedure to make OPMET information available at Washington and London.	COM/MET/NAV/SUR OPMET WG	Completed Completed Completed
20	C.9/12 (TOR 3)	Subject: The need for SIGWX charts to be available in London and Washington for WAFS dissemination Task: Exchange of WAFS SIGWX charts.	A	1) Plan for the exchange of SIGWX charts between all relevant RAFCs and the London and Washington WAFS. 2) Develop transition plan for transfer of responsibilities from the RAFCs to WAFS. 3) Coordination between RAFCs and the respective WAFS be effected to meet time table for production of test high level SIGWX forecasts and the dates when the charts are expected to be considered operational	COM/MET/NAV/SUR WAFS Task Force States	Completed Completed Completed
21	RAN/3 R.10/19 (TOR 3)	Subject: Technical data not available for WAFS satellite broadcast implementation Task: Dissemination of World Area Forecast System (WAFS) products by satellite broadcast.	A	1) WAFS satellite broadcast provider States to advise ICAO of VSAT receiving equipment details. 2) ICAO to relay information to States in the region. 3) Develop draft proposal to amend the ANP as necessary. 4) States to install WAFS satellite receivers.	UK & US ICAO COM/MET States	Completed Completed Completed Completed
22	COM/MET /NAV/SUR /SG (TOR 2)	Subject: Protection of radio frequency spectrum to ensure safety and efficiency of aeronautical services. Task: Take steps to protect the aeromobile spectrum from unauthorised interference. Task: Support ICAO position on various Agenda at WRC including protecting GNSS spectrum for aeronautical use.	A	1) Encourage States to monitor and co-operatively resolve unauthorized intrusion into aeronautical HF bands, 2) Work actively with State Telecommunications Authorities to ensure ICAO positions are supported and aviation views are included in WRC deliberations.	ICAO States	Completed Completed

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
23	APANPIRG D. 10/13	Problem : Revision of Strategy for PA Landing System Task : Development of an up-dated strategy	A	Review the current strategy and develop an up-dated strategy taking into account : 1) standardized GBAS and SBAS 2) feasibility of GBAS to support CAT II and III operations 3) development and deployment of MMR 4) the definition of RNP for approach, landing and departure operations and 5)human, environmental and economic factors.	COM/MET/NAV/ SUR SG	Completed
24	APANPIRG D. 10/14	Problem : Lack of a general strategy for implementation of GNSS Task : Development of a more general strategy for implementation of GNSS.	A	A more general strategy for the implementation of GNSS navigation capability in the ASIA/PAC region taking into account : 1) RNP for all phases of flight 2) standardization of GNSS by ICAO through SARPs, PANS-OPS guidance material 3) human, environmental and economic factors.	COM/MET/NAV/ SUR SG	Completed
25	APANPIRG C. 8/21	Problem : Transition to the final phase of WAFS Task : Planning for transfer of responsibilities of the RAFCs to the WAFCs London and Washington.		Develop WAFS Transition Plan and Procedures and planning for Implementation of transfer of the RAFCs responsibilities to the WAFCs London and Washington.	COM/MET/NAV/ SUR SG WAFS Transition TF	Completed

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
26	RAN/3 C.11/8 (TOR 1)	Subject: Planning of ground-ground communications required for implementation of ATN Task: Integration of ground -ground communications necessary for the implementation of the aeronautical telecommunication network.	B	Plan ground to ground communications for implementation of ATN, taking into account the work of the ATNP. 1) Development of ATN Routing architecture 2) Transition Plan	ATN Trans. TF/3	Completed
27	RAN/3 C.10/11 (TOR 3)	Subject: Inadequate Ground-ground data coms. Task: Aeronautical Fixed Telecommunications Network (AFTN) management.	A	1) Develop procedures for the establishment operation and management of databases. 2) Review AFTN loading, develop possible circuit improvements and routing changes. 3) Develop alternate routing coordination procedures to take into account address stripping procedures. 4) Plan changes to the AFTN with due account to transition to ATN.	COM/MET/NAV/SUR ATN Trans. TF COM/MET/NAV/SUR	Completed On going Completed Completed Completed
28	APANPIRG C.2/23 (TOR 2)	Subject: Lack of implementation of ATS voice circuits Task: Aeronautical Fixed Service (AFS) - resolution of deficiencies	A	Identify AFS deficiencies in the region and develop appropriate solution	CNS/MET States concerned	On going Completed On going Completed

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
29	APANPIRG C. 9/29	Problem : Lack of procedures for OPMET exchange to support the ISCS and SADIS broadcasts. Task : Planning for dissemination of ASIA/PAC OPMET data to the WAFCs London and Washington	A	Develop procedures for dissemination of OPMET data to the WAFCs for uplink on the satellite broadcasts. Planning an implementation of the procedures for OPMET exchange to support the ISCS and SADIS broadcasts. - Develop the new procedure for dissemination of OPMET messages, as listed in Annex 1 to the SADIS User Guide, to the WAFCs London and Washington to meet IATA requirements. - Planning for implementation of the new procedures	CNS/MET SG with assistance of OPMET WG	Completed Completed 2002 2003 on-going Completed
30	RAN/3 C.11/10 (TOR 1)	Subject: Ensure effective transition to sat. coms. Task: Planning for the implementation of satellite communications.	B	In planning for the implementation of CNS/ATM take into account: 1) Requirements for an effective transition, 2) Time frame for implementing changes, 3) HF requirements after implementation of satellite communications, 4) Human factors (staffing, retraining).	CNS/MET	On-going
31	RAN/3 C.11/11 (TOR 1)	Subject: Need for data link to access VOLMET broadcast stations by aircraft. Task: Automation of meteorological information for aircraft in flight (VOLMET) broadcasts.	B	In planning CNS/ATM implementation consider automation of VOLMET broadcast and introduction of D-VOLMET by VOLMET broadcast stations specified in the FASID.	CNS/MET	2008

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
32	RAN/3 C.8/14 APANPIRG/14 (TOR 3)	Subject: Inadequate implementation of procedures for advising aircraft on volcanic ash and tropical cyclones Task: Regional planning for Monitoring of the implementation of international airways volcano watch (IAVW) and tropical cyclone advisories and SIGMETs	A	Plan Monitor and provide assistance in the implementation of IAVW volcanic ash and tropical cyclone advisories and SIGMETs procedures to ensure provision of timely information on volcanic ash and tropical cyclones to aircraft.	CNS/MET Task Force on the implementation of Volcanic Ash and Tropical Cyclone advisories and SIGMETs (VA/TC TF)	On going
33	APANPIRG D. 9/21	Problem : SADIS strategic assessment Task: SADIS strategic assessment of data/information to be included in the satellite broadcast.		Review requirements for SADIS broadcasts and maintain the SADIS strategic assessment tables.	CNS/MET SG	On-going
34	APANPIRG (TOR 3)	Subject: Lack of procedure for application of MET data in ADS messages Task: Use of MET data from ADS messages	A	1) Review MET information transmitted with ADS messages Presentation of the WP on the subject to the CNS/MET/SG/6 2) Develop procedures for utilization of the available MET data by operational units, MET offices and WAFCS	CNS/MET New Zealand CNS/MET	2003 2002 Completed 2004
35	(TOR 3)	Subject: To facilitate regional implementation of CNS/ATM Tasks: a) coordinate training/workshops to allow States to develop and implement new CNS/ATM procedures b) encourage States to participate in the evaluation and training of new CNS/ATM systems c) progress the adoption of WGS-84 co-ordinate system and introduction of high integrity systems for the management of the co-ordinate data	A	1) identify topics for training, develop syllabi and plan training programme 2) encourage States in the evaluation and training of new CNS/ATM systems 3) co-ordinate with States and monitor progress 4) collect information and suggest methods of resolving problems commonly faced by States	CNS/MET CNS/ATM IC SG	On-going On-going On-going On-going

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
36	APANPIRG D. 4/46 RAN/3 C.12/3 APANPIRG 5/3 (TOR 3)	Subject: Provision of adequate CNS/MET services Task: Monitor CNS/ATM systems research and development, trials and demonstrations in the fields of CNS/MET and facilitate the transfer of this information and expertise between States.	A	- Encourage States to conduct R&D, trials & demonstrations of new CNS/MET services - Monitor global developments that may have beneficial consequences on regional planning activities - Consolidate information on new capabilities in the CNS/ATM system, for the Sub-Groups review and action - Serve as a focal point for review of ongoing work of Regional formal and informal working groups that is relevant to CNS/MET - Provide for coordinated training/seminars to keep all States informed on developments of trials and demonstrations	CNS/MET	On-going
37	C 12/24	Subject : Transition to the final phase <u>GRIB and BUFR coded</u> of <u>WAFS products</u> Task : Implementation of the transition to the <u>GRIB and BUFR coded WAFS products</u> final phase of WAFS	A	1) Development of guidelines for the use of BUFR and GRIB codes for the production of WAFS products. 2) Planning and coordinating the transfer of SIGWX and WIND/TEMP charts from the current T4 facsimile format to BUFR and GRIB format. 3) Development of a regional training programme for the operational use of BUFR and GRIB. 4) Participate in the development and implementation of an adequate WAFS back-up system for dissemination of WAFS products in the Asia/Pacific Regions.	CNS/MET SG WAFS Transition <u>Implementation</u> Task Force	2002 Completed 2004 <u>July 2005</u> 2003 <u>2004</u> <u>Completed 2004</u>
38	C12/36	Subject : Lack of ATM requirements for MET components of the ASIA/PAC CNS/ATM Plan. Task : Developing the MET Chapter for the ASIA/PAC CNS/ATM Plan.	A	- Development of the initial draft of the MET Chapter. - Development of the MET components of the CNS/ATM concept/strategy. - Inclusion of ATM requirements for MET information in the CNS/ATM Plan.	CNS/MET SG with assistance of MET WG on CNS/ATM Plan CNS/MET SG with assistance of the METATM TF	Completed 2003 Completed 2004

39	APANPIRG/13 D 13/28	<u>Subject: To improve the efficiency of the regional and inter-regional OPMET exchange and the availability of OPMET information from the ASIA/PAC Region</u> <u>Task: Review and optimize the ROBEX scheme and other OPMET exchanges; introduce monitoring and management procedures for the ROBEX centres and Regional OPMET data banks</u>	A	1) Review and update regional ROBEX tables and relevant documents 2) Propose optimization changes to the ROBEX scheme 3) Improve the availability of OPMET data at the Regional OPMET Data Banks (RODB) 4) Improve the availability of OPMET information from the Pacific States 5) Introduce monitoring and management procedures	CNS/MET SG OPMET Management Task Force	2003 2004 on-going on-going on-going
40	APANPIRG/13 C 13/32	<u>Subject: Quality Management of the meteorological service for the international air navigation</u> <u>Task: Foster the development and implementation of quality management systems by the States' MET authorities/providers in the ASIA/PAC region</u>	B	1) Review the status of implementation of the quality management system in the region 2) Assist in the organization of regional seminars/workshops to foster exchange of information between the States on the matters of quality management systems	CNS/MET SG	On-going

OUTSTANDING CONCLUSIONS/DECISIONS IN THE CNS/MET FIELD

Report Reference Concl./Dec. No.	Action by ANC/Council	Decision/Conclusion/ Action Taken	Action by States/ICAO	Status
C 5/19	C	Need for technical assistance to support WAFS implementation in the ASIA/PAC Regions That, ICAO initiate action to provide technical assistance in terms of equipment and training of personnel under the Technical Co-operation Programme to those States that are in need of assistance to receive WAFS products by satellite broadcast. Noted the conclusion and requested the Secretary General to take action as appropriate.	The use of SADIS and ISCS/2 by ASIA/PAC States has continued to grow and further expansion is expected. Implementation of the SADIS and ISCS/2 is being monitored to define the extent of the assistance required. <u>– UK provided GRIB/BUFR training for SADIS User States in ASIA/PAC region in November 2002.</u>	On-going <u>2005</u>
C 9/18		Operational efficacy of OPMET messages That, a) ICAO carry out a survey on the operational efficacy of the ISCS/2; and b) Results of the survey be made available to the ISCS/2 provider Stat and reported to the COM/MET/NAV/SUR SG/3 Meeting.	– Proposal to carry out a survey on the operational efficacy of the ISCS/2 was forwarded to the ISCS Provider State for review and consideration. – The United States was invited to review the proposed survey form and to provide comments.	To be completed 2004-2005
C 10/19	C	Future development of the WAFS That, ICAO give consideration to the future development of the WAFS with a view of meeting the States' requirements for WAFS and non-WAFS products after transition to the final phase of WAFS and RAFCs cease to operate. Noted the conclusion and requested the Secretary General to arrange for a study on how to meet any non-WAFS requirements indicated by States, in response to the survey requested in Conclusion 10/20.	Proposal is being studied by the Secretariat with assistance of the WAFSSG. The subject is included in the Agenda of the MET Divisional Meeting, September, 2002. <u>– MET Divisional Meeting, 2002 adopted recommendations related to the future development of WAFS.</u> <u>– WAFSOPSG was established in place of the WAFSSG to cater for the operation and development of WAFS.</u>	On-going <u>Completed</u>

Report Reference Concl./Dec. No.	Action by ANC/Council	Decision/Conclusion/ Action Taken	Action by States/ICAO	Status
C 10/21	ANC	Internet access to the WAFS products and OPMET data That, ICAO consider developing the policy for use of the Internet by States to obtain the WAFS products and OPMET data for operational purposes. Noted the conclusion and its relationship to APIRG/12 conclusion 12/27 and requested the Secretary General to consider developing a uniform policy for the use of the Internet by States to obtain WAFS products and OPMET data for operational purposes, as well as for the dissemination for AIS products.	The Uniform policy for the use of the Internet by States for operational purposes is being developed by the Secretariat as requested by the ANC. It is included in the agenda of the MET Divisional Meeting to be held in September 2002. The United Kingdom implemented the SADIS internet-based service as a back-up to the SADIS broadcast to be provided only to States and users authorized to receive SADIS and ISCS broadcasts. SADIS FTP back-up service has been operational since May 2002.	On-going Completed
C 10/23		Revision of the ROBEX Scheme That, in order to facilitate distribution of the ASIA/PAC OPMET information to the WAFC London and Washington for uplink to the satellite broadcasts, the ROBEX Scheme be revised as shown in Appendix J to this Report on Agenda Item 2.2.	The revised ROBEX Scheme is being implemented. The collection areas of some ROBEX Centres have been extended. Task to be carried out by OPMET/E TF. OPMET/E TF developed an action list in regard to the further optimization of ROBEX Scheme.	On-going 2003
C 11/26	ANC	Authorized access to the global WAFS graphical products via the Internet That, ISCS and SADIS provider States consider the possibility of providing global availability of WAFS products via the Internet, to the authorized ISCS and SADIS users. Noted the conclusion and that the Secretary General was developing a policy for the operational use of the Internet by States to access WAFS products as well as OPMET data, and for the dissemination of AIS Information.	The subject matter was discussed by the SADISOPSG/6 and 7. The United Kingdom implemented the SADIS internet-based service as a back-up to the SADIS broadcast to be provided only to States and users authorized to receive SADIS and ISCS broadcasts. SADIS FTP back-up service has been operational since May 2002. A policy for the operational use of the Internet by States is being developed by ICAO. It is included in the agenda of the MET Divisional meeting to be held in September 2002. All SADIS and ISCS users are provided with access to WAFS products through the internet back-up of the SADIS broadcast.	On-going Completed

Report Reference Concl./Dec. No.	Action by ANC/Council	Decision/Conclusion/ Action Taken	Action by States/ICAO	Status
C 11/32		WAFS Tables MET 5 and 6 of the ASIA/PAC ANP (FASID) That, Tables MET 5 and 6 of the ASIA/PAC ANP (FASID) be amended as shown in Appendices H and I to the report.	The ASIA/PAC Basic ANP and FASID have been approved by the Council. Amendment proposal for FASID circulated to States. Amendment proposal approved.	On-going Completed
C 11/33	C	SIGMET Special Implementation Project That, ICAO urgently consider a proposal for the ASIA/PAC Special Implementation Project be established with the primary objective to improve implementation of SIGMET procedures. Noted the conclusion and that such project would be put forward for Council approval through established procedures.	The SIP Project Proposal will be put forward for Council approval in 2001. The SIP Proposal is being revised in order to reduce the cost and will be put forward for Council approval in 2002. The revised SIP was approved by the Council for implementation in 2003. Mission to Japan and Philippines completed by May 2003.	On-going 2003
C 12/12		Need to monitor AFTN circuit performance That, States concerned closely monitor performance of the following AFTN circuits and coordinate upgrading the circuits capacity, in accordance with the AFTN plan. 1. Manila/Singapore 6. Hong Kong/Manila 2. *Nadi/Apia Faleolo 7. Kuala Lumpur/Chennai 3. Mumbai/Colombo 8. Colombo/Singapore 4. Christchurch/Papeete 9. Tokyo/Singapore 5. Mumbai/Nairobi 10. Colombo/Male *the Apia Faleolo/Nadi AFTN circuit will be rerouted by Apia Faleolo/USA upon approval of the amendment proposal to ASIA/PAC ANP.	States concerned were requested to monitor loading condition and upgrade circuit capacity as specified in Table CNS-1A AFTN Plan. Consequently, - Manila/Singapore - upgraded to 300 baud; - Nadi/Apia - reconfigured to Apia/USA and implemented; - Mumbai/Colombo –upgraded to planned for upgrading to 64 kbps on 19 March 2003. 2400 bps in 12/02. Testing going on; - Christchurch/Papeete - upgraded to 2400 bps; - Hong Kong/Manila – upgraded to 300 baud; - Kuala Lumpur/Chennai – upgraded to 64 kbps in April 2003 upgrading planned for 12/02; - Colombo/Singapore – upgraded to 9600 bps on 12 May 2003	Among 10 circuits 8 circuits have been implemented /upgraded Rest remaining two circuit Mumbai/Nairobi and Colombo/Male are is expected to be upgraded by end of 2003. Need to upgrade these two circuits

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			upgrading planned for 12/02; - Tokyo/Singapore – <u>upgraded to 9600 bps on 15 January 2003</u>, upgrading planned for 12/02; and - Colombo/Male – upgrading planned for 12/02 03.	<u>are identified in Conclusion 13/11. It is therefore superceded by Conclusion 13/11 and actions on Conclusion 12/12 is thus considered complete.</u>
C 12/19		Protection of Aeronautical Frequency Spectrum That States: a) assign high priority to the aeronautical spectrum management; b) participate in the development of States' position for WRCs at the national level to ensure support to ICAO position; c) ensure, to the extent possible that, aviation representatives are included in States delegation to the Asia-Pacific Telecommunity (APT) Conference Preparatory Group meetings and at WRCs; and d) ensure participation of designated focal point or contact person at the Regional Preparatory Group Meeting for WRC-2003 to be held from 15 to 16 November 2001 followed by the AMCP WG-F Meeting to be held from 19-27 November 2001 in Bangkok and attendance at APTAPG Meetings and WRC 2003. <i>Noted the Conclusion and requested the Secretary General to continue to encourage States to</i>	ICAO Position was presented to the APT Preparatory Group Meetings for WRC-2003. The conclusion was brought to the attention of States to take appropriate action. List of CAA and APT contact points were provided to States. APT Meeting schedules were also provided to States with a request to participate at APT Meetings. <u>ICAO Position was presented at all five APT Regional Preparatory Group meetings. WRC 2003 was concluded on 4th July 2003 with satisfactory result.</u> <u>Outcome of WRC 2003 was reviewed by the joint meeting of the CNS/MET SG/7 and the CNS/ATM IC SG/10</u>	Completed Completed <u>Completed</u> On-going <u>Completed</u> On-going <u>Completed</u> On-going

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		<i>participate at various levels in different fora to provide support for the ICAO Position at forthcoming WRC-2003</i>		
C 12/20		Requirement for a new WAFS area of coverage “M” That, a) The ASIA/PAC ANP be amended to include under the WAFS a new area of coverage “M” (FASID Chart MET 7) as shown in Appendix G to the Report on Agenda Item 2.2; and b) FASID Tables MET 5 and MET 6, as developed by APANPIRG/11, be amended to include requirement for SWH prepared by the WAFC Washington for the new WAFC area of coverage “M” as given in Appendices H and I to the Report on Agenda Item 2.2. Note: FASID Chart M should be a mercator projection, with coordinates 100°E and 70°N; 110°W and 70°N; 110°W and 10°S; 100°E and 10°S.	Proposal for Amendment of FASID circulated to States. FASID Amendment proposal approved.	Completed On-going

Report Reference Concl./Dec. No.	Action by ANC/Council	Decision/Conclusion/ Action Taken	Action by States/ICAO	Status
C 12/22	C	GRIB Training Workshop That, the SADIS Provider State be invited to arrange for a GRIB training workshop, in co-ordination with ICAO, WMO and other States as necessary, in the ASIA/PAC Regions in 2002. <i>Noted the conclusion and requested the Secretary General to invite SADIS Provider state to hold this workshop in coordination and WMO.</i>	The workshop is planned to hold in November 2002. Combined GRIB/BUFR training was provided by UK Met Office in November 2002.	On-going Completed
C 12/25		Application of EUR OPMET update procedure in the ASIA/PAC Regions That, the procedure similar to the EUR OPMET update procedure be developed and introduced in the ASIA/PAC Regions.	The procedure is to be developed by the OPMET Exchange Task Force.	On-going
C 12/26		Tropical cyclone advisories with the data designator “FK” That, the TCACs Honolulu, Miami, New Delhi, Darwin, Nadi and Tokyo, designated to provide the service in the ASIA/PAC Regions, issue the advisories using the data designator “FK” and ensure the routing of these bulletins to aviation users and London Centre for uplink to the SADIS broadcast. Note: Requirement for Honolulu TCAC in the ASIA/PAC Regions is covered by Conclusion 12/33 formulated by the meeting.	Implemented by Japan and USA. Other TCACs have been notified through WMO Tropical Cyclone regional bodies. The TC advisories with data designator “FK” and standard format awarded to Annex 3 have been implemented by all TCACs in ASIA/PAC except New Delhi.	On-going

Report Reference Concl./Dec. No.	Action by ANC/Council	Decision/Conclusion/ Action Taken	Action by States/ICAO	Status
C 12/28		Proposal for amendment of ICAO SUPPS, Doc 7030/4 That, Regional Supplementary Procedures, ICAO Doc 7030/4, MID/ASIA and PAC, Part 3 – Meteorology – Aircraft Observations and Reports, be amended as shown in Appendix M to the Report on Agenda Item 2.2.	Proposal for Amendment of the regional SUPPs circulated to states. Amendment of the regional SUPPs approved.	On-going Completed
C 12/29		Gia Lam Meteorological Watch Office (MWO) That, a) FASID Table MET 1B of the ASIA/PAC ANP be amended to delete requirement for Hanoi and Ho Chi Minh MWOs and to add requirements for Gia Lam MWO; and b) Consequential amendments be made to FASID Table MET 2A, renamed as FASID Table MET 2B, FASID Table MET 3, Part I and Part II, renamed as FASID Tables 3A and 3B, accordingly.	Proposal for Amendment of FASID circulated to States. FASID Amendment proposal approved.	On-going Completed
C 12/30	C	Operation of the VAACs That, ICAO consider the proposal to amend Annex 3, and the Handbook on the IAVW – Operational Procedures and Contact List, Doc 9766 accordingly, that each VAAC should operate on a 24 hour basis. <i>Noted the conclusion and requested the secretary General to develop proposals for amendment of Annex 3 and Doc 9766 to ensure operation of VAACs on a 24-hour basis.</i>	The requirement to-behas been included in the draft Amendment proposal 73 to Annex 3.	On-going Completed

Report Reference Concl./Dec. No.	Action by ANC/Council	Decision/Conclusion/ Action Taken	Action by States/ICAO	Status
C 12/31		Volcanic ash advisory center That, FASID Table MET 3, Part II of the ASIA/PAC ANP, renamed as FASID Table MET 3B, be amended as shown in Appendix N to the Report on Agenda Item 2.2.	Proposal for Amendment of FASID circulated to States.	On-going Completed
C 12/32	ANC	Volcanic Ash Advisory and SIGMET in graphical format That, ICAO give consideration to further improvement of the format in which the graphical advisory should be issued by VAACs and development of proposals for the format of a graphical SIGMET for volcanic ash, including the necessary guidance regarding procedures for dissemination of information. <i>Noted the conclusion and requested the Secretary General to consider further improving the format of graphical advisories to be issued by VAACs and develop proposals for the graphical format of SIGMET messages for volcanic ash, including the necessary guidance regarding procedures for dissemination of information.</i>	The recommendation for BUFR-coded graphical volcanic ash advisories to be included in the Amendment proposal 73 to Annex 3.	On-going
C 12/33	C	Honolulu tropical cyclone advisory centre That, FASID Table MET 3, Part I of the ASIA/PAC ANP, renamed as FASID Table MET 3A, be amended, as shown in Appendix O to the Report on Agenda Item 2.2, to reflect designation of the TCAC Honolulu with the area of responsibility covering portion of the Central Pacific from 140°W to 180°W. <i>Noted the conclusion and its relationship to the designation of Honolulu as the tropical cyclone advisory centre for the Central Pacific area.</i>	Proposal for Amendment of FASID circulated to States. Approved.	On-going Completed

Report Reference Concl./Dec. No.	Action by ANC/Council	Decision/Conclusion/ Action Taken	Action by States/ICAO	Status
C 12/34		New FASID Charts MET 2 and MET 3 That, the ASIA/PAC ANP be amended to include the new FASID Chart MET 2 and FASID Chart MET 3, as given in Appendices P and Q to the Report on Agenda Item 2.2, showing the areas of responsibility of TCACs and VAACs respectively.	Proposal for Amendment of FASID circulated to States. Approved.	On-going Completed
C 12/35		ASIA/PAC Basic ANP and FASID, Part VI – Meteorology That, the regional procedures given in the introductory text to Part VI – Meteorology of the ASIA/PAC Basic ANP and FASID be amended as shown in Appendices R and S to the Report on Agenda Item 2.2.	Proposals for Amendment of Basic ANP and FASID circulated to States. Approved.	On-going Completed
C 12/36		Chapter 8 – Meteorology of the ASIA/PAC CNS/ATM Plan That, the ASIA/PAC Regional Plan for the new CNS/ATM Systems be amended to include Chapter 8 – Meteorology as given in Appendix T to the Report on Agenda Item 2.2.	To be incorporated in the next version of the Plan. The latest version of the Plan incorporates the MET part as Chapter 11; the Plan is posted on ICAO Bangkok website.	On-going Completed

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LIST OF PARTICIPANTS

State/Org/Name	Position	Address	Telephone/Fax	E-mail
Australia				
Mr. Jeffrey Bollard	Chief Engineer, Technical Standards Safety & Environment Assurance	Airservices Australia GPO Box 367 Canberra, ACT 2601 Australia	Tel: +61 (2) 6268-4949 Fax: +61 (2) 6268-5695	jeffrey.bollard@airservicesaustralia.com
Mr. Bob Peake	Manager, Technology Development	Airservices Australia GPO Box 367 Canberra, ACT 2601 Australia	Tel: +61 (2) 6268-4362 Fax: +61 (2) 6268-5709	bob.peake@airservicesaustralia.com
Mr. Ian Mallett	Head of Aerodrome and CNS/ATM Standards	Civil Aviation Safety Authority Australia GPO Box 2005 Canberra ACT 2601 Australia	Tel: +61 (2) 6217-1736 Fax: +61 (2) 6217-1700	ian.mallett@casa.gov.au
Mr. Ted Williams	National Manager Aviation Weather Services	Commonwealth Bureau of Meteorology GPO Box 1289K Melbourne Victoria 3001 Australia	Tel: +61 (03) 9669-4586 Fax: +61(03) 9669-4695	t.williams@bom.gov.au
Bangladesh				
Mr. Asaduzzaman	Director, Communication	Civil Aviation Authority of Bangladesh Kurmitola, Dhaka 1229 Bangladesh	Tel: +880-2-8911011 Fax: +880-2-8913322	dircom@accesstel.net
Mr. Md. Ali Reza Khan	Director, Air Traffic Services and Aerodromes	Civil Aviation Authority of Bangladesh Kurmitola, Dhaka 1229 Bangladesh	Tel: +880-2-8911125 8914810-16 Ext 3369 Fax: +880-2-8913322	arkhan@agni.com ali.r@bdcom.com

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Brunei Darussalam				
Mr. Hedus Abdullah	Aeronautical Telecommunications Engineer	Civil Aviation Department Ministry of Communications Brunei International Airport BB 2513 Brunei Darussalam	Tel: +673 (2) 330-518 Fax: +673 (2) 333-666	cato@brunet.bn
Mr. Lucas Wong	CNS/ATC/SAR	Civil Aviation Department Ministry of Communications Brunei International Airport BB 2513 Brunei Darussalam	Tel: +673 (2) 330-141 Fax: +673 (2) 344-201	
China				
Mr. Ren Lei	Engineer, Navigation Division	Air Traffic Management Bureau CAAC, P.O. Box 2272, Shilihe Chaoyang District, Beijing 10021, China	Tel: +86 (10) 6731-8866 Ext. 4062 Fax: +86 (10) 6731-8479	xysf@hotmail.com
Mr. Liu Shujun	Engineer, Telecom. Div.	Air Traffic Management Bureau CAAC, P.O. Box 2272, Shilihe Chaoyang District, Beijing 10021, China	Tel: +86 (10) 6731-8866 Ext. 4023 Fax: +86 (10) 6731-8478	atmb_ls@sohu.com
Mr. Xu Jianliang	Senior Engineer Meteorological Division	Air Traffic Management Bureau CAAC, P.O. Box 2272 Shilihe Chaoyang District, Beijing 10021, China	Tel: +86 (10) 6731-8866 Ext. 4115 Fax: +86 (10) 6731-8477	jjllxu@sohu.com xujl@atmb.net.cn
Hong Kong, China				
Mr. Leung Woon-yin	Assistant Director-General of Civil Aviation (Engineering & Systems)	Civil Aviation Department 10/F, Commercial Building Airport Freight Forwarding Centre 2 Chun Wan Road Hong Kong International Airport Hong Kong, China	Tel: +852 2591 5000 Fax: +852 2845 7160	wyleung@cad.gov.hk

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Mr. Peter Chun-Tung Wong	Senior Operations Officer	Air Traffic Management Division Civil Aviation Department 4/F, Air Traffic Control Complex Hong Kong International Airport Hong Kong, China	Tel: +852 2910 6446 Fax: +852 2910 0186	pctwong@cad.gov.hk
Mr. Shun Chi-ming	Senior Scientific Officer	Hong Kong Observatory 134A Nathan Road, Kowloon Hong Kong, China	Tel: +852 2926 8435 Fax: +852 2375 2645 +852 2311 9448	cmshun@hko.gov.hk
Macau, China				
Mr. Lo Veng Tong, Freeman	Technical Officer, Telecommunications and Radio Navigation	Civil Aviation Authority of Macau Airport Infrastructure & Air Navigation R. Dr. Pedro, Jose Lobo, 1-3 Edif. Luso International 26 ^o andar, Macau	Tel: +853 511-213 Fax: +853 338-089	aacm@macau.ctm.net freemanlo@hotmail.com
DPR Korea				
Mr. Kim Chon Su	General Manager of Air Koryo	Air Koryo 4 th Floor, Charn Issara Tower 942/134 Rama IV Rd Bangkok 10500 Thailand	Tel: +66-017760621	
Mr. Pak Yun Jip	Air Koryo Staff	Air Koryo 4 th Floor, Charn Issara Tower 942/134 Rama IV Rd Bangkok 10500 Thailand	Tel: +66-016582725	
Fiji				
Mr. Apenisa Nagatalevu	A/Manager ATS Airports Fiji Limited	Airports Fiji limited (AFL) Private Mail Bag, Nadi Airport Fiji	Tel: +679 672 5777 Fax: +679 672 5161	apenisan@afl.com.fj

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Mr. Moagrava Elaisa	Manager Telecommunications Services	Airports Fiji limited (AFL) Private Mail Bag, Nadi Airport Fiji	Tel: +679 672 5777 Fax: +679 672 5161	mts@afl.com.fj
India				
Mr. A.K. Misra	Executive Director	Airports Authority of India Rajiv Gandhi Bhavan Safdarjung Airport New Delhi 110003 India	Tel: +91 (11) 2465-2075 Fax: +91 (11) 2465-4142	
Mr. P.K. Singhal	General Manager (Communication)	Airports Authority of India Rajiv Gandhi Bhavan Safdarjung Airport New Delhi 110003 India	Tel: +91 (11) 2462-0287 Fax: +91 (11) 2462-0287	gmcomaai@vsnl.net
Mr. R.C. Khurana	General Manager (ATM)	Airports Authority of India Rajiv Gandhi Bhavan Safdarjung Airport New Delhi 110003 India	Tel: +91 (11) 2465 2648 Fax: +91 (11) 2461 1078	gmaraaai@vsnl.net
Indonesia				
Mr. Novie Riyanto Rahardjo		Navigation & Calibration Section Directorate of Aviation Safety DGCA - Indonesia Jl. Merdeka Barat No. 8 Gedung Karya Lt. 23 Jakarta, Indonesia	Tel: +62 (21) 350 6451 Fax: +62 (21) 350 7459	novierianto@telkom.net
Mr. Tussau Fabrice	Expert of DGAC	DGAC – Indonesia Permata Plaza, 8/F Suite 08-04 Jl. MH. THAMRIN 57 Jakarta 10350 Indonesia	Tel: +62 (21) 3903312/13 Fax: +62 (21) 3903311	sot.jkt@indo.net.id

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Japan				
Mr. Shigeki Masuda	Special Assistant to the Director Air Traffic Services System Planning Division	ATS Department Civil Aviation Bureau Ministry of Land, Infrastructure and Transport 2-1-3, Kasumigaseki, Chiyoda-ku Tokyo 100-8918, Japan	Tel: +81 (3) 5253-8739 Fax: +81 (3) 5253-1663	masuda-s2sa@mlit.go.jp
Mr. Morio Miura	Special Assistant to the Director Operations and Flight Inspection Division	ATS Department Civil Aviation Bureau Ministry of Land, Infrastructure and Transport 2-1-3, Kasumigaseki, Chiyoda-ku Tokyo 100-8918, Japan	Tel: +81 (3) 5253-8751 Fax: +81 (3) 5253-1664	miura-m2fj@mlit.go.jp
Mr. Keizou Udaka	Special Assistant to the Director	Air Traffic Services System Planning Division Civil Aviation Bureau Ministry of Land, Infrastructure and Transport 2-1-3, Kasumigaseki, Chiyoda-ku Tokyo 100-8918, Japan	Tel: +81 (3) 5253-8111 Fax: +81 (3) 5253-1663	udaka-k2s5@mlit.go.jp
Mr. Takeshi Koizumi	Deputy Director of Volcanological Division	Japan Meteorological Agency 1-3-4 Ote-machi, Chiyoda-ku Tokyo 100-8122 Japan	Tel: +81 (3) 3284 1749 Fax: +81 (3) 3212 3648	t-koizumi@met.kishou.go.jp
Mr. Masanori Obayashi	Senior Coordinator for Aviation Weather Forecasts Administration Division	Forecast Department Japan Meteorological Agency 1-3-4 Ote-machi, Chiyoda-ku Tokyo 100-8122 Japan	Tel: +81 (3) 3212 8341 ext 3351 Fax: +81 (3) 3284 0180	m_obayashi@met.kishou.go.jp
Mr. Sadayuki Izuka	Senior Manager ATC Systems Division	NEC Corporation 7-1, Shiba-5 chome, Minato-ku Tokyo 108-8001 Japan	Tel: +81 (3) 3798 6636 Fax: +81 (3) 3798 6227	s-izuka@cq.jp.nec.com

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Malaysia				
Mr. Ooi See Hai	Director, Meteorological Office	Malaysian Meteorological Service Jalan Sultan, 46667 Petaling Jaya Selangor Malaysia	Tel: +603 79678004	osh@kjc.gov.my
Mr. Razak Ali	Air Traffic Services Dept.	Department of Civil Aviation Malaysia Air Traffic Services Division Block A, Air Traffic Services Complex Sultan Abdul Aziz Shah Airport 47200 Subang, Selangor Darul Ehsan Malaysia	Tel: +603 5631 1392 Fax: +603 7847 3572	razatc@hotmail.com klatcc@tm.net.my accwmmfc@tm.net.my
Maldives				
Mr. Ali Shareef	Senior Meteorological Forecaster National Meteorological Centre	Department of Meteorology Orchid Building, Orchid Magu Male 20-05 Maldives	Tel: +960 323084, 324524 Fax: +960 320021, 315509	shareef@meteorology.gov.mv
Mr. Moosa Solih	Assistant Managing Director	Maldives Airports Company Limited Malé International Airport Hulhulé Republic of Maldives	Tel: +960 31 3257 Fax: +960 317033	solih@airports.com.mv
Mongolia				
Mr. S. Manlai	Technical Manager	Civil Aviation Authority of Mongolia Buyant-Ukhaa Airport Ulaanbaatar-34, Mongolia	Tel: +976 11 982048 Fax: + 976 11 379888	manlai@mcaa.gov.mn
Mr. Kh. Batsaikhan	Inspector ATS	Civil Aviation Authority of Mongolia Buyant-Ukhaa Airport Ulaanbaatar-34, Mongolia	Tel: +976 11 982041 Fax: + 976 11 379640	kh_batsaikhan@mcaa.gov.mn
Mr. P. Ganbaatar	Manager of Technical Development Division Policy & Foreign Relations Department	Civil Aviation Authority of Mongolia Buyant-Ukhaa Airport Ulaanbaatar-34, Mongolia	Tel: +976 11 986-022 Fax: +976 11 379-640	ganbaatar@mcaa.gov.mn

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
New Zealand				
Mr. Peter Lechner	Head of Planning & Reporting	Civil Aviation Authority of New Zealand Aviation House 1, Market Grove P.O. Box 31-441, Lower Hutt New Zealand	Tel: +64 4 5609400 Fax: +64 4 5692824	lechnerp@caa.govt.nz
Mr. Toby Farmer	Aeronautical Services Officer	Civil Aviation Authority of New Zealand Aviation House 1, Market Grove P.O. Box 31-441, Lower Hutt New Zealand	Tel: +64 4 5609583 Fax: +64 4 5692024	farmert@caa.govt.nz
Mr. Ross Withers	ATS Development Manager	Airways Corporation of New Zealand Limited P.O. Box 14-131 Christchurch New Zealand	Tel: +64 3 358 1517 Fax: +64 3 358 1566	ross.withers@airways.co.nz
Pakistan				
Mr. M. Ahsan Malik	Chief Electronics Engineer/GM EED	Civil Aviation Authority HQ Terminal-1 JIAP Karachi 75200 Pakistan	Tel: +92 (21) 924-8487	ahsanmalik02@hotmail.com
Mr. M. Salman Athar	Senior Air Traffic Control Officer/ATC.RFC	Civil Aviation Authority Islamabad Airport Pakistan	Tel: +92 (51) 928 0360 Fax: +92 (51) 928 0339	mazratsalman770@hotmail.com
Republic of Korea				
Mr. Park, Hyeong-Taek	Director, CNS System Division	Civil Aviation Safety Authority Ministry of Construction & Transportation 274 Gwahae-dong, Gangseo-gu Seoul, 157-711 Republic of Korea	Tel: +82 2 2669 6410 Fax: +82 2 6342 7299	htkpark@moct.go.kr

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Mr. Park Jin-seok	Planning Team Manager	Planning & Operation Division Aviation Meteorological Office Korea Meteorological Administration 2172 1, Unseo-dong, Jung-gu, Incheon 400 340 Republic of Korea	Tel: +82 32 740 2863 Fax: +82 32 740 2807	Parkjs1@kma.go.kr
Mr. Park, Hyo-Dal	Professor	INHA University Department of Electronics 253 Yong-Hyun-Dong, Nam-Ku Incheon 402-751 Republic of Korea	Tel: +82 32 860 7418 Fax: +82 3033 130 7418	hdpark@inha.ac.kr
Singapore				
Mr. Kwek Chin Lin	Project Officer (Systems)	Civil Aviation Authority of Singapore 60 Biggin Hill Road Singapore 509950	Tel: +65 6541-2664 Fax: + 65 6545-6252	kwek_chin_lin@caas.gov.sg
Mr. Lam Keng Gaik	Head Main Meteorological Office	Meteorological Services Division National Environment Agency P.O. Box 8, Changi Airport Singapore 918141	Tel: +65 6542-2863 Fax: +65 6542-5026	lam_keng_gaik@nea.gov.sg
Mr. Lo Weng Kee	Senior Engineer (Nav aids)	Civil Aviation Authority of Singapore P.O. Box 1 Singapore Changi Airport Singapore 918141	Tel: +65 6541-2445 Fax: +65 6542-2447	lo_weng_kee@caas.gov.sg
Sri Lanka				
Mr. C.N. Biyanwilage	Deputy Chief Electronics Engineer	Airport and Aviation Services (S.L.) Ltd., NSC Bandaranaike International Airport Katunayake, Sri Lanka	Tel: +94 (1) 2252-441 Fax: +94 (1) 2252-400	champaka@airport.lk
Mr. P.R. Perera	Air Traffic Control Supervisor	Airport and Aviation Services (S.L.) Ltd., ACC Colombo Airport Ratmalana, Sri Lanka	Tel: +94 (1) 625555 Fax: +94 (1) 635106	ranpravi@slt.lk

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Mr. W.W.M. Dayarathne	Senior Aeronautical Communications Officer Aeronautical Communications Centre	Airport and Aviation Services (S.L.) Ltd. Bandaranaike International Airport, Katunayake, Sri Lanka	Tel: +94 (1) 2252-328 Fax: +94 (1) 2252-861 ext 6115	
Thailand				
Mr. Suchart Hiranyabat	Chief of Air Navigation Facilities Group	Air Navigation Facilities Group Airport Standards and Air Navigation Facilitating Division Department of Civil Aviation 71 Soi Ngarmduplee Tungmahamek, Satorn Bangkok 10120, Thailand	Tel: +66 (2) 287-3194 Fax: +66 (2) 287-3194	
Mrs. Yaowapa Tanadchangsang	Meteorologist	Bureau of Meteorology for Transportation Aeronautical Meteorological Division 3 rd Floor, ATC Tower Bangkok International Airport Bangkok 10210, Thailand	Tel: +66 (2) 535-4667 Fax: +66 (2) 535 4667	tanad_yao@hotmail.com
Mrs. Srisuda Chotwanwirach (Observer)	Meteorologist Meteorological Department	Bureau of Meteorology for Transportation 3 rd Floor, ATC Tower Bangkok International Airport Bangkok 10210, Thailand	Tel: +66 (2) 535-4667 Fax: +66 (2) 504 2471	srisuda@aeromet.tmd.go.th
Mr. Thavit Nowvaratkoonchai	Executive Officer Systems Engineering	Software and Information Systems Dept. Aeronautical Radio of Thailand Ltd. 102 Ngamduplee, Tungmahamek Satorn, Bangkok 10120, Thailand	Tel: +66 (2) 285-9579 Fax: +66 (2) 285-9153	thavit@aerothai.co.th

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Tonga				
Mr. Tino Fuka	Manager Training ATS	Ministry of Civil Aviation P.O. Box 845 Queen Salote Road Nuku' Alofa Tonga	Tel: +676 31988 Fax: +676 31988	fukatino@yahoo.com
Mr. Ofa Fa'anunu	Senior MET Officer	Ministry of Civil Aviation P.O. Box 845 Queen Salote Road Nuku' Alofa Tonga	Tel: +676 24144 Fax: +676 24145	ofaanunu@mca.gov.to
United Kingdom				
Mr. Nigel Gait	International Aviation Manager	MET Office Room SG/12 Sutton House, London Road Bracknell Berkshire RG12 2SZ United Kingdom	Tel: +44 1344 856-268 Fax: +44 1344 854-156	nigel.gait@metoffice.com
Mr. David Underwood	Group Head Public Sector Business	MET Office Room SG/7 Sutton House, London Road Bracknell Berkshire RG12 2SY United Kingdom	Tel: +44 1344 856-281 Fax: +44 1344 854-156	david.underwood@metoffice.com
Mr. Stephen Copley	Group Head Aviation Commerce & Enterprise	MET Office Room S2 Sutton House, London Road Bracknell Berkshire RG12 2SZ United Kingdom	Tel: +44 1344 854-204 Fax: +44 1344 854-821	stephen.copley@metoffice.com
United States				
Mr. Braks Etta	Regional Technical Advisor Office of International Research and Acquisitions, ASD-500	Federal Aviation Administration 800 Independence Avenue, S.W. Washington, D.C. 20591 U.S.A.	Tel: +1 202 267 8782 Fax: +1 202 267 5198	braks.etta@faa.gov
Mr. Ted Davies	Director of International Affairs, ARA-7	Federal Aviation Administration 800 Independence Avenue, S.W. Washington, D.C. 20591 U.S.A.	Tel: +1 202 267 7889 Fax: +1 202 267 5198	ted.davies@faa.gov

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Mr. Dennis Beres	CNS Representative Office of International Research and Acquisitions, ASD-500	Federal Aviation Administration P.O. Box 50109 300 Ala Moana Blvd Honolulu, Hawaii 96813 U.S.A.	Tel: +1 808 541 1244 Fax: +1 808 541 3462	Dennis.beres@faa.gov
Mr. Kevin Browne	Staff Specialist Aerospace Weather Policy & Standards, ARS-20	Federal Aviation Administration 800 Independence Avenue SW Washington, DC 20591, USA	Tel: +1 202 385 7706 Fax: +1 202 385 7701	kevin.browne@faa.gov
Mr. Robert Hallman	NNCC Manager, ANM-400	Salt Lake National Network Control Center, NNCCF 2150 W. 700 N. Bldg. #2 Salt Lake City, Utah, 84116 U.S.A.	Tel: +1 801 320 2165 Fax: +1 801 320 2093	robert.hallman@faa.gov
Mr. Allan Dale Storm	U.S. Air Force Flight Standards Agency Civil/Military Aviation Issues Division	USAF AFFSA/XAX 1535 Command Dr., Suite D/E Andrew AFB, MD 20762-7002 U.S.A.	Tel: +1 240 857 2146 Fax: X3194	allan.storm@andrews.af.mil
Mr. Richard Stone	Programme Manager, International Aviation Services, NWS	National Weather Service 1325, East West Highway (13316) Silver Spring, MD 20910 U.S.A	Tel: +1 301 713-1726 Ext. 140 Fax: +1 301 713-1520	richard.stone@noaa.gov
Mr. Jack McConnell	Advisor	US FAA ITT Industries Inc. 901 D St. SW Suite 222 Washington, D.C. 20024 U.S.A.	Tel: +1 202 314 5953 Fax: +1 202 264 3910	jack.ctr.mcconnell@faa.gov

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Vietnam				
Mr. Dao Son Hai	Senior Meteorologist	Air Navigation Department Civil Aviation Administration of Vietnam Gia Lam Airport, Hanoi, Vietnam	Tel: +84 (4) 827-4191 Fax: +84 (4) 827-4194	dsh@caa.gov.vn
Mr. Dang Dinh Tuat	ATS/MET Specialist	Air Traffic Management of Vietnam Civil Aviation Administration of Vietnam Gia Lam Airport, Hanoi, Vietnam	Tel: +84 (4) 873 0320 Fax: +84 (4) 827 2597	vatmats@hn.vnn.vn
Mr. Phung Minh Tan	Chief of Technical Branch Southern Region Air Traffic Services	Air Traffic Management of Vietnam Civil Aviation Administration of Vietnam Ho Chi Minh City, Viet Nam	Tel: +84 (4) 844 3105	sorats@hcm.vnn.vn
IATA				
Mr. Dayanthe Athulathmudali	Assistant Director, Safety Operations & Infrastructure - Asia/Pacific	International Air Transport Association 77 Robinson Road, #05-00 SIA Building Singapore 068896	Tel: (65) 6239-7264 Fax: (65) 6536-6267	athud@iata.org
Mr. Soon Boon Hai	Assistant Director, Safety Operations & Infrastructure - Asia/Pacific	International Air Transport Association 77 Robinson Road, #05-00 SIA Building Singapore 068896	Tel: (65) 6239-7262 Fax: (65) 6536-6267	soonbh@iata.org
Mr. Owen B. Dell	Manager, International Operations	Cathay Pacific Airways Limited International Affairs Department 9/F Central Tower, Cathay Pacific City 8 Scenic Road Hong Kong International Airport Lantau, Hong Kong, China	Tel: 852 2747 8829 Fax: 852 2141 8829 SITA: HKGVLCX	owen_dell@cathaypacific.com
Capt. Aric Oh	Manager, Flight OPS Technical	Singapore Airlines Limited 161 Tai Keng Gardens Singapore 535433	Tel: +65-6540 3694 Fax: +65-6285 8687	aric_oh@singaporeair.com.sg ciraho@pacific.net.sg

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State/Org/Name	Position	Address	Telephone/Fax	E-mail
Mr. Noriyuki Todo	Staff Director Meteorology, Flight Operations Department	Japan Airlines Co., Ltd. West Passenger Terminal 3-2, Haneda Airport 3-chome Ota-ku, Tokyo 144-0041, Japan	Tel: +81 (3) 5756-3136 Fax: + 81 (3) 5756-3527	noriyuki.todo@jal.com
Mr. Hans-Rudi Sonnabend	Head of Meteorological Services	Lido GmbH Lufthansa Aeronautical Services FRA OD/N-M, D-60546 Frankfurt/Main, Germany	Tel: +49 (69) 6969-0362 Fax: +49 (69) 6968-740	h-r.sonnabend@lido.net
IFALPA				
Capt. Koichi Sano	Regional Vice President for the North Pacific	International Federation of Air Line Pilot's Associations 3-2-11 Higiriyama Konan-Ku, Yokohama City 233 Japan	Tel: +81 (3) 5705 2770 Res: +81 (45) 845-2154 Fax: +81 (3) 5705 3274 Res: +81 (45) 847-0363	Sano-koichi@alpajapan.org KoichiSano@k4.dion.ne.jp
Capt. Toby Gursansky	Regional Vice President for the South Pacific	IFALPA Level 1, 12 Lord Street Locked Bag 747 Botany NSW 2019 Australia	Tel: +61-2-99487532	gursansky@bigpond.com
SITA				
Mr. Adrian Goodfellow	Regional Manager APAC & SEAsia Operations and Navigation Services	Aircraft Services Ground floor SITA 40 Brisbane Avenue Barton ACT 2603 Australia	Tel: +61-2-6273 9103 Fax: +61-2-6273 7700 Mobile: 61-413 881 320	Adrian.goodfellow@sita.aero
WMO				
Mr. N.T. Daillo	Chief, Aeronautical Meteorology Unit	WWW Applications Department World Meteorological Organization 7 bis, Avenue de la Paix CH-1211 Geneva 2 Switzerland	Tel: +41 (22) 730 8283 Fax: +41 (22) 730 8021	ntdiallo@www.wmo.ch diallo_n@gateway.wmo.ch

**CNS/MET/SG/7 and CNS/ATM/IC/SG/10
Bangkok, Thailand, 15-21 July 2003**

State/Org/Name	Position	Address	Telephone/Fax	E-mail
ICAO				
Mr. K.P. Rimal	Regional Officer, CNS	International Civil Aviation Organization 252/1 Vibhavadi Rangsit Road, Ladyao, Chatuchak, Bangkok 10900, Thailand	Tel: +66 (2) 537-8189 Fax: +66 (2) 537-8199	krimal@bangkok.icao.int
Mr. Li Peng	Regional Officer, CNS	International Civil Aviation Organization 252/1, Vibhavadi Rangsit Road, Ladyao, Chatuchak, Bangkok 10900, Thailand	Tel: +66 (2) 537-8189 Fax: +66 (2) 537-8199	pli@bangkok.icao.int
Mr. David J. Moores	Regional Officer, ATM	International Civil Aviation Organization 252/1 Vibhavadi Rangsit Road, Ladyao, Chatuchak, Bangkok 10900, Thailand	Tel: +66 (2) 537-8189 Fax: +66 (2) 537-8199	dmoores@bangkok.icao.int
Mr. John E. Richardson	Regional Officer, ATM	International Civil Aviation Organization 252/1 Vibhavadi Rangsit Road, Ladyao, Chatuchak, Bangkok 10900, Thailand	Tel: +66 (2) 537-8189 Fax: +66 (2) 537-8199	jrichardson@bangkok.icao.int
Mr. Dimitar Ivanov	Regional Officer, MET	International Civil Aviation Organization 252/1, Vibhavadi Rangsit Road, Ladyao, Chatuchak, Bangkok 10900, Thailand	Tel: +66 (2) 537-8189 Fax: +66 (2) 537-8199	divanov@bangkok.icao.int



International Civil Aviation Organization

**Seventh Meeting of CNS/MET Sub-Group of APANPIRG
Tenth Meeting of CNS/ATM IC Sub-Group of APANPIRG**

Bangkok, Thailand, 15 – 21 July 2003

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