



International Civil Aviation Organization

**NINTH MEETING OF THE
COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND
METEOROLOGY SUB-GROUP OF APANPIRG
(CNS/MET SG/9)**

Bangkok, Thailand, 11–15 July 2005

Agenda Item 13: Review CNS/ATM systems planning and implementation:

- 2) MET related issues**
- 3) Inter-disciplinary issues**

REPORT OF METATM TASK FORCE

(Presented by Chairman of the Task Force)

SUMMARY

This paper reports on the work of METATM Task Force of the
CNS/MET SG/

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 terms of reference of the Task Force(TF) are:

- 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

2.1 Task Force Activity Since July 2004

2.1 Regional survey on the MET component of ADS reports

2.1.1 In response to Conclusion 13/30 of APANPIRG the task force conducted a regional survey on the status and future plans of States to process the MET component of ADS reports. A preliminary survey report was presented to CNS/MET SG 8 in July 2004. The final report which was submitted for APANPIRG 15 is at Attachment 1 to this report.

2.2 Fostering of exchanges between MET and ATM

2.2.1 In line with Conclusion 14/45 of APANPIRG below:

Conclusion 14/45 - Fostering of exchanges between MET and ATM

That,

a) The MET Authorities/Providers of the States, be encouraged to continually assess with the corresponding ATM authorities the requirements for MET information with the aim of developing new products/information to support the ATM, bearing in mind the potential costs and benefits involved; and

b) ICAO be invited, in coordination with WMO, to organize a MET/ATM coordination seminar in ASIA/PAC Region in 2004, to foster the exchanges between the MET and ATM experts in order to facilitate further development of the MET component of the CNS/ATM systems in the ASIA/PAC Region.

2.2.2 The Task Force has been involved in the organisation of a MET/ATM coordination seminar. A draft program has been prepared and is at Attachment 2.

2.2.3 The Task Force has compiled a list of Annex 3 (Amendment 73) SARPs which deal specifically with arrangements between Meteorological Authorities and Air Traffic Service Authorities. This material has been prepared to help facilitate discussion between MET and ATM communities and the development of new MET products in support of ATM. The list can be found at Attachment 3 to this report.

2.3 MET developments in support of ATM

2.3.1 A number of States have been working to design and develop MET products and services to better utilise MET information in support of ATM. Samples of a number of such products are at Attachment 4 and represent excellent examples of MET/ATM liaison and cooperation.

2.3.2 Members of the group may recall that Japan presented an information paper at CNS/MET SG7 outlining details of new product development in support of ATM. The products discussed included a graphical depiction of forecast conditions critical to ATM operations, and terminal area thunderstorm information. These products are shown at Attachment 4 figures A4.1 and A4.2.

2.3.3 Attachment 4 Table A4.1 shows a sample "TerMET" product under development by Hong Kong, China. The product was developed after consultation with users to identify ATM specific MET requirements. Detailed information regarding this product will be presented at CNS/MET SG9 by Hong Kong, China.

2.3.4 Attachment 4 figure A4.3 shows a product developed by Australia displaying terminal area convective information.

2.3.5 Attachment 4 figure A4.4 show a demonstration product developed by the United States to display near real-time convective information in relation to aircraft position. The system has the ability to produce tactical cockpit displays for relay to aircraft in flight.

2.4 Future work of the Task Force

2.4.1 The Task Force plans to;

- further assist with the inclusion of ATM requirements for MET information in the CNS/ATM plan as a task of the CNS/MET SG,
- develop a range of sample products for MET information required in support of ATM for discussion between relevant MET and ATM authorities,
- assist with the planning of a MET/ATM coordination seminar in ASIA/PAC Region

3. Action

3.1 The meeting is invited to note the information provided and the work of the Task Force.

Attachment 1

Asia/Pacific Regional Survey on the current status and future plans of States to process the MET component of ADS reports

1. Introduction

1.1 As a result of conclusion 13/30 of APANPIRG the METATM Task Force of the CNS/MET sub-group has carried out a regional survey to assess the current status and future plans of States in the Asia/Pac Regions to process the MET component of the ADS message (MET block) and forward the data to the WAFCs and to assess if the data is quality controlled. This paper presents the responses to the survey carried out over June and July 2004.

2. Survey

2.1 The survey and covering letter at Attachment A were prepared and distributed to States. Sixteen responses were received.

3. Survey Responses

3.1 Q1. Use of ADS by ATS authority

Is ADS being used?

- Six States indicated that ADS was being used operationally
- One State was conducting a trial of ADS
- One State was conducting a preliminary test of ADS
- One State did not answer this question.

3.2 Q2. Reception of MET block by meteorological watch offices (MWO)

Are arrangements in place for MWO to receive the MET block. Please provide brief description

- One State was receiving the MET block and forwarding it to MWO via AFTN in AIREP format.
- Two States were using ADS but not receiving the MET block
- One State was either not receiving or not forwarding the MET Block to MWO.
- Of the two States conducting Trials/Tests one State reported it was receiving the MET block via D-ATIS and forwarding it to MWO through AFTN. The other State was using the MET block for ATC purposes but not forwarding it.
- One State was not forwarding the data to MWO but was placing on the WMO GTS.
- Eight States were not using ADS
- One State did not provide a response to this question.

3.3 Q3. Quality Control

Is the MET block quality controlled

a. If so how (e.g. range check, check for transmission errors)?

- The State using ADS operationally and forwarding the MET block to MWO was performing a syntax check on the data.
- The State testing ADS and forwarding the MET block to MWO was not quality

- controlling the MET block.
- One State was performing a transmission check.

3.4 **Q4. Dissemination**

Is the data forwarded to the WAFCs?

a. If so how?

- The MWO receiving the MET block in AIREP format was forwarding the information to WAFCs via the WMO GTS.
- It could not be determined if the MWO of the State testing ADS was forwarding the MET block to WAFCs.

3.5 **Q5. Future plans**

Are there plans for the introduction of ADS?

a. If so when,

b. Have provisions been made for MWO to;

- i.** Receive the MET block when it becomes available
- ii.** QC the data
- iii.** Forward the data to WAFCs?

Response to part **a.**

- Six States are already using ADS.
- Two States indicated they have no plans for the introduction of ADS.
- Four States indicated they have plans for the introduction of ADS, three during 2005 and one between 2005 and 2010.
- One State had successfully demonstrated ADS including MET block extraction but is unlikely to utilise ADS due to adequate ATC radar coverage.
- One State had currently testing ADS including MET block extraction is unlikely to utilise ADS due to adequate ATC radar coverage.
- One State replied that implementation would be subject to future development of ADS and ICAO requirements.
- One State did not answer this question.

Response to part **b.**

- One State indicated that MWO was currently receiving, performing QC and forwarding to the MET block to WAFCs.
- One State has made provisions to forward the MET block to MWO but does not yet do so however it does QC and place the data on the WMO GTS.
- Three States indicated provisions have been made for MWO to receive, QC and forward the MET block to WAFCs (timelines of end 2004, 2005 and 2010 were provided).
- One State will make provisions for MWO to receive, QC and forward the MET block to WAFCs after ADS implementation expected between 2005-2010.
- One State replied that subject to future development of ADS and ICAO requirements it will incorporate the provisions in its ATC systems.
- Two States responded MET block extraction is unlikely to utilise ADS due to adequate ATC radar coverage.
- Two States do not plan to implement ADS (question not applicable).
- Two States have made no provision to for MWO to receive, QC or forward the MET block.

- One States responded that coordination was required between three organisation and invited ICAO to facilitate discussion.
- Two States did not provide a response to this part of the question.

3.6 Further Comments

Please feel free to provide comment on any aspects of your experience with the MET component of the ADS message which may be of benefit to other States or you would like to draw to the attention of ICAO.

A number of States indicated that ADS was not likely to be adopted in the near term due to adequate surveillance radar coverage. One of these States was pursuing the retrieval of MET data via Mode-S datalink noting that this technique appears an attractive alternative to ADS as it would not incur ACARS communication costs. However it also noted that the weather reporting function had not been implemented in the transponder software and the supplier had no plan to implement it due to the lack of requirements from airlines. The State encourages other Meteorological Authorities to note the potential of this datalink for aircraft weather reporting and explore its feasibility with their National ATS authorities and airlines.

The only State currently utilising the MET block of ADS operationally has noted data quality issues due to the use of the AIREP Bulletins for the distribution of data and suggests that with the growth of ADS derived data it may be appropriate to identify ADS data to allow specifically designed quality control processes which should include the provision to associate data to individual aircraft.

Ted Williams
Chairman
METATM TF of the CNS/MET SG
16 August 2004

Attachment 2

Regional Seminar on MET/ATM

Provisional Agenda

- Agenda Item 1:** Organisation of Air Traffic Management and Meteorological services by the States:
- 1) Authorities and Providers
 - 2) Current and proposed organisational frameworks and consultative mechanisms
- Agenda Item 2:** ICAO Annexes and guidance materials relating to MET and ATM coordination arrangements
- 1) Annex 3 SARPS relating to ATM
 - 2) Annex 11 SARPS and PANS-ATM (Doc 4444) relating to MET
 - 3) Doc 9377 (Manual on Coordination between ATS, AIS and Aeronautical MET services)
- Agenda Item 3:** Meteorological Impacts on ATM:
- 1) En-route – Large-scale Weather Deviations
 - 2) Terminal Area
MET information for Air Traffic Flow Management
- Agenda Item 4:** Use of MET by ATM:
- 1) Current practices
 - 2) Limitations of MET information (uncertainty) and the resources required to provide a particular level of service
- Agenda Item 5:** Future requirements – MET component of the CNS/ATM systems:
- 1) ATM developments requiring additional MET information
 - 2) Tailored products
 - 3) Products under development

Annex 3 SARPS relating to ATM/ATS

CHAPTER 4. METEOROLOGICAL OBSERVATIONS AND REPORTS

4.2 Agreement between air traffic services authorities and meteorological authorities

Recommendation. — An agreement between the meteorological authority and the appropriate ATS authority should be established to cover, amongst other things:

- a) the provision in air traffic services units of displays related to integrated automatic systems;
- b) the calibration and maintenance of these displays/instruments;
- c) the use to be made of these displays/instruments by air traffic services personnel;
- d) as and where necessary, supplementary visual observations (for example, of meteorological) phenomena of operational significance in the climb-out and approach areas) if and when made by air traffic services personnel to update or supplement the information supplied by the meteorological station;**
- e) meteorological information obtained from aircraft taking off or landing (for example, on wind shear); and
- f) if available, meteorological information obtained from ground weather radar.

Note.— Guidance on the subject of coordination between ATS and aeronautical meteorological services is contained in the Manual on Co-ordination Between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services (Doc 9377).

4.3 Routine observations and reports

4.3.1 At aerodromes, routine observations shall be made throughout the 24 hours each day, except as otherwise agreed between the meteorological authority, the appropriate ATS authority and the operator concerned. Such observations shall be made at intervals of one hour or, if so determined by regional air navigation agreement, at intervals of one half-hour. At other aeronautical meteorological stations, such observations shall be made as determined by the meteorological authority taking into account the requirements of air traffic services units and aircraft operations.

4.4 Special observations and reports

4.4.1 A list of criteria for special observations shall be established by the meteorological authority, in consultation with the appropriate ATS authority, operators and others concerned.

4.6.3 Runway visual range

4.6.3.5 Recommendation. —The units providing air traffic service and aeronautical information service for an aerodrome shall be kept informed without delay of changes in the serviceability status of the automated equipment used for assessing runway visual range.

4.8 Observations and reports of volcanic activity

Recommendation. — The occurrence of pre-eruption volcanic activity, volcanic eruptions and volcanic ash cloud should be reported without delay to the associated air traffic services unit, aeronautical information services unit and meteorological watch office. The report should be made in the form of a volcanic activity report comprising the following information in the order indicated:

CHAPTER 5. AIRCRAFT OBSERVATIONMS AND REPORTS

5.8 Relay of air-reports by ATS units

The meteorological authority concerned shall make arrangements with the appropriate ATS authority to ensure that, on receipt by the ATS units of:

- a) routine and special air-reports by voice communications, the ATS units relay them without delay to their associated meteorological watch office;
- b) routine air-reports by data link communications, the ATS units relay them without delay to WAFCs and
- c) special air-reports by data link communications, the ATS units relay them without delay to their associated meteorological watch office and, WAFCs.

CHAPTER 7. SIGMET NAD AIRMET INFORMATION, AERODROME WARNINGS AND WINDS SHEAR WARNINGS

7.1 SIGMET information

7.1.6 Close coordination shall be maintained between the meteorological watch office and the associated area control centre/flight information centre to ensure that information on volcanic ash included in SIGMET and NOTAM messages is consistent.

7.4 Wind shear warnings

7.4.2 Recommendation.— Wind shear warnings for arriving aircraft and/or departing aircraft should be cancelled when aircraft reports indicate that wind shear no longer exists, or alternatively, after an agreed elapsed time. The criteria for the cancellation of a wind shear warning should be defined locally for each aerodrome, as agreed between the meteorological authority, the appropriate ATS authority and the operators concerned.

CHAPTER9. SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

9.4 Flight documentation

9.4.4 **Recommendation.** — Whenever necessary and possible, the flight documentation should be brought up to date, in writing or orally, before it is supplied to flight crew members. In cases where a need for amendment arises after the flight documentation has been supplied, and before take-off of the aircraft, the meteorological office should, as agreed locally, issue the necessary amendment or updated information to the operator or to the local air traffic services unit, for transmission to the aircraft.

9.6 Information for aircraft in flight

9.6.2 Meteorological information for use by aircraft in flight shall be supplied to air traffic services units in accordance with the specifications of Chapter 10.

CHAPTER 10. INFORMATION FOR AIR TRAFFIC SERVICES, SEARCH AND RESCUE SERVICES AND AERONAUTICAL INFORMATION SERVICES

10.1 Information for air traffic services units

10.1.1 The meteorological authority shall designate a meteorological office to be associated with each air traffic services unit. The associated meteorological office shall, after coordination with the air traffic services unit, supply, or arrange for the supply of up-to-date meteorological information to the unit as necessary for the conduct of its functions.

CHAPTER 11. REQUIREMENTS FOR AND USE OF COMMUNICATIONS

11.1 Requirements for communications

11.1.1 Suitable telecommunications facilities shall be made available to permit aerodrome meteorological offices and, as necessary, aeronautical meteorological stations to supply the required meteorological information to air traffic services units on the aerodromes for which those offices and stations are responsible, and in particular to aerodrome control towers, approach control offices and the aeronautical telecommunications stations serving these aerodromes.

11.1.2 Suitable telecommunications facilities shall be made available to permit meteorological watch offices to supply the required meteorological information to air traffic services and search and rescue services units in respect of the flight information regions, control areas and search and rescue regions for which those offices are responsible, and in particular to flight information centres, area control centres and rescue coordination centres and the associated aeronautical telecommunications stations.

11.1.4 Telecommunications facilities between meteorological offices and, as necessary, aeronautical meteorological stations and aerodrome control towers or approach control offices shall permit communications by direct speech, the speed with which the communications can be established being such that the required points may normally be contacted within approximately 15 seconds.

APPENDIX 3. TECHNICAL SPECIFICATIONS RELATED TO METEOROLOGICAL OBSERVATIONS AND REPORTS

(See Chapter 4 of this Annex)

4.1 Surface wind

4.1.2 Displays

4.1.2.1 Surface wind displays relating to each sensor shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units shall relate to the same sensors, and where separate sensors are required as specified in, 4.1.1.2 above, the displays shall be clearly marked to identify the runway and section of runway monitored by each sensor

4.1.3 Averaging

4.1.3.1 The averaging period for surface wind observations shall be:

a) 2 minutes for local routine and special reports and for wind displays in air traffic service units;

4.1.3.2 **Recommendation.** — The averaging period for measuring variations from the mean speed (gusts) reported in accordance with 4.1.4.2 c) should be 3 seconds for local routine and special reports

and for METAR and SPECI and for wind displays used for depicting variations from the mean wind speed (gusts) in air traffic services units.

4.2 Visibility

4.2.2 Displays

Recommendation. — When instrumented systems are used for the measurement of visibility, visibility displays relating to each sensor should be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units should relate to the same sensors, and where separate sensors are required as specified in 4.2.1, the displays should be clearly marked to identify the area, e.g. runway and section of runway, monitored by each sensor.

4.3 Runway visual range

4.3.3 Display

4.3.3.1 Where runway visual range is determined by instrumented systems, one display or more if required, shall be located in the meteorological station with corresponding displays, in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units shall be related to the sensors, and where separate sensors are required as specified in 4.3.1.2, the displays shall be clearly marked to identify the runway and section of runway monitored by each sensor.

4.3.3.2 **Recommendation.** — Where runway visual range is determined by human observers, runway visual range should be reported to the appropriate local air traffic services units, whenever there is a change in the value to be reported in accordance with the reporting scale (except where the provisions of 3.2.2 a) or b) apply). The transmission of such reports should normally be completed within 15 seconds after the termination of the observation.

4.5 Clouds

4.5.2 Display

Recommendation. — When automated equipment is used for the measurement of the height of cloud base, height of cloud base display(s) should be located in the meteorological station with corresponding display(s) in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units should relate to the same sensor, and where separate sensors are required as specified in 4.5.1, the displays should clearly identify the area monitored by each sensor.

4.6 Air temperature and dew point temperature

4.6.1 Display

Recommendation . — When automated equipment is used for the measurement of air temperature and dew-point temperature, air temperature and dew-point temperature displays should be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units should relate to the same sensors.

4.7 Atmospheric pressure

4.7.1 Display

When automated equipment is used for the measurement of pressure, QNH and, if required in accordance with 4.7.3.2 b), QFE displays relating to the barometer shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. When QFE values are displayed for more than one runway, as specified in 4.7.3.2 d), the displays shall be clearly marked to identify the runway to which the QFE value displayed refers.

4.7.3 Reporting

4.7.3.2 In local routine and special reports:

b) QFE shall be included if required by users or, if so agreed locally between the meteorological and air traffic services authorities and operators concerned, on a regular basis;

APPENDIX 4. TECHNICAL SPECIFICATIONS RELATED TO AIRCRAFT OBSERVATIONS AND REPORTS (See Chapter 5 of this Annex)

4. Specific provisions related to reporting of wind shear and volcanic ash

4.1 Reporting of windshear

4.1.2 Recommendation. — Where wind shear conditions in the climb-out or approach phases of flight were reported or forecast but not encountered, the pilot-in-command should advise the appropriate air traffic services unit as soon as practicable unless the pilot-in-command is aware that the appropriate air traffic services unit has already been so advised by a preceding aircraft.

APPENDIX 5. TECHNICAL SPECIFICATIONS RELATED TO FORECASTS (See Chapter 6 of this Annex)

1. Criteria relating to TAF

1.3 Use of change groups

1.3.1 **Recommendation.** — The criteria used for the inclusion of change groups in TAF or for the amendment of TAF should be based on the following:

a) when the surface wind is forecast to change through values of operational significance the threshold values should be established by the meteorological authority in consultation with the appropriate ATS authority and operators concerned, taking into account changes in the wind which would:

require a change in runway(s) in use; and

2) indicate that the runway tailwind and crosswind components will change through values representing the main operating limits for typical aircraft operating at the aerodrome;

4. Criteria related to area and route forecasts other than forecasts issued within the framework of the world area forecast system

4.2 Amendments to area and route forecasts

4.2.1 A list of criteria to be used for amendments to area and route forecasts shall be established by the meteorological authority, in consultation with operators and other users concerned.

APPENDIX 6. TECHNICAL SPECIFICATIONS RELATED TO SIGMET AND AIRMET INFORMATION, AERODROME WARNINGS AND WIND SHEAR WARNINGS (See Chapter 7 of this Annex)

6. Specification relating to windshear warnings

6.2 Format and dissemination of windshear warnings

6.2.1 The wind shear warnings shall be prepared in abbreviated plain language in accordance with the template in Table A6-3 and disseminated for aerodromes where wind shear is considered a factor in accordance with local arrangements with the appropriate ATS authority and operators concerned and by the meteorological office designated to provide service for the aerodrome or disseminated directly from automated ground-based wind shear remote-sensing or detection equipment referred to in 6.1 a) and b).

APPENDIX 9. TECHNICAL SPECIFICATIONS RELATED TO INFORMATION FOR AIR TRAFFIC SERVICES, SEARCH AND RESCUE SERVICES AND AERONAUTICAL INFORMATION SERVICES

(See Chapter 10 of this Annex)

1. Information to be provided to air traffic service units

1.1 List of information for the aerodrome control tower

The following meteorological information shall be supplied, as necessary, to an aerodrome control tower by its associated aerodrome meteorological office:

- a) local routine and special reports, METAR and SPECI, TAF and trend forecasts and amendments thereto, for the aerodrome concerned;
- b) SIGMET and AIRMET information, wind shear warnings and aerodrome warnings;
- c) any additional meteorological information agreed upon locally, such as forecasts of surface wind for the determination of possible runway changes; and
- d) information received on volcanic ash cloud, for which a SIGMET has not already been issued, as agreed between the meteorological and ATS authorities concerned.

1.2 List of information for the approach control office

The following meteorological information shall be supplied, as necessary, to an approach control office by its associated aerodrome meteorological office:

- a) local routine and special reports, METAR and SPECI, including current pressure data, TAF and trend forecasts and amendments thereto, for the aerodrome(s) with which the approach control office is concerned;
- b) SIGMET and AIRMET information, wind shear warnings and appropriate special air-reports for the airspace with which the approach control office is concerned and aerodrome warnings;
- c) any additional meteorological information agreed upon locally; and

d) information received on volcanic ash cloud, for which a SIGMET has not already been issued, as agreed between the meteorological and ATS authorities concerned.

1.3 List of information for the flight information centre

The following meteorological information shall be supplied, as necessary, to a flight information centre or an area control centre by its associated meteorological watch office:

a) METAR and SPECI, including current pressure data for aerodromes and other locations, TAF and trend forecasts and amendments thereto, covering the flight information region or the control area and, if required by the flight information centre or area control centre, covering aerodromes in neighbouring flight information regions, as determined by regional air navigation agreement;

b) forecasts of upper winds, upper-air temperatures and significant en-route weather phenomena and amendments thereto, particularly those which are likely to make operation under visual flight rules impracticable, SIGMET and AIRMET information and appropriate special air-reports for the flight information region or control area and, if determined by regional air navigation agreement and required by the flight information centre or area control centre, for neighbouring flight information regions;

c) any other meteorological information required by the flight information centre or area control centre to meet requests from aircraft in flight; if the information requested is not available in the associated meteorological watch office, that office shall request the assistance of another meteorological office in supplying it;

d) information received on volcanic ash cloud, for which a SIGMET has not already been issued, as agreed between the meteorological and ATS authorities concerned; and

e) information received concerning the accidental release of radioactive materials into the atmosphere, as agreed between the meteorological and ATS authorities concerned.

1.4 Specific provisions related to the supply of information on volcanic ash and volcanic eruptions

1.4.1 Volcanic ash advisory information issued by a VAAC shall be supplied to area control centres and flight information centres concerned in its area of responsibility.

1.4.2 Information received on pre-eruption volcanic activity and/or a volcanic eruption shall be supplied, as necessary, to an ATS unit by its corresponding associated meteorological office as agreed between the meteorological and ATS authorities concerned.

1.7 Format of information

1.7.1 **Recommendation.** — Local routine and special report, METAR and SPECI, TAF and trend forecasts, SIGMET and AIRMET information, upper wind and upper-air temperature forecasts and amendments thereto should be supplied to air traffic services units in the form in which they are prepared, disseminated to other meteorological offices or received from other meteorological offices, unless otherwise agreed locally.

1.7.2 **Recommendation.** — When computer-processed upper-air data for grid points are made available to air traffic services units in digital form for use by air traffic services computers, the contents, format and transmission arrangements should be as agreed between the meteorological authority and the appropriate ATS authority. The data should normally be supplied as soon as is practicable after the processing of the forecasts has been completed.

3. Information to be provided for aeronautical information service units

3.1 List of information

The following information shall be supplied, as necessary, to an aeronautical information services unit:

a) information on meteorological service for international air navigation, intended for inclusion in the aeronautical information publication(s) concerned;

Note. — Details of this information are given in Annex 15, Appendix 1, Part 1, 3.5 and Part 3, 2.2, 2.11, 3.2 and 3.11.

b) information necessary for the preparation of NOTAM or ASHTAM including, in particular, information on:

1) the establishment, withdrawal and significant changes in operation of aeronautical meteorological services. This information is required to be provided to the aeronautical information services unit sufficiently in advance of the effective date to permit issuance of NOTAM in compliance with Annex 15, 5.1.1 and 5.1.1.1;

2) the occurrence of volcanic activity;

Note. — The specific information required is given in Chapter 3, 3.3.3 and Chapter 4, 4.8 of Annex 3.

3) accidental release of radioactive materials into the atmosphere, as agreed between the meteorological and appropriate civil aviation authorities concerned.

Note. — The specific information required is given in Chapter 3, 3.4.2 g).

c) information necessary for the preparation of aeronautical information circulars including, in particular, information on:

1) expected important changes in aeronautical meteorological procedures, services and facilities provided; and

2) effect of certain weather phenomena on aircraft operations.

APPENDIX 10. TECHNICAL SPECIFICATIONS RELATED TO REQUIREMENTS FOR AND USE OF COMMUNICATIONS

(See Chapter 11 of this Annex)

1. Specific requirements for communications

1.2 Grid point data for ATS and operators

1.2.1 Recommendation. — When upper-air data for grid points in digital form are made available for use by air traffic services computers, the transmission arrangements should be as agreed between the meteorological authority and the appropriate ATS authority.

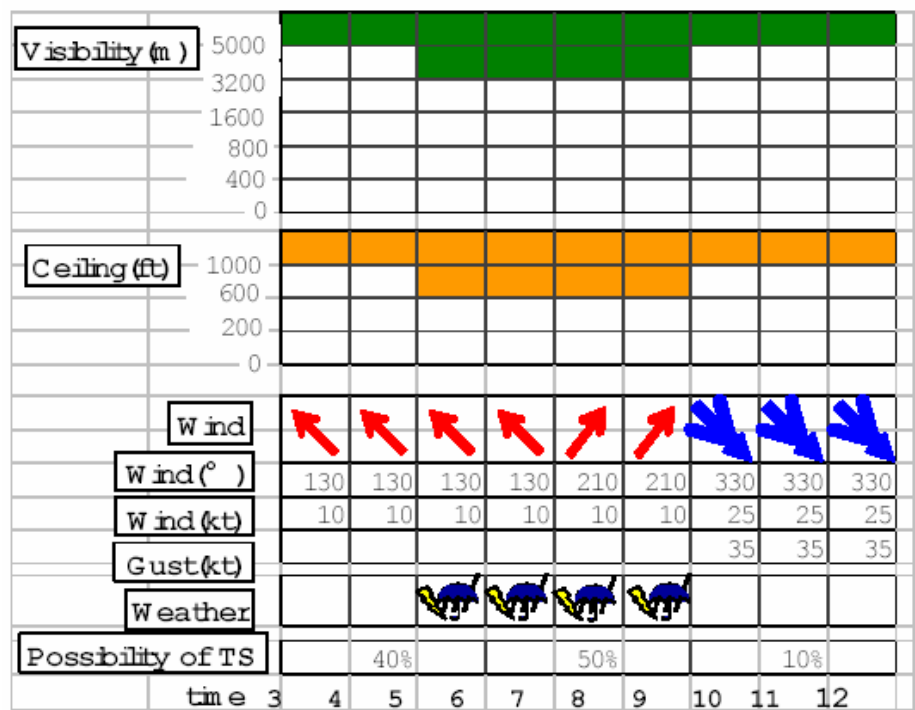


Figure A4.1

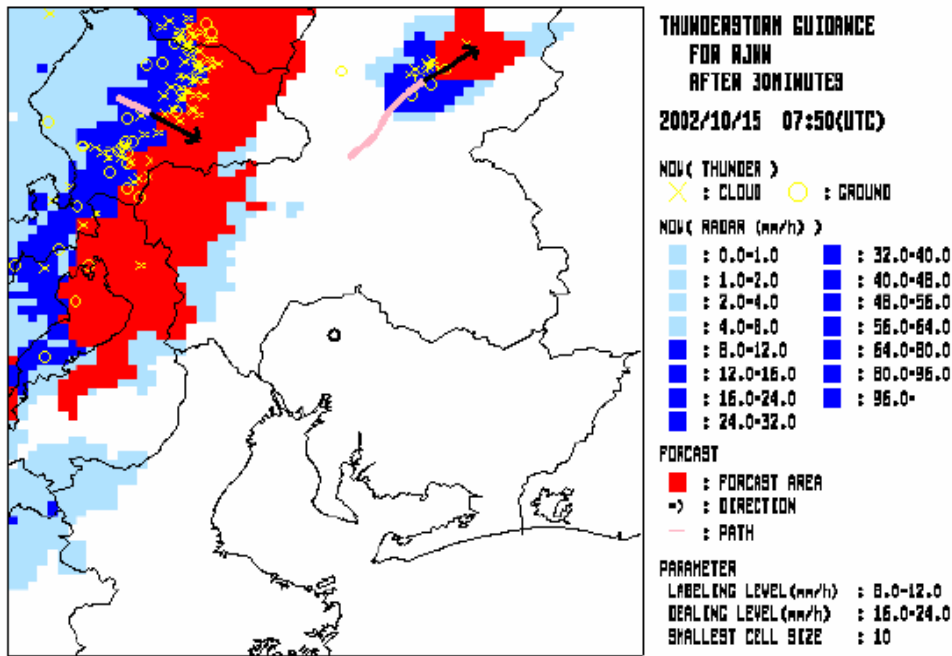


Figure A4.2

**Table A4.1 - SAMPLE TerMet
Hong Kong International Airport**

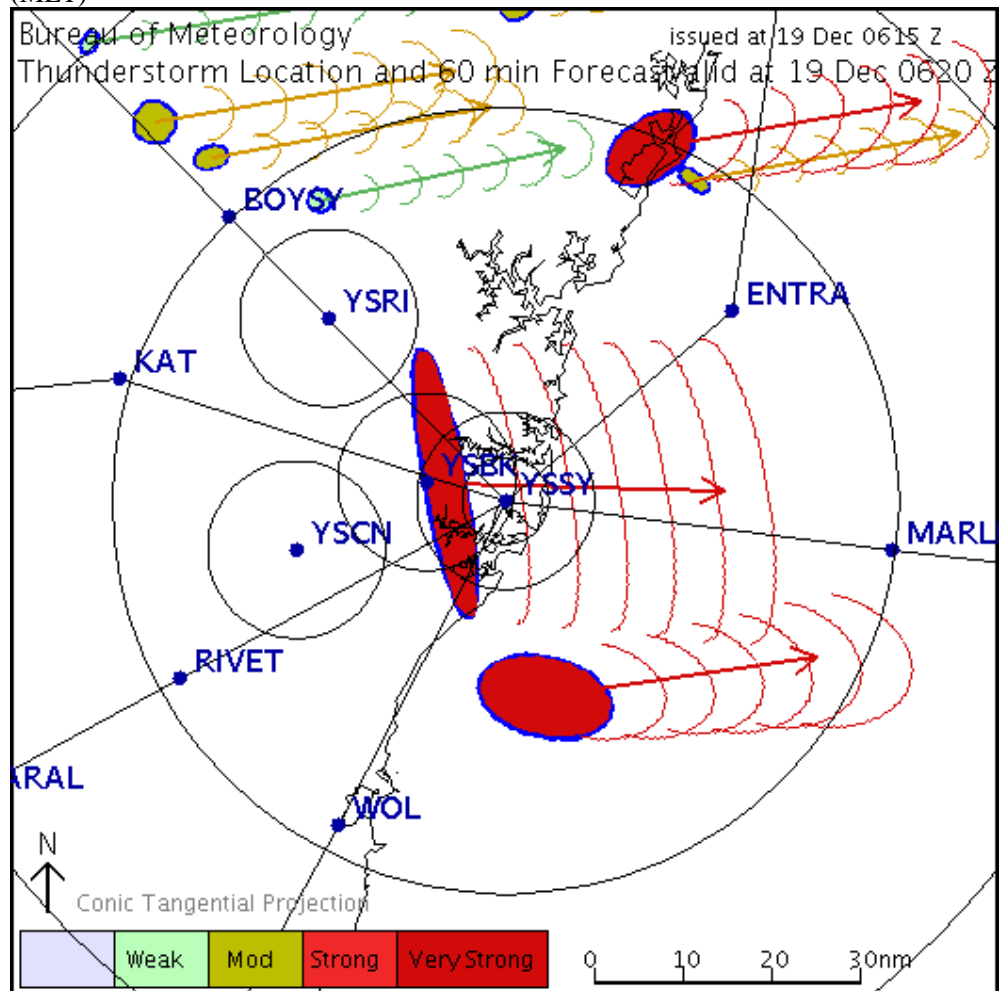
Runway 07

Issue time: 05090415Z

	Present				
Time (UTC)	0400	0500	0600	0700	0800
Wind	220/16	220/16	220/16	210/15	210/15
TEMPO		VRB25	VRB25	--	--
Tailwind (kt)	14	14	14	11	11
TEMPO		--	--	--	--
Crosswind (kt)	+8	+8	+8	+10	+10
TEMPO		--	--	--	--
Prevailing Visibility	10km	10km	10km	8km	8km
TEMPO		1500m	1500m	3000m	3000m
Cloud ceiling	8000	8000	8000	8000	8000
TEMPO		4000	4000	4000	4000
Cloud base	600	600	600	600	600
TEMPO		400	400	400	400
SIGWX		--	--	--	--
TEMPO	SHRA	TSRA +SHRA	TSRA +SHRA	SHRA	SHRA

Criteria for highlighting the data in red

Tailwind	exceeding 5 kts
Crosswind	exceeding 20 kts
Visibility	less than 5000m
Cloud Ceiling	1000 ft or below
Cloud Base	less than 1500 ft



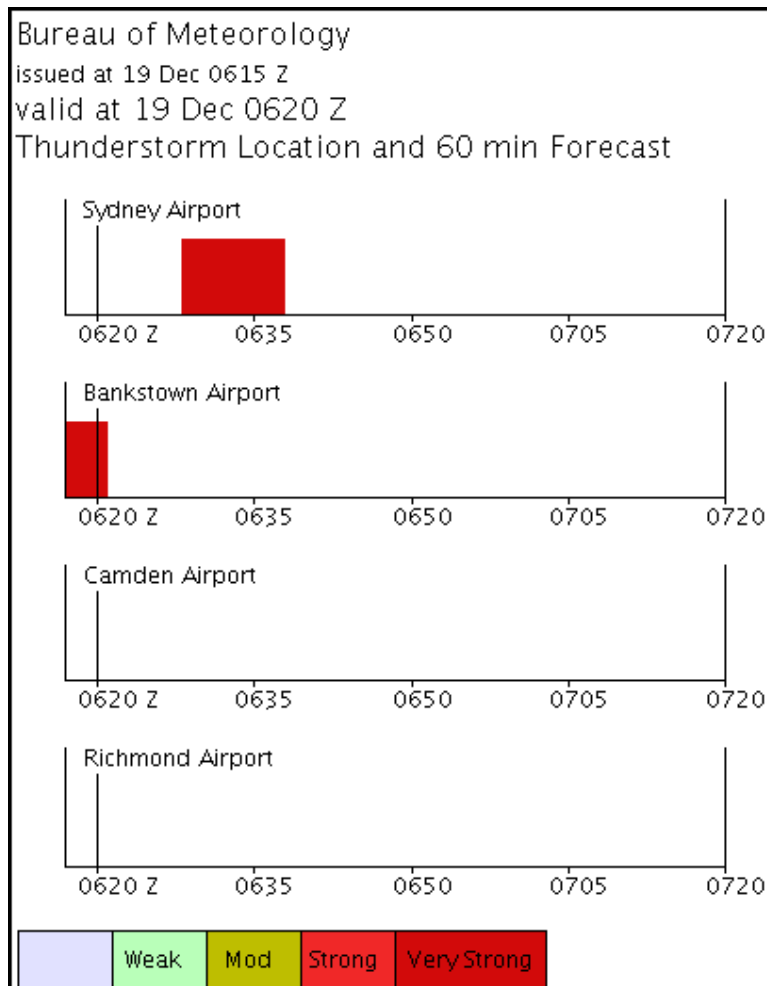


Figure A4.3

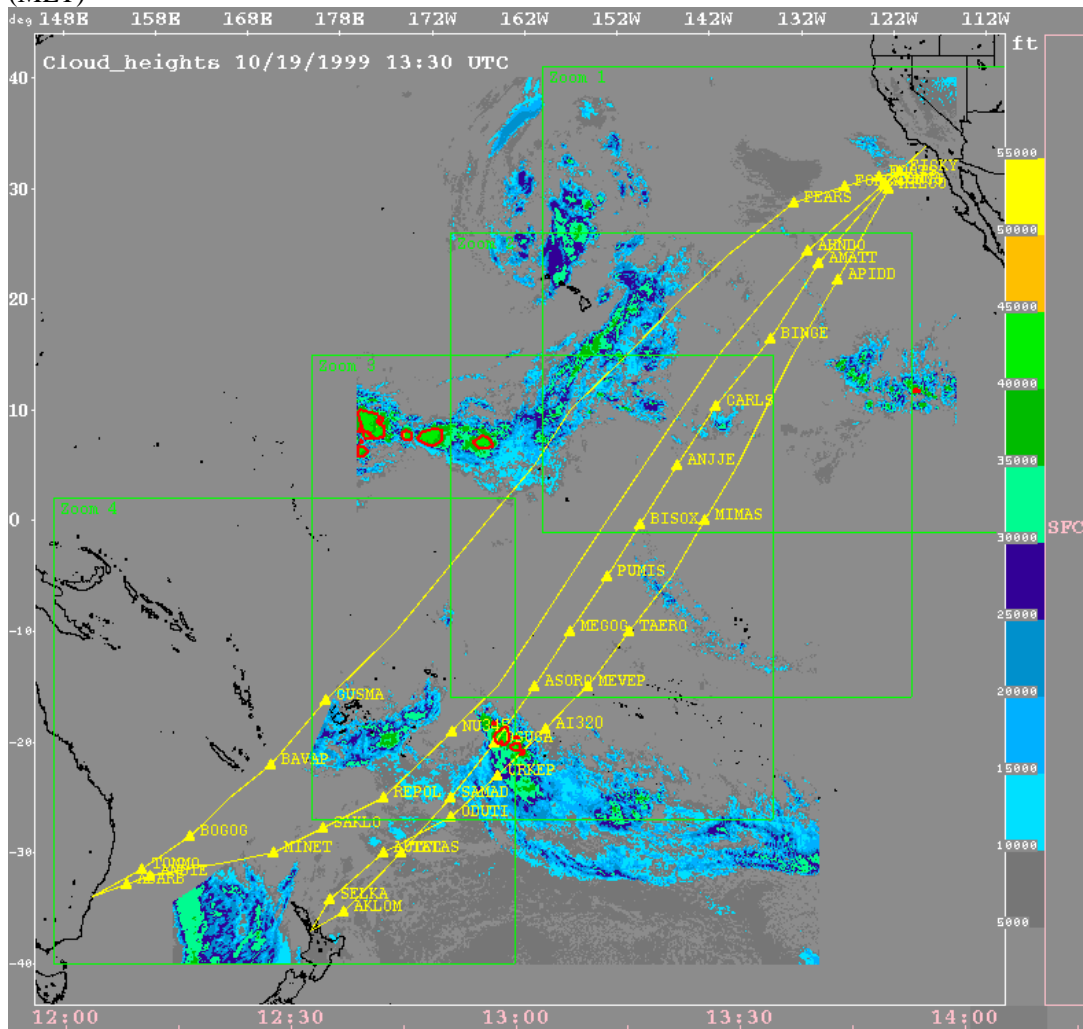


Figure A4.4