



- Agenda Item 2:** **Review of Air Navigation Matters**
2.2 **Air Navigation specific activities:**
2.2.4 **Aeronautical Meteorology (MET)**
- *MET to support ATM and need to enhance coordination between Meteorological and Air Traffic Control services*

**MET TO SUPPORT ATM AND NEED TO IMPROVE COORDINATION BETWEEN
METEOROLOGICAL AND AIR TRAFFIC SERVICES**

(Presented by the Secretariat)

SUMMARY	
Immediate access to real-time OPMET data is required to support Air Traffic Management.	
References:	
• Doc. 9750 /963 - Global Air Navigation Plan. 3rd ed. 2007 • Doc. 8733. Air Navigation Plan for the CAR/SAM Regions. • Annex 3. “Meteorological Service for International Air Navigation”. Sixteenth Edition. July 2007. • Annex 6. “Operation of Aircraft”, Part I. Aeroplanes. Eighth Edition. July 2001. • Annex 11. “Air Traffic Services”. Thirteenth Edition. July 2001.	
Strategic Objectives	<i>This working paper is related to Strategic Objectives A, D and E</i>

1. Introduction

1.1 Aeronautical technology has delivered great achievements; notwithstanding, aircraft operations are still vulnerable to adverse meteorological conditions and volcanic ash clouds that cause accidents, incidents and delays. Meteorological Service in the Eastern Caribbean region is of crucial importance for the safety and efficiency of air transport operations, particularly with the noted frequency of regional and seasonal occurrence of tropical cyclones, thunderstorms, heavy rainfall, wet runways and low density air.

1.2 *Meteorology to support Air Traffic Management*

1.2.1 Meteorological information used primarily for aircraft operations is called “OPMET data”; OPMET data include meteorological reports (METAR, SPECI and local reports), aerodrome forecasts (TAF), landing forecasts (TREND), aircraft observations, SIGMET and AIRMET messages on hazardous meteorological phenomena or volcanic ash clouds.

1.2.2 The increase of air transport operations demands better meteorological information to take advantage of fair weather and avoid dangerous atmospheric phenomena and volcanic ash. In fact, the Global Air Navigation Plan demands **immediate** access to **high-quality** aeronautical meteorological (OPMET) information that is required to assist Air Traffic Management in tactical decision-making for aircraft surveillance, air traffic flow management and flexible and dynamic aircraft routing that will contribute to the optimization of the use of airspace. Such stringent requirements demand efficient OPMET data exchange, an increase in automated meteorological systems and more data links to download and upload meteorological information.

1.2.3 The ICAO NACC Regional Office oversees meteorological support to Air Traffic Management. RO/MET monitors, via internet, meteorological reports (METAR) and aerodrome forecasts (TAF) issued by the CAR States and Territories and provides tailored assistance to them, via e-mail or telephone, to eliminate problems when data are not available or contain coding errors. The support from MET and ATS personnel that carry out meteorological duties in the Eastern Caribbean States and Territories has been very positive so that, nowadays, METAR and TAF from all Eastern Caribbean aerodromes, with regular scheduled flights, are available in OPMET data banks. Cooperation among Eastern Caribbean States and Territories has been crucial to achieve this goal, since some States, namely Antigua and Barbuda, Barbados and Puerto Rico, prepare and disseminate aerodrome forecasts for neighbouring States or Territories which do not have a meteorological forecast office.

1.2.4 The ICAO NACC Regional Office has also provided assistance to the Eastern Caribbean aeronautical meteorological offices on the preparation, dissemination and use of SIGMET messages. Assistance has been focussed on tropical cyclone and volcanic ash cloud SIGMET messages. States and territories are encouraged to contact the NACC Regional Officer, Aeronautical Meteorology in order to maintain MET information up-to-date.

1.2.5 Most aeronautical meteorological offices in the Eastern Caribbean Region use a WAFS workstation to disseminate OPMET data, since only a few of them have an AFTN terminal at their premises. For these reason, the ICAO NACC Regional Office sent messages to the Eastern Caribbean States to encourage them to protect their WAFS workstations against lightning strikes, current surges and voltage spikes. The NACC Regional Office also provided information on contingency procedures, in case of damage to the communications facilities, to disseminate OPMET data, via internet, using the USA/NOAA/NWS E-mail Data Input System.

1.2.6 In compliance with ICAO SARPs in Annex 3 and the Air Navigation Plan for the CAR/SAM Regions, the Civil Aviation, MET and ATS Authorities of the Eastern Caribbean States and Territories must ensure that MET, ATS and AIM personnel that operate WAFS workstations and AFTN terminals disseminate OPMET data without delay to the aviations users, to support Air Traffic Management and airline operations.

1.3 *MET in the Performance Framework to achieve the Global ATM*

1.3.1 The NACC Regional Office has prepared the NAM/CAR Regional Performance Framework that contains performance objectives aimed to achieve the Global Air Traffic Management. In particular, the meteorological component of the NAM/CAR Regional Performance Framework is included in the **Appendix** to this working paper; it refers to improve timely availability of high-quality meteorological and climatological information for decision making in ATM to take advantage of fair weather and avoid hazardous meteorological phenomena. This performance objective contains a series of tasks aimed to support air traffic management flow, improve route planning and management, improve situational awareness of pilots on current weather conditions, enhance runway and airspace capacity, promote the use of data-link to download and upload meteorological information and improve meteorological systems.

1.3.2 Delegates of the States are invited to consider the regional meteorological performance objective “Improve Availability of Meteorological Information” (Appendix A), as a reference to prepare their National Performance Framework to support the achievement of the Global Air Traffic Management.

1.4 *Need to enhance special air-reports and MET – ATS coordination*

1.4.1 Coordination between ATS and MET services in the Eastern Caribbean States and Territories, namely Antigua and Barbuda, Montserrat and Trinidad and Tobago, has been crucial to prepare and disseminate SIGMET messages to warn aircraft on the presence of volcanic ash clouds from the eruption of the Soufriere Hills Volcano. Nevertheless, there is still a need to enhance MET-ATS coordination to get aircraft reports to be used to prepare and issue SIGMET messages on clear air turbulence (CAT) and wind shear, since these phenomena are sometimes difficult to detect with conventional meteorological information.

1.4.2 Recently, an aircraft flying in the CAR Region encountered clear air turbulence (CAT). In this event, 26 passengers were injured, 4 seriously. In spite of this; no air-report was relayed from the ATS units to the meteorological offices; therefore, no SIGMET was prepared and issued to warn other aircraft on the presence of CAT. For a long time, an outstanding deficiency in several Eastern Caribbean States has been that special air-reports are not regularly relayed to the meteorological offices.

1.4.3 Paragraph 4.4.2 of Annex 6, Part I, states that: “ The procedures for **making** meteorological observations on board aircraft in flight and for recording and **reporting** them are contained in Annex 3, the PANS-(ATM (Doc. 4444) and the Regional Supplementary procedures (Doc. 7030)”. Standards 5.5.a of Annex 3 and 4.12.3 PANS-ATM (Doc. 4444) indicate that: “Special observations shall be made by all aircraft whenever the following conditions are encountered: a) severe turbulence”; besides, Standard 5.7.2 of Annex 3 indicates that: “Aircraft observations shall be reported during flight at the time of the observation is made or as soon thereafter as is practicable”. On the other hand, standards 5.8 of Annex 3 and 2.20.1 .b of Annex 11 refer to the coordination between the meteorological and air traffic control services to ensure that, on receipt at the ATS units, special air-reports are to be relayed without delay to the corresponding meteorological office or meteorological watch office.

1.4.4 In this regard, the Civil Aviation, Air Traffic Control Services and Meteorological Authorities of the Eastern Caribbean States may wish to remind pilots, ATS and MET personnel the need to comply with ICAO standards to ensure that: “Special air-reports are prepared and relayed to the meteorological offices, without delay, to prepare and issue SIGMET messages”.

1.5 *Quality Management System in Meteorology.*

1.5.1 The meeting is also invited to take note that the establishment of a Quality Management System in Meteorology is a requirement to support the Global Air Traffic Management. Therefore, recommendation 2.2.2 of Annex 3, that is due to become a standard in November 2010, demands the implementation of a properly organized quality system to provide for the quality management of the meteorological information to be supplied to the aeronautical users. In this regard, the meeting is invited to take note that the Civil Aviation Authority of Jamaica will host an ICAO Seminar / Workshop on the “Development of a Quality Assurance System to enhance the Aeronautical Meteorological Service” to be held in Montego Bay, Jamaica, from 25 to 27 November 2009.

2. Suggested Actions

2.1 The meeting is invited to:

- a) take note of the information presented;
- b) review the Appendix to this working paper, and in particular, those items mentioned in paragraphs 1.2.6, 1.3.1, 1.3.2, 1.4.4 and 1.5.1, and agree on actions to improve MET services in the E/CAR Region; and
- c) determine other actions deemed pertinent.

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APPENDIX

IMPROVE AVAILABILITY OF METEOROLOGICAL INFORMATION				
Benefits				
Efficiency	- Assist ATM in tactical decision making for aircraft surveillance, air traffic flow management and flexible and dynamic routing of aircraft - improve aerodrome and airspace capacity - improve situational awareness of pilots - reduce unnecessary consumption of fuel and prevent unnecessary delays due to minimal meteorological conditions at the airports - improve planning of flight routes and schedules			
Operational safety	- Increase the number of flights in areas of fair weather conditions and prevent or reduce flights in areas of unfavorable meteorological conditions and volcanic ash clouds - prevent landing operations at aerodromes under minimal meteorological conditions			
Strategy				
Short Term (2010)				
ATM Component	TASK DESCRIPTION	START - END	RESPONSIBLE	STATUS
AOM, DCB, AO, TS, AUO	a) Increase and protect facilities to disseminate and Exchange aeronautical meteorological information i) Increase AFTN, WAFS and internet facilities to disseminate OPMET data at meteorological offices and stations. ii) Increase AFTN communications facilities to relay aircraft special reports from the air traffic control units to the meteorological offices iii) Implement lightning and other protection systems for the AFTN and WAFS facilities used for OPMET exchange iv) Maintain and expand the number of workstations used to receive meteorological products of the World Area Forecast System	2009 - 2010	States and Territories	Valid

AOM,DCB, AO, TS, AUO	b) Increase availability, timeliness and quality of OPMET data i) Improve the use of the METAR and TAF codes/templates used to disseminate meteorological reports and aerodrome forecasts ii) Enhance preparation and availability of SIGMET information on hazardous meteorological conditions and volcanic ash clouds iii) Enhance the availability of landing forecasts, TREND, considering user (IATA) requirements	2009 - 2010	States and Territories	Valid
AOM, DCB, AO, TS, AUO	c) Establish contingency procedures to disseminate OPMET data, via Internet, in case of failure of the AFTN and WAFS facilities	2009 - 2010	States and Territories ICAO NACC	Valid
AO	d) Improve the quality of data, provided by meteorological sensors, used in meteorological reports Establish verification and calibration programmes of data provided by meteorological instruments and automated weather systems at the aerodromes	2009 - 2010	States and Territories	Valid
AUO	e) Monitor availability and quality of OPMET data issued by CAR States and Territories and provide assistance if required	2009 - 2010	States and Territories	Valid
AUO	f) Monitor participation of States and Territories in the International Airways Volcano Watch and provide assistance if necessary	2009 - 2010	ICAO NACC Washington VAAC	Valid
AUO	g) Monitor participation of States and Territories in the International Tropical Cyclone Watch and provide assistance if necessary	2009 - 2010	ICAO NACC Miami TCAC	Valid
AOM, DCB,AO, TS, AUO	h) Establish Quality Assurance Systems provided to the aeronautical users	2010	States and Territories	Valid
AUO	i) Conduct, every year, update seminars and courses on relevant operational aeronautical meteorological matters	2009-2010	States and Territories ICAO NACC, WMO AR IV	Valid
AUO	j) Consider standards and recommendations ICAO and WMO for the training and recruitment of aeronautical meteorological personnel	2009 - 2010	States and Territories	Valid

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<i>Mid Term (2015)</i>				
AUO	k) Establish cost recovery schemes for the aeronautical meteorological services	2010 - 2015	States and Territories	Valid
AO, TS	l) Increase the number of automated weather systems at the aerodromes	2010 - 2015	States and Territories	Valid
AO, TS	m) Implement meteorological data downlinks at the MET and ATS units	2012-2015	States and Territories	Valid
AO, TS	n) Implement meteorological data uplinks from the automated weather systems, ATS and meteorological unit	2012-2015	States and Territories	Valid
AUO	o) Prepare hourly-monthly climatological tables of the aerodromes for itinerary planning	2010 - 2015	States and Territories	Valid
GPIs	GPI/6 air traffic flow management, GPI/7 flexible/dynamic ATS route management, GPI/9 situational awareness, GPI/14 runway operations, GPI/17 implementation of datalink applications, GPI/18: aeronautical information, GPI 19. Meteorological systems.			

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