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North American, Central American and Caribbean Office

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**Agenda Item 3: Air Navigation Services**

**3.1 CNS/ATM**

**ENHANCED COOPERATION FOR THE PROVISION OF AERONAUTICAL METEOROLOGICAL SERVICE TO INTERNATIONAL AIR NAVIGATION**

(Presented by the Secretariat)

**Summary**

This working paper presents the need for improving the coordination and cooperation between civil aviation administrations and meteorological authorities of the States/Territories and International Organizations of the CAR Region, and the development of adequate cost/recovery mechanisms for aeronautical meteorological services (MET) by the States/Territories/International Organizations.

**1. Background**

1.1 On 8 September 2000, the Secretary General of ICAO and the Secretary General of the World Meteorological Organization (WMO) issued a joint letter inviting ICAO contracting States/Territories, OMM Member States and the entities designated as State's meteorological (MET) authorities "to enhance their cooperation at the national level in order to ensure that the provision of aeronautical meteorological service would continue to contribute effectively towards the safety, regularity and efficiency of international air navigation". Cooperation and mutual understanding between the aeronautical meteorological service authority/provider and other aviation authorities/organizations (CAA, ATS authority/provider, airport authorities) is crucial for the effective and efficient implementation of the ICAO provisions related to aeronautical meteorology by the States/Territories.

1.2 The enhanced cooperation between the MET authorities/providers and the civil aviation administrations is considered extremely important in the efforts for improving the level of implementation of the required MET facilities and services, and hence in resolving the existing safety-related MET deficiencies. Some of the main areas where the coordination and collaboration are of particular importance could be outlined as follows:

- full implementation of the World Area Forecast System (WAFS);
- eliminating safety related MET deficiencies related to operational safety, particularly those related to SIGMET information (especially SIGMET for volcanic ash clouds and tropical cyclones);
- development of adequate cost-recovery mechanisms for the MET services at national level.

## **2. Participation of CAR States/Territories/International Organizations in ICAO MET meetings and in seminars and workshops organized by ICAO in coordination with the WMO**

2.1 Most CAR States/Territories/International Organizations have delegated the provision of MET services (aeronautical meteorological) to National Meteorological Services, however the participation in ICAO meetings, seminars and workshops in MET area have been very poor, which affects the quality of MET services. In this sense, civil aviation Administrations and meteorological authorities of CAR States/Territories/International Organizations are urged to make the greatest efforts to improve the coordination, for which the Meeting could agree to formulate the following Draft Conclusion:

**DRAFT  
CONCLUSION 2/XX                      AGREEMENTS                      BETWEEN                      CIVIL                      AVIATION  
ADMINISTRATIONS AND MET AUTHORITIES OF CAR  
STATES/TERRITORIES/INTERNATIONAL ORGANIZATIONS**

That CAR States/Territories/International Organizations, that have not yet done so, subscribe agreements among civil aviation Administrations and meteorological authorities in order to:

- a) clearly identify their respective functions; and
- b) that the agreement states the mechanism to ensure the participation of MET personnel in ICAO meetings, seminars and workshops organized by ICAO in coordination with the WMO, according to the *Modus vivendi* between ICAO and the WMO (Doc 7475).

## **3. Year 2005 – crucial for the implementation of WAFS**

3.1 The World Area Forecast System (WAFS) was established in 1982 in response to changes in the aeronautical operational requirements, specifically the rapidly increasing number of international operations, including long-haul flights. In order to promote the global aviation safety and efficiency, the WAFS combined meteorology and communication technologies in providing meteorological information for flight planning and operations.

3.2 The WAFS went through several phases of development. A very important step towards the optimization and harmonization of the provision of WAFS products was the closure of the Regional Area Forecast Centres (RAFCs) (in CAR/SAM Regions it was completed by 2002) and centralizing the issuance of wind/temperature and significant weather forecasts by the two World Area Forecast Centres (WAFC) London and Washington.

3.3 Other significant changes in the system are related to the cessation of T4 format altitude wind and temperature charts as of 1<sup>st</sup> July 2005 by the United States as Provider State of the International Satellite Communications System (ISCS1). From then on the Washington WAFC disseminates altitude wind and temperature forecasts only in GRIB code. Additionally, on 31<sup>st</sup> July 2005, the Washington WAFC ended the use of X.25 protocol FOR the transmission of WAFS products and started the use of TCP/IP protocol. It is also foreseen that the London and Washington WAFC will continue issuing significant weather forecast charts (SIGWX) until 30 November 2006 and as from that date all WAFS forecasts will be generated and disseminated in digital format (in WMO codes, called GRID and BUFR).

3.4 In other words, the well known aviation weather charts used worldwide for flight documentation will no more be disseminated by the WAFC in pictorial format, but in the form of encoded messages. These messages will be converted into charts by specialized software packages installed on the WAFS workstations used by the States/Territories. The gain of the transition to digital products will be twofold: economical – less bandwidth required for the dissemination of the highly compressed digital messages in comparison with the pictorial products; and operational – better resolution of the forecasts and flexibility for tailoring the flight documentation to the specific flight routes used by each operator.

3.5 In order to make full use of the WAFS forecasts in the digital (GRIB/BUFR) representation, all States/Territories will have to upgrade their WAFS workstations and software for processing WAFS data before the implementation date in 2006.

#### **4. Elimination of safety related MET deficiencies related to SIGMET information**

4.1 Provision of timely and accurate warnings for hazardous en-route weather phenomena in the form of SIGMET messages, is one of the highest priority tasks of the States' meteorological authorities. As other ICAO Regions, CAR Region has been affected by volcanic ash clouds. In order to support the issuance of SIGMET by the States/Territories' meteorological watch offices (MWO), ICAO established a network of volcanic ash advisory centers (VAAC) that utilize state-of-the-art technologies to produce forecasts of the volcanic ash cloud trajectories.

4.2 Buenos Aires and Washington VAACs are two of the nine VAACs worldwide that are part of the CAR/SAM Regional ANP. It should be recalled that the first encounters of modern airliners with volcanic ash, which triggered the establishment by ICAO of the International Airways Volcano Watch (IAVW), happened in the airspace of Indonesia in 1982. Amongst them was the well known British Airways Flight 009, that lost its four engines and suffered severe damage on encountering ash from Mt Galunggung in Indonesia, in June 1982. It descended to 12 000 feet before being able to restart its engines and make an emergency landing in Jakarta.

4.3 The severe damage from volcanic ash on aircraft and dramatic effects on the flight safety are now well known. In the past 20 years, more than 80 commercial aircraft have unexpectedly encountered volcanic ash clouds in flight. Commercial jetliners that have encountered volcanic ash plumes have had all engines fail, with several near-crashes. Abrasion to forward-facing surfaces, including cockpit windows, the leading edges of wings and control surfaces, engine cowlings, etc., threaten safety and require expensive repairs. Cockpit windows have been pitted badly enough to endanger landing. Damages to a single aircraft have reached \$80 million. In addition to these major repair costs from encountering a heavier plume of ash, aircraft flying through thinner plumes require instead maintenance of engines and external surfaces.

4.4 On average, about 15 explosive eruptions, powerful enough to inject ash into the stratosphere, occur per year. Ash clouds that reach above 25,000 ft. can travel hundreds of miles. Giant plumes from a major eruption, such as Mt. Pinatubo in 1991, can affect aircraft thousands of miles downwind. Therefore, the issuance of timely and accurate advisories and SIGMETs and their dissemination to airlines, ATS units and other users concerned, should be pursued by all relevant organizations/agencies of the States/Territories in the regions exposed to volcanic activity.

4.5 It is a great achievement that the VAACs of Washington and Buenos Aires of the CAR/SAM Regions have been fully implemented and are now providing the required advisory services. However, these services would not be effective if the States/Territories' MWO, do not issue SIGMET based on the advisories received from the VAAC, since the SIGMET is a crucial report to aircraft. Based on reports from the PIRGs, the Meteorology (MET) Divisional Meeting (2002) recognized that deficiencies existed in the issuance of SIGMET, in particular, SIGMET for volcanic ash and formulated specific recommendations in this regard.

4.6 ICAO has addressed deficiencies related to SIGMET and assistance was provided to States by issuing a Regional SIGMET Guide. In case of the CAR/SAM Regions, SIGMET Guide is being updated based in amendment 73 to Annex 3 and in each Region a SIGMET Special Implementation Project (SIP) has been carried out in special emphasis was given to volcanic ash SIGMET. However, the main potential for improving SIGMET information is within the States/Territories and could be realized by enhancing the coordination and cooperation between the MET offices, AIS and ATS units, volcanological agencies and operators, in order to ensure timely exchange of any available information that supports the SIGMET issuance. Therefore, the States/Territories' civil aviation administrations and the meteorological authorities are invited to address jointly all issued related to the issuance of SIGMET. The procedures in use should be reviewed and aligned with the relevant ICAO SARPs and guidance material.

4.7 An effective measure in enhancing the coordination at national level would be the establishment of formal relationships by signing a Letter of Agreement between the organizations/agencies involved in the collection and dissemination of information relevant to SIGMET.

4.8 Airlines should note that their important contribution to the collaborative effort of providing timely and accurate SIGMET information is in providing timely and accurate special air-reports by aircraft flying through or near meteorological phenomena that may affect the safety of flight.

4.9 The vision for a fully coherent and effective advisory service would be as follows: timely and accurate warnings (SIGMET) provided by the meteorological watch offices that ensure no surprises related to meteorological conditions in the air, timely and accurate advisories provided by the VAACs to meteorological watch offices in support of the SIGMET issuance and to airlines and air traffic services to effectively support their decision making on the safe air space usage. Cooperation at national level is a crucial element in materializing this vision.

## **5. Development of adequate cost-recovery mechanisms for the MET services at national level**

5.1 Meteorological services for international air navigation are part of the air navigation services described in article 28 of the Convention for Civil Aviation and, as such, are subject to cost recovery in accordance with ICAO principles and policy on the air navigation service charges. Guidance on establishing national practices for recovery of the cost for the meteorological services rendered specifically for the international air navigation is provided in ICAO *Manual on Air Navigation Services Economics*, Doc 9161 and in WMO *Guide on Aeronautical Meteorological Services Cost Recovery* (WMO-No. 904).

5.2 MET Divisional Meeting (2002) noted that problems still existed in the practical implementation of the guidelines on cost recovery by CAR States/Territories. The meeting adopted Recommendation 4/2, Extension of guidance material on cost recovery, calling for ICAO and WMO to further develop the guidance based on the experience gained and including case studies illustrating specific examples of cost recovery arrangements in a variety of regulatory environments.

5.3 CAR States/Territories' civil aviation administrations and meteorological authorities are urged to cooperate closely in setting up national practices for the cost recovery of fair, equitable and agreed costs for providing the required meteorological services and facilities for international air navigation. This process should include full consultation with the operators. In this sense, the Seventh Meeting of the GREPECAS Aeronautical Meteorology Subgroup (AERMETS/7), held in Mexico City, from 23 to 27 May 2005, approved Draft Conclusion 7/2 – Cost recovery of the aeronautical MET services of the CAR/SAM Regions, which will be submitted to GREPECAS/13 (Santiago, Chile, 14 to 18 November 2005) for approval.

**6. Action by the Meeting**

6.1 The meeting is expected to:

- a) note the content of this paper;
- b) recognize the importance of the enhanced cooperation at the national level in providing effective and efficient meteorological service to international air navigation; and
- c) consider the Draft Conclusion included in paragraph 2.1.

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