ATS/MET/PILOTS/VA

INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE ICAO/WMO CAR/SAM ATS/MET/PILOTS AND VOLCANIC ASH SEMINAR

(ATS/MET/PILOTS/VA)

(BOGOTÁ, COLOMBIA 12 – 16 NOVEMBER 2001)

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE ICAO/WMO CAR/SAM SEMINAR ON COORDINATION BETWEEN AIR TRAFFIC SERVICES, AERONAUTICAL METEOROLOGICAL SERVICE AND PILOTS (ATS/MET/PILOTS) AND VOLCANIC ASH

(Bogota, Colombia, 12-16 November 2001)

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ICAO/WMO CAR/SAM ATS/MET/PILOTS AND VOLCANIC ASH SEMINAR

(Bogotá, Colombia 12 – 16 November 2001)

PART I – HISTORY OF THE SEMINAR

1. Objective

1.1 This seminar was organized by ICAO and the World Meteorological Organization (WMO) pursuant to Recommendations 13/8 and 13/11 of the CAR/SAM/3 RAN Meeting (Buenos Aires, Argentina 1999) to provide participants a forum to examine various aspects related to the exchange of meteorological information between air traffic services, meteorologists, search and rescue and aeronautical information services and pilots. Participants would also have the opportunity to examine volcanic ash issues including operational procedures and their impact on aviation operations, as well as training related to volcanic ash.

1.2 Place and duration

1.2.1 The seminar was held at the premises of the Centro de Estudios Aeronáuticos (CEA) of the Unidad Administrativa Especial de Aeronáutica Civil (UAEAC) of Colombia, thanks to the kind offer of the Colombian Institute for Hydrology, Meteorology and Environmental Studies (IDEAM) and the Civil Aviation Authority of Colombia.

1.3 Organization and opening

1.3.1 The seminar was organized jointly by the World Meteorological Organization (WMO) and ICAO, with the cooperation of the US National Weather Service and co-hosted by the Colombian Institute for Hydrology, Meteorology and environmental Studies (IDEAM) and the Civil Aviation Authority (UAEAC). Dr. Carlos Castaño Uribe, Director of the IDEAM, opened the seminar and remarked on the high importance of the seminar for the CAR/SAM Regions. Dr. Alberto Muñoz Gómez, Technical Secretary of Unidad Administrativa Especial de Aeronáutica Civil (UAEAC) of Colombia, pointed out the importance of this event as a contribution to security, regularity and efficiency in international civil aviation.

1.4 Languages

1.4.1 The seminar was conducted in English and Spanish. Documentation received prior to the seminar was provided in both languages. Documentation received during the seminar was provided in the available language. The Report of the Seminar was issued in both languages.

1.5 **Agenda**

1.5.1 The seminar considered the following items:

Agenda Item 1: Organization of the Seminar

Agenda Item 2: Air traffic services and meteorological services organizations

Agenda Item 3: Meteorological information for air traffic services and search, rescue service units and aeronautical information services

Agenda Item 4: Coordination between air traffic services units and meteorological offices and stations

Agenda Item 5: Coordination between aeronautical information services and aeronautical meteorological services

Agenda Item 6: Letters of agreement between air traffic services and meteorological services.

Agenda Item 7: Available methods for the effective provision of meteorological information to air traffic services units.

Agenda Item 8: Meteorological support to the air traffic management system including uplink/downlink of information to/from aircraft

Agenda Item 9: Volcanic ash and its operational impact

Agenda Item 10: International airways volcano watch (IAVW)

Agenda Item 11: Procedures to be followed for the dissemination of information on volcanic ash

Agenda Item 12: ATS procedures to avoid areas of volcanic activity/ash, including contingency arrangements

Agenda Item 13: Training on volcanic ash

Agenda Item 14: Evaluation of the seminar

1.6 **Participants**

1.6.1 The seminar was attended by 73 participants from 24 CAR/SAM States. Lecturers and moderators for the seminar included ICAO staff members, experts from NOAA-NESDIS, the Buenos Aires VAAC and a WMO Representative.

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PART II – REPORT OF THE SEMINAR

2.1 The information provided below is the executive summary of the subjects dealt with during the seminar.

Agenda Item 2: Air traffic services and meteorological services organizations

2.2.1 The seminar noted that the increasing tendency to centralization of meteorological services for international air navigation is causing changes in the way such services are provided to users, particularly, in the automation of meteorological services provision and the international airways volcano watch.

2.2.2 Likewise, it was recalled that although the ATS/MET reporting points concept would not be applicable to automatic air-reporting through air-ground data link, during some years many aircraft will not have data link equipment and will continue issuing ATS/MET air-reports by means of oral communications during the en-route flight phase. In view that the transition to aircraft with data link capacity will be gradual, planning and implementation in the CAR/SAM Regions will have to consider the two ways of air-reporting and States should make continuous emphasis in the implementation of existing air reporting procedures, while gradual implementation of air reporting through automated data link is coordinated.

2.2.3 Based on presentations made by participants during the seminar, the following aspects were emphasized:

a) The increasing tendency for ATS staff to make meteorological observations in place of trained meteorologists and the briefing of pilots by flight dispatchers in place of duly trained forecasters were highlighted as practices that could have negative impacts on flight safety. It was suggested that the issue of ATS staff making observations should be dealt with in the Letter of Agreement between the ATS and meteorological authorities. Regarding the briefing of pilots by flight dispatchers, it was pointed out that the responsibility of MET is to ensure that flight documentation is prepared and available in accordance with ICAO / WMO provisions. The user of the information has ultimate responsibility to collect the information and use it as the user sees fit;

b) the increasing lack of contacts between pilots and duly trained meteorologists for consultation and briefing purposes was noted with regret. It was explained however that this could be due to difficulties of pilots to reach the aeronautical meteorological offices particularly at large airports. Furthermore, because of existing dedicated means of communication set up in some instances by meteorological service providers themselves, pilots do not see the need to be physically present at meteorological offices; and

c) the priority given to aeronautical meteorology in some WMO Member/ICAO Contracting States is not adequate. This is reflected by the lack of equipment at aeronautical meteorological offices as well as the insufficient number of qualified personnel. In this regard, it was suggested that appropriate priority be given to the implementation of aeronautical MET services as an essential air navigation service, in accordance with

Conclusion 14/44 formulated by the CAR/SAM/2 RAN Meeting and Recommendation 13/8 by the CAR/SAM/3 RAN Meeting.

Agenda Item 3: Meteorological information for air traffic services and search, rescue services units and aeronautical information services

2.3.1 It was noted that the considerable volume of meteorological information and services required by ATS units to efficiently achieve their objectives has been included in the specifications to be provided to international air navigation by meteorological services, explaining the way in which meteorological information necessary for the development of their functions should be provided to operators, flight crew members, ATS units, search and rescue services centers, airports administrations and other entities interested in international air navigation activities.

2.3.2 In order that ATS units reach their objectives, they need a great volume of meteorological information and services. The meteorological data required by ATS units to develop their functions has increased in volume and complexity during the last years. With the utilization of oral communications (HF and VHF) and the recent implementation of data link communications, ATS units have become an important means of transmission for meteorological data to aircraft. Even in cases when information is radio-broadcasted to aircraft, ATS units are generally responsible for some transmissions [ej., ordinary broadcasting of meteorological information for in flight aircraft (VOLMET broadcasting), broadcasting for automated terminal information service (ATIS), etc.] as well as for the reception through air-reports (AIREP) of meteorological information originated by aircraft. The last are very important due to the occurrence of certain meteorological phenomena such as turbulence, freezing and low-level wind shear, which can be only diagnosed and confirmed through this way.

Item 4: Coordination between air traffic services units and meteorological offices and stations

2.4.1 Agenda item 3 of the seminar noted how intricately inter-twined the air traffic and meteorological authorities are in the provision of services to air navigation. In many cases the air traffic services unit and the meteorological offices and stations are at the same aerodrome and serve the same aircraft, air routes and/or areas. Moreover, ATS units are the only interface between MET and the pilot and, as such, play a critical role in the provision of information to aircraft. To achieve the best service for aviation, close co-ordination of these efforts is necessary and continued consultation and coordination between these units, offices and stations at the local level is important for an efficient exchange of information.

2.4.2 In order to supplement the guidance regarding coordination between ATS units and meteorological offices and stations continuous liaison should be maintained between the meteorological authority and AIS offices and units in each State. As the result of such liaison, the meteorological authority submits directly, or through its meteorological offices and/or aeronautical meteorological stations, to the AIS units concerned, certain information to be included in the Integrated Aeronautical Information Package (IAIP) of the State concerned. The AIS authority designated by the State concerned to collect all elements of the IAIP, the international NOTAM/ASHTAM office and the aerodrome aeronautical information service units should be supplied with the necessary information as agreed by the meteorological and AIS authorities concerned.

Agenda Item 5: Coordination between aeronautical information services units and meteorological offices and stations

2.5.1 General information on the meteorological service provided to aeronautical users in a State, including the ATS authorities and their operational units, is promulgated through the aeronautical information service (AIS). Changes in the provision of the service, changes in meteorological procedures and even new information concerning significant weather impact on flight operations are notified to aeronautical users through the AIS. Likewise, certain information e.g. concerning the occurrence of volcanic activity hazardous to flight operations is obtained and disseminated to the users concerned and to aircraft in flight in coordination between meteorological watch offices and aeronautical meteorological stations, ATS and AIS units.

2.5.2 In some regions, provisions have recently been developed and are being implemented for the harmonized access by pilots and operators to aeronautical information services and to meteorological information to be used in pre-flight planning in various ATS/MET automated self-briefing and flight documentation facilities. Relevant provisions have been incorporated in Annex 3, 9.9. These provisions were further developed and included in Amendment 72 to Annex 3, which became applicable in November 2001. Further implementation of the provisions of day -to-day operations of relevant facilities for the harmonized access to AIS and MET information will also require coordination between the AIS and MET authorities and their personnel.

2.5.3 During discussions on co-ordination among all air navigation service stakeholders, it became clear that training on all co-ordination aspects needed to be intensified in various countries to ensure a better understanding of the objectives and functions of ATS, MET, AIS, Search and Rescue and Pilots. It was pointed out that although good quality meteorological service to aviation was available in the two Regions, aviation safety would only be ensured if each air navigation entity is fully aware of its functions and the procedures put in place to ensure an orderly and timely delivery of services. In this regard, the following suggestions were made by the seminar:

a) the need to implement GREPECAS/10 Conclusion 10/39 to set up an ICAO/WMO pilot project for the training of aeronautical meteorological staff that could include co-ordination aspects;

b) the need to give high priority to the timely availability of AIREP that contribute to the valuable data base used to run NWP model and special AIREPS to meteorological watch offices to provide vital information for the issuance of SIGMET were highlighted;

c) the importance to note different meaning of "tropical cyclone surveillance" for aviation and for other users in the Caribbean Region was highlighted during the seminar; and

d) the use of the new Edition of the Manual on Co-ordination between ATS/AIS and Aeronautical Meteorological Services (Doc 9377) to make relevant authorities in a number of WMO Members/ICAO Contracting States aware of the need to implement such co-ordination;

Agenda Item 6: Letters of agreement between air traffic services and meteorological services

2.6.1 The letter of agreement should, from the outset, provide the objective of establishing the directives for the necessary co-ordination between air traffic units and aeronautical meteorological offices and stations, in order to ensure the provision of meteorological services necessary for national and international air navigation. The agreement should also specify the responsibility of air traffic services units in relation to the transmission of air-reports and other meteorological information obtained from aircraft in flight.

2.6.2 When, for special or unforeseen reasons, a significant change in the co-ordination between the parties involved or services mentioned in the letter of agreement becomes necessary, the respective authorities, through mutual agreement, may effect temporary changes or amendments, provided that these changes are seen not to last for a long time; normally not more than 60 days. Permanent revisions of the letter of agreement should be made in writing by the authorities that sign and approve this agreement, which should state in clear terms the responsibilities of both authorities.

2.6.3 In order to achieve good implementation of the services promulgated in the letter of agreement, it is necessary that meteorological and air traffic services personnel have a clear understanding of each other's responsibilities. Courses or on-the-job training for the personnel should be periodically organized with the objective of familiarizing the personnel with the activities performed by both services. Periods and dates for these courses should be agreed in accordance with criteria developed by the authorities.

2.6.4 The authorities were requested to put in place a letter of agreement that would clearly and unambiguously delineate the services and responsibilities of each authority. This is important not only for improving services provided in day to day operations but also for use in the case of an incident or accident where legal aspects may be involved. A sample letter of agreement for ATS MET, SAR and AIS co-ordination was proposed to participants that should be adapted to specific conditions in each WMO Member/ICAO Contracting State.

Agenda Item 7: Available methods for the effective provision of meteorological information to air traffic services units

2.7.1 The inclusion by States of detailed information on meteorological data provision to air traffic services in their AIPs or other publications, in order to give all interested bodies a clear idea of meteorological services and air traffic management systems, facilitates the coordination and efficient provision of air navigation services. Likewise, due note was taken that the ATS/AIS/MET Manual (Doc 9377) includes an illustration of the methods used by some States for the efficient provision of meteorological information to air traffic services units.

2.7.2 Likewise, during the seminar, participants made presentations on this subject, which contributed to the exchange of views.

Agenda Item 8: Meteorological support to the air traffic management system including uplink/downlink of information to/from aircraft

2.8.1 Development of new communications, navigation and surveillance (CNS) technologies to be applied to both the ATS system and aircraft will facilitate a substantial improvement and extension of

ATS currently provided to aircraft operators. This process will, no doubt, require additional meteorological support to ATS and affect the coordination between the ATS authorities and the meteorological authorities and their respective operational units.

2.8.2 Since the progress which has been made in planning for the new air traffic management (ATM) system does not yet provide for a detailed analysis and guidance regarding the coordination between individual elements and units of the new ATM system and meteorological offices and aeronautical meteorological stations, material was presented to describe trends in the provision of meteorological service to international air navigation including ATS and, in the context of these trends, to outline the envisaged meteorological support to the new ATM system.

2.8.3 The need was highlighted to keep authorities informed about the implementation of the CNS/ATM in the near future to enable them to be prepared to take appropriate steps. In this regard, it was suggested that high priority should be given to telecommunication and co-ordination aspects of CNS/ATM to address current ATS weaknesses;

Agenda Item 9: Volcanic ash and its operational impact

2.9.1 The Seminar noted that during the last 30 years, more than 90 commercial aircraft propelled by jet engines have been damaged as a result of volcanic ash encounters in their flight paths and that most plinian-type explosive volcanic eruptions throw volcanic ash upwards, even surpassing the cruise levels of international transport aircraft. Likewise, it was clear that volcanic eruptions with classification lower than plinian cannot be set aside, because the ash columns they produce can also reach the aircraft cruise levels and, if the volcano is located next to approach and take-of paths, it could occur that weaker columns may affect aircraft taking-off from or descending to aerodromes.

2.9.2 The increased availability of information provided by satellites and the facility to transform such information in data useful to operators, has allowed the reduction of volcanic ash encounters in the airspace of aircraft routes. Nevertheless, a better coordination and cooperation among air operations staff and a close communication between them and the organizations responsible of observations on active volcanoes, would help to improve even more the current situation, since potential risk of a volcanic ash encounter still remains, considering that vulcanologists foresee the occurrence of 50 to 60 volcanic eruptions per year worldwide.

2.9.3 The volcanic ash operational impacts were discussed including volcanic ash effects on aircraft entering an ash plume as well as steps to be taken by pilots in case of volcanic ash encounters. Information was given on substantial financial losses incurred in particular for repairing damaged aircraft and losses resulting from airport closures and for cleaning affected airports premises. In this regard, a suggestion was made by one participant for ICAO to provide statistical information on the impacts of volcanic ash for international air navigation thought to be useful information to have.

Agenda Item 10: International airways volcano watch (IAVW)

2.10.1 A presentation was made on the ICAO International Airways Volcano Watch (IAVW). The presentation highlighted both the observing part dealing with the detection of volcanic eruptions and

volcanic ash and the warning part related to the issuance of volcanic ash advisory information in message and graphical format. It was pointed out that, with regard to warnings, the issuance of long term NOTAMs/ASHTAMs prior to an eruption by some authorities and unnecessary delay in the cancellation of NOTAMs/ASHTAMs were reported to causing difficulties for operators by denying airspace to aircraft for extended periods. A number of problems that remained to be addressed were highlighted which included:

a) The lack of sufficient and reliable and timely notification of volcanic eruptions. In this regard, the seminar was informed that ICAO was investigating the possibility to having real-time access to the infrasonic volcanic ash signatures from the Comprehensive Nuclear-Test-Ban Treaty Organization infrasonic network used to support the Comprehensive Test Ban treaty;

b) communications difficulties between observing sources and ACCs, VAACs and meteorological watch offices;

c) cancellation of NOTAMs/ASHTAMs, long term NOTAMS/ASHTAMs for pre-eruption of volcanoes;

d) extension of the coverage of VAAC to support "free flight" or "dynamic routing"

e) lack of winds height data in some States where there are active volcanoes.

The presentation also highlighted the contents of the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691) and the *Handbook on the International Airways Volcano Watch (IAVW) – Operational Procedures and Contact List* (Doc 9766).

Agenda Item 11: Procedures to be followed for the dissemination of information on volcanic ash

2.11.1 Issues related to volcanic ash forecast from atmospheric transport and dispersion model were discussed including difficulties for the initial detection of the volcano eruption, current uncertainties such as meteorological forecasts, volcanic ash column top height, particle size and distribution and ash boundary distribution.

2.11.2 Noting that there were some discrepancies in the use of alert color codes for volcanic ash warning in some WMO Member/ICAO Contracting States, a suggestion was made that co-ordination through ICAO was needed. It was pointed out that these discrepancies resulted from local agreements established to alert local authorities and that ICAO had alert color provisions only for warning aviation users. Although it was recognized that it would be difficult to convince local authorities and scientists to use a single worldwide color code, the effort is worth trying to have a single agreed alert color code. In this regard, it was suggested to use the color code for level of alert referred in the guidance for the completion of the ASHTAM format, appearing in ICAO Annex 15, Appendix 3.

2.11.3 Examples of graphic display of volcanic ash forecast, WEB sites for accessing volcanic ash information and current activities being carried out by the Washington VAAC. Graphics of volcanic ash eruptions by a number of active volcanoes in the Caribbean, Central and South America were shown as well as current techniques for the monitoring and detection of volcanic ash using ground and space

based technologies were discussed. The seminar noted with regret that the split window technique currently on board GOES satellite would not be available on next generation GOES satellites.

Agenda Item 12: ATS procedures to avoid areas of volcanic activity/ash, including contingency arrangements

2.12.1 The need for follow-up on action to be taken by an ACC in the event of a volcanic eruption and for effective co-ordination between ACC/FIC/NOF was emphasized and meteorological watch offices was reported, "to be a two-way street fundamental to the entire SIGMET system". It was said to be "specially critical for the International Airways Volcano Watch (IAVW), which is unique in that it requires the issuance of both NOTAM/ASHTAM and SIGMETs for weather phenomena". The need to keep updated information from contact points including VAACs, and updated WMO abbreviated headers in the the IAVW Handbook (Doc 9766) to facilitate the transmission of NOTAMS and ASHTAMS was particularly highlighted by the lecturers.

Agenda Item 13: Training on volcanic ash

2.13.1 The seminar was aware that information on operational procedures for dissemination of information on volcanic eruptions and volcanic ash clouds, does not achieve its objective, if it is not known by all involved. In order to avoid the negative impact of volcanic ash on air operations proper coordination is necessary.

2.13.2 Participants were encouraged to disseminate in their States the information received during the seminar, through workshops organized at national level, involving ATS/MET/AIS personnel, as well as pilots.

Agenda Item 14: Evaluation of the seminar

2.14.1 As suggested by the WMO Representative in his welcoming address, most participants indicated that, upon return to their home country, they would pass on the knowledge gained at this seminar to their colleagues and that a Letter of Agreement for co-ordination between all air navigation stakeholders would be either updated or developed. Evaluation of the seminar indicated that over 92 % of participants were of the view that the objective of the training "was fully met".