



SAM 03/03-AIS/MAP/AUTO
WP/4.1
30/05/03

INTERNATIONAL CIVIL AVIATION ORGANIZATION
SOUTH AMERICAN OFFICE

**AERONAUTICAL INFORMATION SERVICES, AERONAUTICAL CHARTS AND
AIS AUTOMATION COORDINATION AND IMPLEMENTATION MEETING**

(SAM 03/03-AIS/MAP/AUTO)

(Lima, Peru, 13 to 17 October 2003)

**Agenda Item 4: Review on the status of implementation of the WGS-84 System in the ICAO
SAM Region.**

(Presented by the Secretariat)

SUMMARY

This Working Paper presents for its consideration by the Meeting a review on the implementation level of the 1984 World Geodetic System (WGS-84) in the ICAO South American Region (SAM).

References:

- Report of the Third CAR/SAM/3 RAN Meeting, (Buenos Aires, Argentina, 5 – 15 October 1999).
- Report of the AIS/MAP/SG/7 (Varadero, Cuba, 23 to 27 October 2000)
- Report of the GREPECAS/10 & 11 Meetings (Spain 2001 and Brazil 2002, respectively)

1. Introduction

1.1 ICAO Annexes 4 and 15 stipulate that the geographic coordinates published for the benefit of civil aviation should be referenced to the geodetic datum of the World Geodetic System - 1984 (WGS-84). The use of the WGS-84 as a common geodetic datum for global air navigation was a requirement foreseen for implementation by States by 1 January, 1998. In order to meet this requirement, States would necessarily have to transform and/or convert all of their geographic coordinates to the WGS-84. In this respect, effective measures need to be taken to encourage the implementation of this requirement in the SAM Region.

1.2 The CAR/SAM/3 RAN meeting recognised that the WGS-84 System had a direct impact on the timely and effective implementation of GNSS and CNS/ATM systems. It also noted that the matter was being duly dealt with by the relevant ICAO Regional Offices and GREPECAS. On the other hand, the aforementioned meeting, despite noting that progress had been made in WGS-84 implementation in the ICAO SAM Region, recognised that there were still some implementation difficulties, which would need to be directly tackled by some States in order to fully comply with this technical requirement.

2. Action to foster WGS-84 implementation

2.1 The meeting should note that ICAO is making an effort to assist the States involved with the effective implementation of the WGS-84 System. In this sense, a series of specific actions have been initiated, such as the holding of technical meetings, seminars and workshops on the WGS-84 System. Likewise, the States, in order to meet the various requirements of the aforementioned system, have received the support required in terms of documentation on the reference technique. Furthermore, through the implementation of Special Implementation and Technical Assistance Projects, direct support has been provided to the States for the completion of field geodetic surveys at international airports.

2.2 In addition to the above, mention should be made of the particular measures taken by the ICAO SAM Regional Office to foster effective WGS-84 implementation in the area involved, such as:

- execution of Special Implementation Project (SIP) SAM/98 – WGS/84 (1998), aimed at providing technical assistance and conducting field surveys and verifications at the main airports of six (6) SAM States;
- coordination of a Special Technical Cooperation Project, under agreement between the United States TDA Agency and LACAC (1998-1999), for the conduction of field work and the production of aerodrome charts for 21 airports in the CAR Region and 3 international airports in Venezuela; and,
- conduction of two (2) WGS-84 seminars/workshops (2000 and 2001) to assist CAR/SAM States and conduct field geodetic activities at the main international airports of Bolivia, Colombia, Panama, Peru and Venezuela.

2.3 With respect to the status of implementation of the WGS-84 system in the CAR/SAM Regions, the first meeting of the ATM/CNS Subgroup (July 2001) examined this particular matter, and noted that, despite ICAO efforts, at least 57% of SAM States had not implemented the WGS-84 System in an efficient way. Therefore, it agreed to adopt Draft Decision 1/65 (WGS-84 implementation problems), asking GREPECAS to submit a request to the Air Navigation Commission for the establishment of SIPs to support the States concerned in the effective implementation of this technical requirement. In turn, and as a follow-up to the aforementioned action, GREPECAS/10 adopted Conclusions 10/57, 10/49, 10/55 and 10/56 (concerning a special implementation project/SIP-WGS-84; the production of aeronautical charts based on the WGS-84; the publication of WGS-84 geographic coordinates; and the publication of the WGS-84 geoid undulation, respectively). In this respect, it would be advisable for the meeting to take note of the action taken to foster WGS-84 implementation in the SAM Region.

3 **Status of implementation of WGS-84 requirements**

3.1 With respect to WGS-84 implementation in the SAM Region, significant progress has been made with respect to field work at the main international airports. As a result of this, primary (PACs) and secondary (SACs) control points have been established in that type of aerodromes. However, additional efforts still need to be made by civil aviation administrations to meet other WGS-84 requirements, such as: completing field work at airports, mainly those involving the survey of all obstacles in the surroundings of aerodromes, the conversion of all airspace geographic coordinates, and the preparation of all the required aeronautical charts in reference to the WGS-84 System.

3.2 In addition to paragraph 3.1 above, other elements that will have to be taken into account by the States for full and effective WGS-84 implementation are, *inter alia*: the need to publish geoid undulations at runway thresholds of international airports, the establishment of quality assurance systems capable of safeguarding the precision and integrity of the geographical data used by civil aviation, and the use of appropriate and effective procedures for validating WGS-84 data. It is also recognised that, for a full and effective WGS-84 implementation, States will be required to adopt special measures on this matter in order to incorporate said requirement into their national implementation plans. In order to allow the meeting to conduct the respective assessment of this issue, **Appendices B**, and **C** have been included to this paper.

3.3 In this regard, it is a well-known fact that the date established for WGS-84 implementation (1998) was due more than 4 years ago, and despite the efforts and the progress made in this regard in the SAM Region, it is a matter of concern that full implementation of this system has not yet been achieved as required, mainly due to a series of difficulties that still exist to meet this technical requirement in an effective manner. In order for the meeting to properly examine this matter, **Appendix A** to this working paper shows a series of problems that are hindering an effective WGS-84 implementation in the area of concern.

4. **Additional action required for an effective WGS-84 implementation**

4.1 With respect to that stated in paragraph 3 above, and in the opinion of the Secretariat, relevant measures would need to be taken for prompt implementation of these technical requirements. Therefore, close coordination between civil aviation administrations and national and military geographic institutes would be required in order to effectively and properly meet the vertical requirements of the WGS-84 system. In this respect, it is a well-known fact that some progress has been made in the SAM Region with respect to the establishment of a geodetic datum for defining a South American geoid model, and that this is being carried out by the PAIGH SIRGAS Geophysics Group. In this regard, the meeting could suggest the advisability of organising an informal meeting to deal with this particular matter. Consequently, the adoption of the following action is suggested:

CONCLUSION 4/1: WGS-84 COORDINATION MEETING

That the ICAO SAM Regional Office take the necessary action in order to foster, summon, sponsor and conduct an informal coordination and implementation meeting during the 2003-2004 period, with the direct and effective participation of technical personnel from all the States and organisations which might be involved in the determination of geoid models in the SAM Region, in order to deal with the question of the vertical requirements of the WGS-84 system in a proper and professional manner.

4.2 Another aspect of the difficulties facing States for full WGS-84 implementation in the SAM Region relates to the establishment of quality assurance systems capable of safeguarding the precision and integrity of geographic data used in civil aviation, and the need to pay special attention to the procedures used for validating WGS-84 data. Consequently, it is suggested that the meeting adopt the following action:

CONCLUSION 4/2: WGS-84 DATA QUALITY ASSURANCE

That SAM States take the necessary steps to:

- a) establish quality systems in their AIS/MAP services, so as to guarantee, at all times, the precision and integrity of WGS-84 geographic data used in civil aviation; and
- b) adopt effective procedures to validate the WGS-84 data used in civil aviation.

4.3 In addition to the above, the SAM Regional Office needs to have detailed and reliable information on WGS-84 data published and/or to be published by the States concerned, taking into account that ICAO Document 9674-AN/946 [WGS-84 System Manual] contains a model questionnaire (Appendix G), which should be used to supply the required information. Consequently, the following action should be adopted:

CONCLUSION 4/3: PROVISION OF DETAILED INFORMATION ON WGS-84 DATA

That SAM States, in order to ensure the availability of WGS-84 information at a regional level, take the necessary measures to:

- a) supply the SAM Office, no later than June 2004, the WGS-84 data used in civil aviation which has been published and/or to be published; and, to that end,
- b) use the questionnaire contained in Appendix G to ICAO Document 9674-AN/946 [WGS-84 Manual].

5. **Conclusion**

5.1 Appendix A to this working paper presents for your consideration a series of inconveniences which are affecting the effective implementation of the WGS-84 System in the area of concern. Likewise, Appendices B and C present aspects related to the status of implementation of WGS-84 System requirements in the SAM Region. Item 4 of this paper presents, for analysis, consideration and adoption, a series of specific actions aimed at promoting some type of relevant solution and/or guidance to improve the reported situation. Therefore, the meeting is invited to review in detail the contents of this working paper, together with the information presented in its respective Appendices, and to adopt any action it may deem advisable.

6. **Suggested action**

6.1 In view of the aforementioned, the meeting is invited to:

- a) review the contents of this working paper and its respective Appendices; and
- c) adopt the Conclusions proposed and any other action which might be required.

- - - - -