

INTERNATIONAL CIVIL AVIATION ORGANIZATION
FIRST MEETING OF DIRECTORS OF CIVIL AVIATION OF THE
CARIBBEAN REGION (CAR/DCA/1)

(Grand Cayman, Cayman Islands, 8-11 October 2002)

Agenda Item 4: Air Navigation

4.4 AIS Developments

(Presented by the Secretariat)

SUMMARY

This working paper presents to the Meeting a general view on the status of development of the different AIS/MAP Implementation Projects in the CAR Region: AIS/MAP Automated Systems; AIS/MAP Quality System; and WGS-84.

References:

- Report of the Third CAR/SAM Air Navigation Regional Meeting (Buenos Aires, Argentina, 5-15 October 1999).
- Report of the Seventh AIS/MAP/SG Meeting (Varadero, Cuba, 23-27 October 2000).
- Report of the GREPECAS/10 Meeting (Las Palmas, Canary Islands, 23-27 October 2001).
- Annex 15 - "Aeronautical Information Services" and Annex 4 - "Aeronautical Charts".
- ICAO Doc 9750/AN/963 "Worldwide Air Navigation Plan for the CNS/ATM Systems".

1. **AIS/MAP Automation**

1.1 **Introduction**

1.1.1 ICAO Annex 15 states that the main object of AIS/MAP services is to ensure the flow of information necessary for the safety, regularity, and efficiency of international air navigation. To this end, the aeronautical community is conscience of the problems faced regarding the provision of AIS/MAP services in the CAR Region, especially those directly related with late dissemination of aeronautical information to international users. Therefore, it is essential that States/Territories civil aviation authorities understand the great importance and direct impact that an adequate provision of AIS/MAP Services has in order to ensure the required level of efficiency of aeronautical operations.

1.1.2 Aeronautical Information Services provided by State/Territories civil aviation authorities through the years and up to his date have been adequate in supporting manual flight operations. Nevertheless, the rapidly evolving technologies in the aviation environment are causing airlines to be more dependent on the efficiency, accuracy, integrity and timeliness in which AIS/MAP services can provide the essential and critical aeronautical information/data to air navigation. On the other hand, the automated systems such as the Integrated Flight Management System (FMS), the Global Navigation Satellite System (GNSS) sensors, flight planning and flight simulation, require accurate, updated in real time and readily available and/or timely information. Consequently and with the aim of complying with the operational requirements of the CNS/ATM and GNSS systems (FMS inclusive), as well as the use of software for the application of the Geographical Information System (GIS) and Terrain Digital Model System (TDMS) integrated to the AIS/MAP database, States/Territories should be conscious of the drastic changes that will necessarily take place under the AIS Services support and provision scheme, through the transition period from the present manual systems to a fully automated and integrated AIS/MAP environment.

1.2 **Actions to promote the implementation of the AIS/MAP Integrated Automated System**

1.2.1 When considering the alternative of establishing an Integrated Automated AIS/MAP System in the CAR Region, this system's objective should be mainly based on operational principles tending to avoid, as much as possible, potential incompatibilities and discrepancies between the interlinked facilities (Web Systems) within the integrated automated AIS/MAP System. Therefore, it should always be considered necessary that this type of system be designed on common procedures and standardized formats. In Central America, Eastern and Central Caribbean several coordination meetings have been held directly aimed at supporting and fostering the establishment in those geographical areas of the CAR/SAM AIS/MAP Integrated Automated Systems and their future evolution toward an AIS/MAP Database System. On this particular issue, the Meeting should take note that despite efforts made by ICAO and implementation actions adopted by some States/Territories in the establishment of AIS/MAP Automated Systems, a continuous policy of implementation should be in force by the States/Territories concerned, as well as support and verification of this situation by the ICAO Regional Office.

1.2.2 Considering the above mentioned paragraph, the GREPECAS/10 Meeting when considering the actions adopted by the AIS/MAP/SG/7 regarding the present status of implementation of the NASC by the States/Territories of the CAR/SAM Region, noted that many States/Territories had made great progress in the implementation of NOTAM databases as part of the AIS Integrated Automated System. In this regard, it was considered convenient to urge States that have not yet complied with this requirement to proceed with the prompt implementation of the mentioned Data Banks and formulated **“Conclusion 10/53 Implementation of NOTAM Databases”**, and called on ICAO to support further progress on these issues.

1.2.3 In regard to the technical specifications prepared by the AIS/MAP Subgroup for the establishment of the first phase of the CAR/SAM Integrated Automated AIS/MAP System, the GREPECAS/10 Meeting noted with satisfaction that the "Coordinated Plan for the Implementation of the National Data Banks (NASC) in the CAR/SAM Regions" and "Common Operational Procedures Manual for an Integrated Automated AIS System (COPM) in the CAR/SAM Regions" had been updated by the AIS/MAP Subgroup and that these documents are available as support to the work being carried out in respect of the CAR/SAM Integrated Automated AIS/MAP System. To this end, implementation and a continued use of these two documents was approved through the **“Conclusion 10/51 - Status of NASC and CAR/SAM COPM documents”**.

1.2.4 With the aim of supporting the implementation of the AIS Integrated Database System Project in the CAR/SAM Regions, and recognizing the important support these systems will provide for an effective implementation of the CNS/ATM systems as envisaged in the Global CNS/ATM Air Navigation Plan, the GREPECAS/10 Meeting invited the concerned States/Territories, through **“Conclusion 10/54 - AIS integrated database support for CNS/ATM Systems”** to continue the work on this issue

2. AIS/MAP Quality Control System

2.1 Introduction

2.1.1 Aeronautical information/data are used by air traffic controllers, in the cockpit and flight planners, flight simulators, etc. Altered or erroneous aeronautical information/data have a great influence on the safe operation of flights and their control. Consequently, high standards are required by AIS/MAP providers. This will have to be achieved through an automated System that guarantees the quality and integrity of the information provided by the AIS/MAP databases. The Meeting should focus their attention on the fact that in the near future air navigation and control systems will depend completely on aeronautical information in electronic form, and that such data would be interrogated and exchanged by different entities and users towards AIS/MAP automated databases, validated and/or certified, in order to provide these services with a high quality control.

2.2 Discussion

2.2.1 Taking into consideration the above mentioned paragraph, the Meeting is invited to consider the need that effective actions be taken for the implementation of the AIS/MAP Quality Control System in the CAR Region, since this technical requirement was adopted by ICAO as the System that will allow quality control of aeronautical information/data for Global Air Navigation, and its implementation by States/Territories should be undertaken as soon as possible. To this end, ICAO put into practice a number of specific actions, such as the development of guidance material and planning of Seminars/workshops (Spanish and English), on AIS/MAP quality control for the years 2003 and 2004. Additionally, the States/Territories can count on having the support required of technical documentation to comply with the different requirements of the mentioned system, using the guidelines of the AIS Quality Control Manual. Direct support would also be given to the States/Territories in order to undertake the implementation of the AIS/MAP Quality Control System through Special Implementation Projects (SIPs) and technical co-operation projects. The requirements are stated in Annex 15, Aeronautical Information Services, Chapter 3:

“3.2.2 Recommendation. - The quality system established in accordance with 3.2.1 should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards, and certified by an approved organization.

Note.— International Organization for Standardization (ISO) 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme. The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization.”

2.5 In addition to the requirements for Quality System described in **Annex 15**, it is important to take note of ICAO Doc 9750-AN/963, Global Air Navigation Plan for CNS/ATM Systems, Chapter 9, paragraph 9.4:

“9.4 The role and importance of Aeronautical Information/data has changed significantly with the implementation of RNAV, RNP and airborne computer-based navigation systems. These systems are all data-dependent, and in that respect aeronautical data have become the crucial and critical components of the system. Consequently, corrupt or erroneous aeronautical information/data can potentially affect the safety of Air Navigation. In this respect, as of 1 January 1998, each Contracting State must take necessary measures to introduce a properly organized quality system containing procedures, processes and resources necessary to implement quality management at each functional stage of the data process. Established quality systems must provide users with the necessary assurance and confidence that distributed aeronautical information/data satisfy established requirements for data quality (accuracy, resolution and integrity) and timeliness.”

3. WGS-84 Implementation

3.1 Introduction

3.1.1 Annex 15 states that geographical coordinates indicating latitude and longitude for International Civil Aviation shall be expressed in terms of the World Geodetic System - 1984 (WGS-84) geodetic reference datum. It also states that in addition to the elevation of specific surveyed ground positions, which had been topographically surveyed, geoid undulation (referenced to the WGS-84 ellipsoid) for those positions specified in Appendix 1 of Annex 15 shall also be published. Furthermore, Annex 11 and Annex 14, Volume I and II, establish the requirements related to the determination and reporting of the geographical coordinates in airspace and aerodromes; and Annexes 15 and 4 establish specifications governing the publication in text or graphic as well as datum regarding its resolution. The WGS-84 Manual (Doc 9674) provides guidelines to facilitate the implementation by States/Territories of the WGS-84 requirements. Taking into consideration the aforementioned criteria, the use of the transformation of coordinates from a prior Datum into WGS-84 is not recommended.

3.1.2 On the other hand, the Meeting should consider the need to adopt the most effective measures to achieve complete WGS-84 implementation in the CAR Region in view of the fact that this technical requirement was adopted by ICAO as the Common Geodetic Reference Datum for Global Air Navigation and whose implementation by States/Territories was foreseen for 1 January 1998. Nevertheless, the Meeting should take note that the ICAO has been making great efforts to assist the concerned States/Territories until completion of effective implementation of the WGS-84. To this end, a number of specific actions have been developed such as the planning of several Seminars/Workshops on WGS-84. Furthermore, with the publication of Doc 9674 – World Geodetic System - 1984 (WGS-84) the States/Territories have the required technical documentation support to comply with the different requirements of the system. Also direct support has been provided to States/Territories to undertake field survey at international airports of the CAR/SAM Regions through Special Implementation Projects and Technical Cooperation Projects.

3.1.3 Regarding the main progress achieved in the CAR/SAM Regions in the development of strategies for the progressive introduction of requirements on the implementation of the Area Navigation (RNAV) as part of the future implementation of the Global Navigation Satellite Systems (GNSS), it was observed that part of this achievement had been aimed to the efforts toward the implementation of requirements such as the Non-Precision Approach GPS, the proposal for implementation of the RNAV Routes and the CNS/ATM Regional Transition Plan, among others. In lieu of the above, in order to fully comply with the mentioned requirements, the States/Territories would necessarily have to fulfil the requirement of transforming all their geographical coordinates into WGS-84. For all the above mentioned, the effective WGS-84 implementation is essential in the development of the CNS/ATM and GNSS systems.

3.1.4 Consequently, the Meeting should note the great importance of all States/Territories of the CAR/SAM Region completing the implementation of the WGS-84 requirements and the need to consider all those actions that could be essential to promote consistent and effective application of the technical requirements specified in ICAO Annex 15 that are basic to air navigation to support GNSS Systems.

3.2 Actions to promote WGS-84 implementation

3.2.1 In regard to the actions adopted by ICAO and Contributory Bodies, the ALLPIRG Group in charge of coordinating and assessing the actions adopted by the Air Navigation Planning and Implementation Regional Groups, has set special attention to the problem of lack of an effective WGS-84 implementation in the CAR/SAM Regions, as well as other ICAO Regions.

3.2.2 Through the analysis made by the First Meeting of the ATM/CNS Subgroup (Redondo Beach, California, United States, 16-20 July 2001) on the level of implementation of the WGS-84s in the CAR/SAM Regions, it could be verified that although efforts were made by the concerned ICAO Regional Offices either in direct form or through the RLA/98/003 Regional Project, 59 % of the States/Territories of the CAR and Central American Regions had not complied the effective implementation of the WGS-84. Therefore, the Meeting deemed necessary that to support the implementation of the CNS/ATM Systems, follow-up actions be developed to assist States/Territories of the area under consideration in the fulfilment of the cited requirement. To this end, the adoption of Draft Decision 1/65 (WGS-84 Implementation Problems) was agreed, requesting the GREPECAS Secretariat to present a paper to GREPECAS/10 Meeting requesting the Air Navigation Commission to establish special implementation projects to deal directly with the effective WGS-84 implementation.

3.2.3 According to that stated in the preceding paragraph, the GREPECAS/10 Meeting agreed to promote the complete and effective implementation of the WGS-84 in the CAR/SAM Regions through the availability of additional economic resources that could come from Special Implementation Projects, such as those approved by the ICAO Council for attending non-implementation of technical requirements that directly affect the safety of air operations and adopted the following Conclusions:

CONCLUSIÓN 10/49	PRODUCTION OF AERONAUTICAL CHARTS BASED ON WGS-84
CONCLUSIÓN 10/55	PUBLICATION OF GEOGRAPHIC COORDINATES BASED ON WGS-84
CONCLUSIÓN 10/56	PUBLICATION OF WGS-84 GEOID UNDULATION
CONCLUSIÓN 10/57	SPECIAL IMPLEMENTATION PROJECT (SIP) -WGS-84

4. Conclusion

4.1 The Meeting is invited to review in detail the contents of this Working Paper aimed at fostering the effective and complete implementation of the Automated AIS/MAP Systems, AIS/MAP Quality Control System and WGS-84 in the CAR Region.

5. Suggested action

5.1 The Meeting is invited to:

- a) review the contents of this Working Paper; and
- b) undertake all possible measures, including Bilateral or Multilateral cooperation, SIPs, ICAO Technical Cooperation Programme or other International Organizations in order to fulfill and follow-up the implementation plans presented in this Working Paper.

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