



International Civil Aviation Organization

CAR/SAM Regional Planning and Implementation Group (GREPECAS)

**Tenth Meeting of the GREPECAS Aeronautical Information Services Subgroup
(AIS/MAP/SG/10)**

Caracas, Venezuela, 26 February - 02 March 2007

AIS/MAP/SG/10-WP/07

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- Agenda Item 3: Review of Planning Aspects and the Transition towards AIM**
3.2 Review of the progress achieved in the CAR/SAM Regions with regard to the application of AIP concepts and electronic aeronautical charts

AIP AND ELECTRONIC AERONAUTICAL CHARTS

(Presented by the Secretariat)

SUMMARY

The purpose of this working paper is to evaluate the problems related with the progress achieved in the CAR/SAM Regions with regard to the implementation of the AIP and Electronic Aeronautical Charts.

References:

- AIS/MAP/SG/9 Meeting (Santo Domingo, Dominican Republic, 13 to 17 June, 2005).
- Report of GREPECAS/13 Meeting (Santiago, Chile, 14 to 18 November, 2005).

1. Introduction

1.1 The main objective of this working paper is to present to the AIS/MAP/SG/10 Meeting's consideration, aspects concerning technical requirements related to the electronic display of AIP information and aeronautical charts - ICAO. For the consideration of this subject, the Meeting should consider, at first, previous actions already adopted, both by the AIS Subgroup and GREPECAS, it is also important to be aware that due its complexity and reaches, a thorough study on this matter is required, and this should necessarily be carried out by one of the support groups of the AIS/MAP Subgroup.

1.2 Chapter 20 of ICAO Annex 4, establishes that the electronic aeronautical charts display would be made in compliance with the requirements of Annex 6 for the carriage of charts should enable flight crews to execute in a convenient and timely manner, route planning, route monitoring and navigation by displaying required information. It is established as well, that the electronic aeronautical charts display would have the capability to continuously plotting and displaying the aircraft's position in a true motion mode where generation of the surrounding chart would take place automatically. The Annex stresses that the supply and update of the data used in the electronic aeronautical charts display would be made according to aeronautical data quality requirements (see Chapter 2 of ICAO Annex 15).

2. **Background**

2.1 During the consideration of the technical requirements related to the electronic aeronautical charts display, the AIS/MAP/SG/9 Meeting took note that the AIS/MAP/98 Divisional Meeting, when analyzing the reaches of these technical requirements, pointed out some basic concepts directly related to electronic charts for their dynamic display in the cockpits. The Meeting also recognized the existence of some key elements that could directly affect the implementation of the procedures required to satisfy the electronic aeronautical charts display, among which the following could be mentioned:

- Need to define and develop basic operational requirements and required specifications for electronic charts;
- availability of a detailed study on terrain and obstacles electronic data, in digital format;
- availability of requirements on a VFR aeronautical chart (1:1,000,000/1:500,000), in digital format;
- electronic availability of all high quality and integrity aeronautical, geographical and geodesic information/data for civil aviation use, in direct support to GNSS; and,
- availability of specialized databases for each State regionally integrated, to ensure electronic availability of the required aeronautical information/data and electronic display of aeronautical charts within the Region.

2.2 As a result of the actions agreed by the AIS/MAP/SG/9 Meeting, GREPECAS/13 Meeting, when analyzing this matter, considered that for the planning and study of the electronic aeronautical charts, it was necessary to take into account the fundamentals regarding planning contained in ICAO Annexes 4, 6 and 15. The Meeting also stressed the importance for specialists in the AIS/MAP areas to be trained in all the topics related with electronic aeronautical charts.

3. **Discussion**

3.1 Although the electronic AIP is not mentioned in the above paragraphs, only electronic aeronautical charts in particular, mainly since this matter was considered both in the AIS/MAP/SG/9 Meeting and in GREPECAS/13 Meeting, and the electronic AIP is not the matter of discussion; however, when noting that for the conception of the electronic aeronautical chart, the availability of all the high quality and integrity aeronautical, geographical and geodesic information/data in digital format would be necessary, as indicated in paragraph 2.1 above, and taking into consideration that this type of information is generally contained in the AIP document, if this information is available in digital format and could electronically inter-act to conceive the electronic aeronautical chart, we would be dealing with an electronic AIP concept.

3.2 When considering the development of the concept on electronic display of AIP information and aeronautical charts, the managing of specialized and complex databases should be necessarily considered, however, this will have to progress as far as these concepts are developed and improved, mainly regarding the concept on electronic aeronautical charts in relation to the concept of electronic display of AIP information. In the market there are already several types of tools that could efficiently support this type of technical requirements. In this regard, it could be noted that there is currently a technology, which, even though its application is not new in other areas, in the Aeronautical Information Services does not have too much time of application yet, despite the great advantages that this technology is offering in the aeronautical field, as it is the case of the Geographical Information Systems (SIG/GIS).

3.3 In addition to paragraph 3.2 above, it should be mentioned that the GIS consist in computer systems capable to capture, store, analyze, exhibit and represent in digital format, information of geo-referenced type, that is data identified according its geographic location. It should also be noted that when some type of information is collected, it is very important to know where it is located, and this could be done through the use of a geo-referenced location system, as well as the longitude and latitude, elevation data could also be included. It could be indicated that the different types of information contained in a GIS could be inter-related to each other, and this relation between the data could assist in taking the right decisions on the most appropriate way of using such information.

3.4 It is also important to mention that many computer databases actually being used, as well as several kinds of data in form of products, could be included directly to the GIS, since these systems allow to integrate information difficult to associate with any other mean, besides, the GIS could also convert the existing digital information, which could be in a different format from the final product and through its recognition by the system could be used, as it could be the case of emerging data of digital satellite images and/or air photographs, which could be analyzed and processed, to produce then thematic maps digital information, which could be applied to aviation as in the case of the aeronautical visual flight charts (VFR).

3.5 This working paper does not intend to consider in detail nor technically Geographic Information Systems (GIS), but to recognize that these systems are being used more and more by the States for different uses, and have become recently in a valuable application tool, not only for the production of specific aeronautical charts, but also for the coordinated preparation of the AIP document, since it allows a direct inter-action with all the technical elements that contribute in the generation of primary aeronautical information/data. It is also important to recognize that GIS Systems, when operating with geographic and elevation location variables, could also support the generation of terrain digital models with high position range, which permits that the GIS could be related with global position systems, as it is Google Earth system.

4. **Final Considerations**

4.1 During the evaluation of this subject and before taking any action, the Meeting should be able to recognize the key requirements that could have direct influence in the implementation of the procedures to satisfy the electronic display of AIP Information and aeronautical charts. The AIS/MAP Subgroup should also recognize that the requirements to satisfy the electronic aeronautical charts display are of global reach, based on an effective, accurate and highly reliable integration of regional systems. The development of concrete specifications should be commissioned to working teams with the required experience and capacity to directly attend this specific purpose.

4.2 Taking into consideration the above, and mainly with regard to the fact that as a result of new technical requirements included in ICAO Annexes 4 and 15, related with the administration of digital aeronautical information/data used by international civil aviation through electronic means, and that such type of requirements could lead the States to use all the tools and technical support available in the industry, makes it necessary to have guidelines and/or specifications for the use of any of these type of systems available in the market. Considering also, that the generation of digital aeronautical data through electronic means, makes it necessary to develop new technical standards assigned to regulate the provision, storage, access and maintenance of the required aeronautical data, the necessary actions should be adopted in order to manage this type of operational requirements.

4.3 Since it is important for the development of the AIS Services in the CAR/SAM Regions, the use of GIS Systems as an electronic mean to support AIS activities is considered convenient. Therefore, the Meeting in principle should have to recognize the need to develop the pertinent studies on the subject, taking into account cost/benefit factors in the application of this type of technology, but, possibly based on regional cooperation agreements, the application of such type of systems could be feasible within the Region. For the study of this matter, it should be considered that the GIS Systems are already in use or in process of being used in the Region as direct support to their AIS Systems, and that ICAO has already implemented a GIS System for the management of the Global Air Navigation Plan. For this reason, the study of the application of GIS Systems in the Aeronautical Information Services is considered of utmost importance. Therefore, the Meeting could take some action on this particular matter.

5. **Suggested action**

5.1 Based on the considerations presented in this working paper regarding the need to take actions oriented to promote the implementation of automated systems in the CAR/SAM Regions, which will enable the electronic display of AIP information and aeronautical charts, and taking into account the need for a better study on this matter, and mainly on the possibility of the States to use Geographic Information Systems (SIG/GIS) in the Aeronautical Information Services, the Meeting is invited to consider the contents of this note and, if necessary, to take the required actions in order to promote the use of GIS Systems for aeronautical purposes in the AIS area.

5.2 Taking into account the information of this working paper, as well as paragraph 5.1 above, the Meeting is invited to adopt the following actions:

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CONCLUSION 10/X-

ACTIONS BY THE STATES FOR THE USE OF GIS SYSTEMS IN THEIR AIS SERVICES

That, taking into account the appropriateness of evolving towards the concept of digital aeronautical information management by electronic means in the CAR/SAM Regions, the States concerned are invited to:

- a) consider the possibility of implementing Geographic Information Systems (SIG/GIS) as automated support in the activities of their AIS services, for the electronic display of AIP information and aeronautical charts; and
- b) allow the immediate training of AIS personnel in the practical manage of GIS systems, as a mean to promote and facilitate the implementation of this kind of systems in their AIS services.

DRAFT**CONCLUSION 10/X-****ACTIONS BY THE ICAO REGIONAL OFFICES
CONCERNED TO PROMOTE THE USE OF GIS
SYSTEMS IN THEIR AIS SERVICES**

That, considering the need to evolve towards the concept of digital aeronautical information management by electronic means in the CAR/SAM Regions, ICAO Regional Offices concerned take the necessary actions in order to include in Technical Cooperation Regional Projects the requirement on the implementation of Geographic Information Systems (SIG/GIS) as automated support for the activities of the AIS services to assist CNS/ATM.

DRAFT**CONCLUSION 10/X -****ACTIONS TO PROMOTE THE STUDY OF GIS SYSTEMS
TO BE USED IN AIS SERVICES**

That, taking into account the appropriateness of studying the application of GIS Systems in the AIS Services, GREPECAS approve to include within the AIS Subgroup work programme, the following tasks:

- a) develop guidelines and technical specifications to facilitate the use of Geographic Information Systems (GIS) as electronic support of the activities of the AIS Services; and
- b) take the actions to review the AIS/MAP training programme, in order to include the issue related to GIS Systems, in the Regional Training Programme AIS-021 CAR/SAM.