



**WORKING PAPER**

**TWELFTH AIR NAVIGATION CONFERENCE**

**Montréal, 19 to 30 November 2012**

**Agenda Item 1: Strategic issues that address the challenge of integration, interoperability and harmonization of systems in support of the concept of “One Sky” for international civil aviation**

**1.1: Global Air Navigation Plan (GANP) – framework for global planning**

**MODERNIZATION OF SOUTH AMERICA DIGITAL NETWORK**

(Presented by Brazil on behalf of REDDIG Member States)

**SUMMARY**

This paper describes the efforts made by States and ICAO to modernise the South American digital network (REDDIG). It represents the vision of REDDIG Member States with respect to the adoption of a network infrastructure in support of current and future ATS applications described in the ASBU communications roadmap.

**Action:** The Conference is invited to take note of the action presented in paragraph 4.4.

**1. INTRODUCTION**

1.1 Before the advent of digital communication technologies, air navigation services in the SAM Region were provided through the implementation of analogue circuits under bilateral agreements.

1.2 The aforementioned circuits, in addition to having channel capacity issues for the transmission of applications, were implemented by ground telecommunication service providers that lacked the possibility to support services between two ATC units without resorting to third parties.

1.3 In order to implement a reliable and highly available network, the ICAO Lima Regional Office gave its firm support to South American States through the establishment of Technical Cooperation Project RLA/98/019 (Implementation of the South American Digital Network) which, after completing the implementation in September 2003, was replaced by RLA/03/901 (REDDIG Management System and Space Segment Administration). In REDDIG, all aeronautical fixed services (voice and data) specified in the CAR/SAM FASID (Regional Air Navigation Plan for the CAR/SAM Regions, Doc 8733) are exchanged.

1.4 REDDIG started operations with fifteen nodes in the SAM Region, located in Argentina, Bolivia, Brazil (three nodes), Chile, Colombia, Ecuador, Guyana, French Guiana (France), Paraguay, Peru, Suriname, Uruguay and Venezuela and, in 2006, Trinidad & Tobago joined the network. In addition, with the interconnection with the MEVA II VSAT network (VSAT network for the Central American and Caribbean States), a REDDIG node is added in Honduras for COCESNA (Corporación Centro Americana de Servicios de Navegación Aérea).

1.5 As happens with all electronic equipment, the REDDIG has reached the end of its useful life; in addition, with the increase of the new services to implement, such as ATN applications (AMHS, AIDC, radar data and new ATS speech services, a regional action plan for the implementation of a new regional IP network (REDDIG II) has been drafted.

## 2. **PROJECT RLA/03/901 (GENERAL ASPECTS)**

2.1 The Convention on International Civil Aviation (Chicago Convention), signed in Chicago on 7 December 1944, establishes certain principles and arrangements to promote the safe and orderly development of international civil aviation and to allow international air transport services to be provided on the basis of equal opportunities and in a safe and economic manner.

2.2 As ICAO contracting States and signatories to the Convention on International Civil Aviation, the States participating in Project RLA/03/901 have undertaken specific responsibilities concerning the adoption of standards and internationally agreed practices to regulate international civil aviation. The director of civil aviation or similar administrative authority of each State is responsible for ensuring that the civil aviation administration adheres and complies with such international obligations.

2.3 Amongst such obligations, civil aviation administrations are normally responsible for the development and implementation of the facilities, services, and procedures required to ensure the safety, regularity and efficiency of air operations. The orderly and timely implementation of such facilities, services, and procedures is agreed by the contracting States and coordinated by ICAO through regional air navigation plans.

2.4 The Caribbean/South American Regional Air Navigation Planning and Implementation Group (GREPECAS) is the regional mechanism in charge of planning the implementation of the regional air navigation plan and identifying specific issues affecting air navigation, suggesting appropriate solutions. The States participating in Project RLA/03/901 are members of GREPECAS.

2.5 The air navigation system performance-based implementation plan for the SAM Region approved by all the SAM civil aviation authorities, includes the short- and medium-term implementations of the systems and services for the implementation of the ATM operational concept, following the guidelines in the in the Global Air Navigation Plan (Doc 9750, Third Edition). In support of the plan's services, the existence of continuously operating, reliable, and available telecommunication network infrastructure is fundamental to ensure continuous and safe air traffic.

2.6 For the SAM Region, this network is the REDDIG, a VSAT digital network with distributed processing capable of interconnecting automated user systems. Its users share the satellite segment and network resources, with a centralised management and control system. This system operates based on established procedures and in accordance with the interests of the States that use the network. Likewise, and in order to keep operations cost-efficient, the administration system controls satellite resources and bandwidth use in benefit of all parties concerned.

2.7 The REDDIG management system enables its administration on behalf of the participating States and network owners in a way that serves the interests of the air navigation services to be provided by States, in keeping with the requirements of the Regional Air Navigation Plan, and the gradual transition to ICAO CNS/ATM systems at regional level with the corresponding inter-regional interfaces.

2.8 In the technical aspect, the ICAO South American Regional Office makes arrangements as necessary for the control and follow-up of project activities and outputs, taking into account, inter alia, the

conclusions and recommendations of States within the context of GREPECAS on matters related to the objectives of the project.

2.9 The REDDIG is managed by the network administrator working from the NCC of Manaus, Brazil, who is hired by the ICAO Technical Cooperation Bureau in accordance with the terms of reference and can maintain informal communications with the technical counterparts of each State for the fulfilment of his/her activities. The alternate to the Manaus NCC is Ezeiza, Argentina, which starts operating in case of failure of the Manaus NCC or during the period assigned as part of the NCC operational rotation process to maintain the operational capacity of the NCC technicians of Argentina. Figure 1 describes the nodes that make up the REDDIG.



Figure 1. Distribution of REDDIG nodes

2.10 The civil aviation administrations of participating States provide counterpart support as needed for the successful implementation of the project and to ensure continued results. This support may include full- or part-time participation of professionals and other personnel, and the provision of office space, classrooms, furniture, equipment, inputs, local transportation, telephone, telefax, and other services that are essential for the effective performance of activities by personnel assigned by the project.

2.11 Regarding training of technical personnel, specific programmes are conducted to address the specific characteristics of REDDIG equipment. The courses take place at a node selected for that purpose and are supplemented with periodic technical and operational meetings where technicians can develop procedures and discuss issues to resolve common problems.

2.12 For continued network operation, annual budgets are approved, which contemplate the procurement of spare parts that are centralized in the ICAO South American Office for control purposes. This Office sends any spares to the REDDIG nodes presenting failures in their equipment.

2.13 In this regard, the strength of Project RLA/03/901 should be highlighted, since it is clear that all the parties involved — REDDIG member States and the REDDIG Administration (ICAO, REDDIG Administrator), are fully committed to achieving the benefit of all contracting States to keep the navigation services in the Region with the highest reliability levels.

2.14 It should be noted that the REDDIG has no financial objectives and is totally focused on achieving service excellence for contracting States.

### 3. MODERNIZATION OF THE INFRASTRUCTURE

3.1 In order to address maintenance difficulties in the existing network, maintain high levels of availability of the services foreseen by ICAO, incorporate the new service requirements of the region, and implement an ATN network in keeping with ICAO specifications, REDDIG member States prepared an action plan for the implementation of a new digital network in the SAM Region, involving a complete change of technology in REDDIG equipment.

3.2 As part of the activities of the action plan for the implementation of the new network, called REDDIG II, a study was prepared on the implementation of the new digital network, with the support of technical cooperation project RLA/06/901 – *Assistance for the implementation of a regional ATM system according to the ATM operational concept and the corresponding technological support for communications, navigation, and surveillance (CNS)*.

3.3 Based on the study and the results of the seminar/workshop, a group of experts on communication networks from Argentina and Brazil, under coordination of the ICAO South American Regional Office, drafted a technical specifications document for the procurement and implementation of the REDDIG II.

3.4 The Twelfth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/12), after a financial, operational, and technical evaluation for REDDIG II implementation, unanimously approved same, urging that the implementation process start through the ICAO Technical Cooperation Bureau, Purchasing Section.

3.5 The tender process was conducted by the Technical Cooperation Bureau (TCB) in Montreal on behalf of all REDDIG member States. The process ended with the evaluation of the technical specifications by a group of South American experts and the REDDIG Administration.

3.6 The REDDIG II will be made up of two Internet Protocol Suite (IPS) network platforms: a satellite and a ground network.

3.7 The ground network would support the new short- and medium-term service requirements not contemplated in the satellite network, and would serve as backup in case of failure in one or more nodes of the satellite network or in case of total failure of the satellite network, and would also serve as means of transportation for new administrative applications. Figure 2 describes the architecture of REDDIG II.

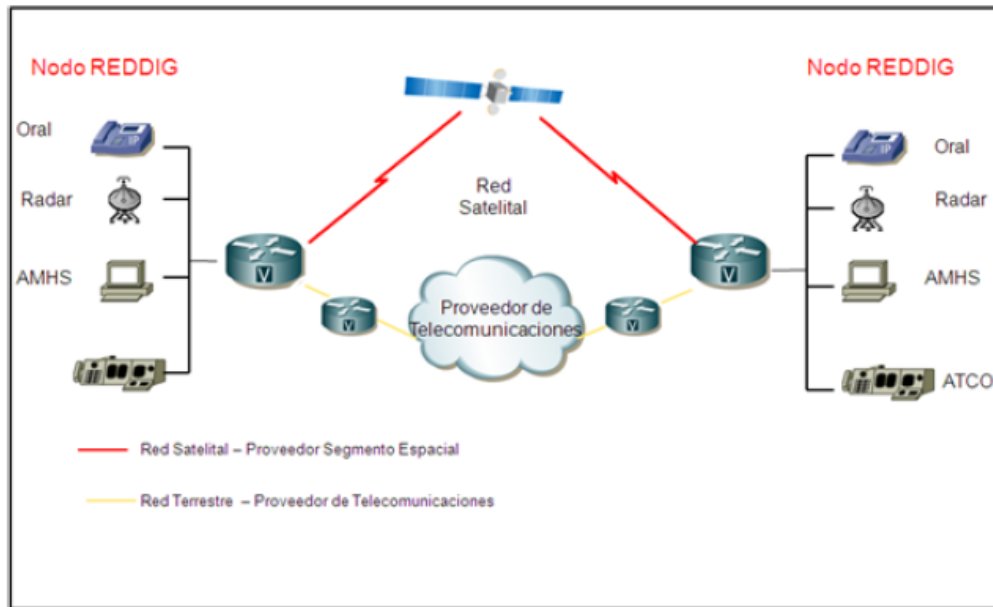


Figure 2. Basic topology of REDDIG II

#### 4. CONCLUSION

4.1 The REDDIG is regional network implemented and managed by an ICAO technical cooperation project, with the active participation of all member States, who are owners of the nodes and in charge of their maintenance, managed by an Administration composed by a network administrator and ICAO, in support of ATS applications in South America.

4.2 REDDIG operations started in 2003 and ICAO technical cooperation project RLA/03/901 provides service excellence to member States. However, the current REDDIG equipment has reached the end of its life cycle and presents limitations in supporting new services, becoming a new network necessary.

4.3 For the implementation of the new network, the tender process was completed at the end of June 2012 with the designation of the winner, expecting to start REDDIG II operations in the first quarter of 2014, under the management of project RLA/03/901.

4.4 The Conference is invited to:

- a) note the information provided;
- b) review the operation, management and modernization of the SAM digital network through and ICAO technical cooperation project, with the aim that same can be adapted in other ICAO regions that might require it; and
- c) address other matters it may deem appropriate.