SAM Region Digital Network (REDDIG)

1. Background

1.1 Since 1994, in the SAM Region, States began to examine various digital communications systems in order to implement a regional network to support voice and data communications between Air Traffic Service (ATS) units, increase availability, reduce costs and facilitate the implementation of new services.

1.2 The CAR/SAM Regional Planning and Implementation Group at GREPECAS/6 (1996) formulated Conclusion 6/27 - Implementation of the Digital Network for the SAM Region, in which it requested the SAM Regional Office, in coordination with the States of the SAM Region, to establish the best technological alternative for the implementation of the SAM Region Digital Network.

1.3 The Third Coordination Meeting for the Implementation of the New Digital Network (Lima, Peru, October 21-23, 1998) was the decisive meeting that established an institutional arrangement among the States of the SAM Region for the implementation of the new regional aeronautical communications infrastructure.

1.4 Through a Regional Technical Cooperation Project (**RLA/98/019**), the International Civil Aviation Organization implemented for the participating States the digital network infrastructure that was called the Digital Network of the SAM Region (REDDIG). REDDIG became operational in September 2003 (REDDIG I).

1.5 For the first 5 years of operation, the States signed an agreement with ICAO under another Regional Technical Cooperation Project (**RLA/03/901**) for initial network management, until the Region creates a regional multinational mechanism. The Project RLA/03/901 should also lead the implementation of applications in the CNS/ATM field in accordance with regional air navigation plans, take charge of the rental of the satellite segment and take the necessary actions to modernize the network infrastructure in accordance with operational needs and available technological advances.

1.6 In this regard, under Project RLA/03/901, ICAO has coordinated the interconnection with the CAR/NAM network (MEVA); modernized the REDDIG in 2015 (REDDIG II) to have a terrestrial network (MPLS) as a backup of the main (satellite) IP network; and, supported the implementation of new applications such as AMHS (ATS Message Handling System), AIDC (ATS Interfacility Data Communication) and ADS-B (Automatic Dependable Surveillance – Broadcasting). The Regional Project has also implemented cybersecurity equipment (firewalls and related equipment) to improve the security resilience of the network.

1.7 As the negotiations for the establishment of a regional multinational body were not concluded, the participating States of REDDIG, through meetings of the REDDIG Coordination Committee, have renewed in 2008, 2013 and 2018 the agreement with ICAO to maintain the RLA/03/901 Project in force.

2. Current situation of the Regional Project RLA/03/901

2.1 Currently, the Digital Network of the SAM Region is in its REDDIG II version, having two segments: a satellite (VSAT) segment and a terrestrial (MPLS) segment. Participate in the Regional Project RLA/03/901 all States of the SAM Region (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, France (French Guiana), Guyana, Panama, Paraguay, Peru, Suriname, Uruguay and Venezuela), a Caribbean State

(Trinidad &Tobago) and a CAR Organization (COCESNA – Central American Corporation of Air Navigation Services).

2.2 Besides the nodes implemented at the Regional Project participants, there are REDDIG II nodes (MPLS) implemented in countries/organizations of other regions: Spain (Madrid), South Africa (Johannesburg), United States (Atlanta and Salt Lake City) and Aireon (Virginia).

2.3 Figure 1 depicts the current topology of REDDIG II.

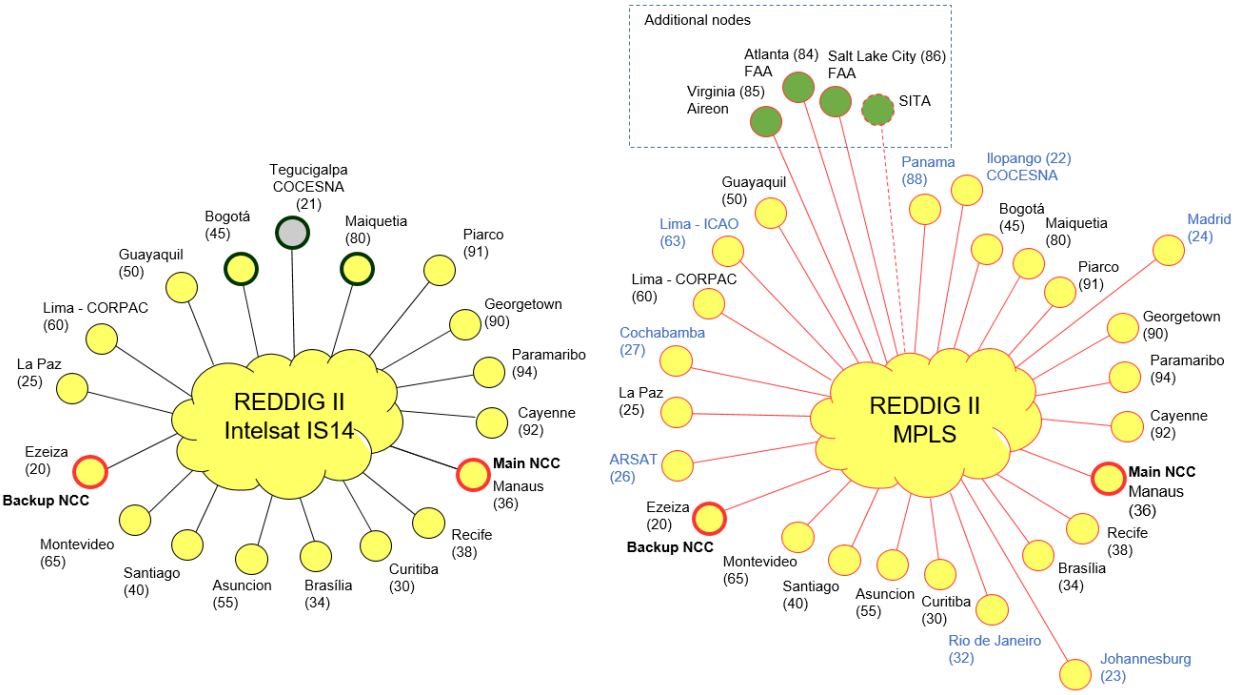

Figure 1 – REDDIG II Topology (Satellite + MPLS links)

2.4 The nodes in green represents the additional nodes contracted directly with the MPLS telecom provider by organizations interested to connect to the network, after the corresponding approval of the REDDIG Coordination Committee. SITA is in the process of a REDDIG II node (MPLS) implementation.

3. REDDIG Governance

3.1 The main body of governance is the Coordination Committee, conformed by representatives of the States participating in the Regional Technical Cooperation Project RLA/03/901 and the SAM Regional Office as Secretariat.

3.2 At least one meeting a year is convened, in order to evaluate the activities developed, plan and approve the activities of the next period, review the financial situation of the project, approve the budget of the next period and make the evaluation of the project with respect to the expectations of the participating States.

3.3 Extraordinary meetings can also be convened. In the same way, when necessary, the Coordination Committee can activate Ad-hoc groups to analyze, carry out studies or execute a specific activity.

Project Management and Administration

3.4 ICAO, having the Technical Cooperation Bureau (TCB) to execute the procurement processes, contract formalization and finance control, carries out the project management. The SAM Office is responsible for the administration of the project, maintaining all communication with the participating States, controlling the budgetary resources and contracts in force, as well as providing logistical support for spare parts and maintenance in the factory.

3.5 Figure 2 depicts the current managerial organization for the REDDIG Project.

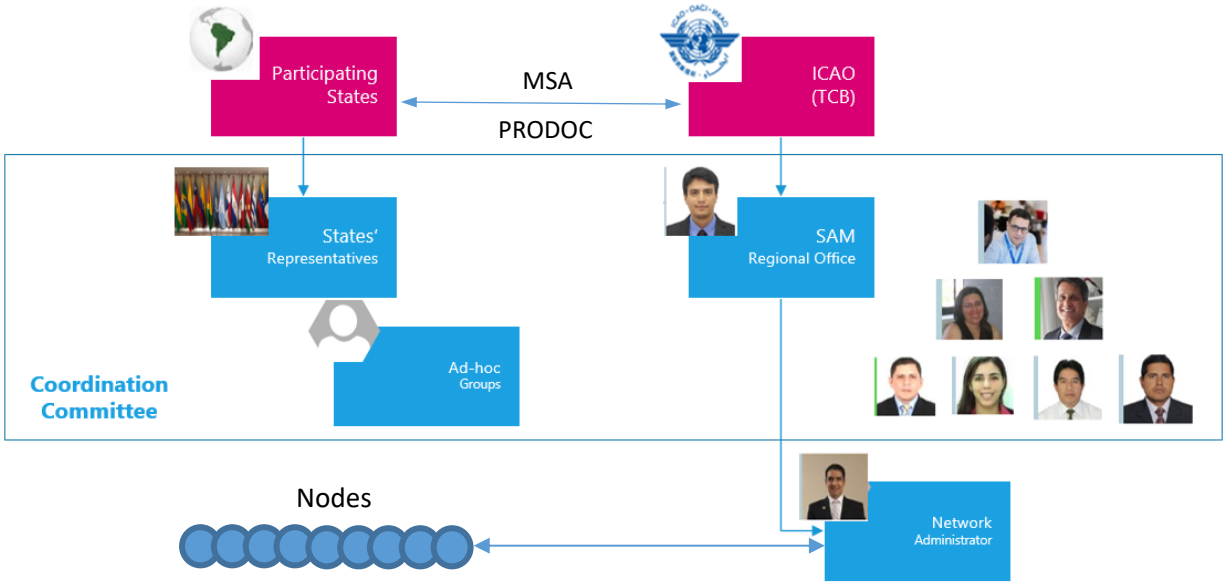

Figure 2 – Regional Technical Cooperation Project RLA/03/901 (REDDIG)

Network Administration

3.6 REDDIG II has a main Network Control Center (NCC) located in Manaus (Brazil) and a backup NCC in Ezeiza (Argentina). The Network Administrator works at the Manaus NCC along with five technicians provided by the Brazilian Administration, monitoring the network services, and supporting the participating States' personnel 7 days a week, 24 hours a day.

3.7 Besides managing the current services/circuits, the Network Administrator can configure new services or circuits, only coordinating with the participating States, without involving the communication service providers.

3.8 The Network Management System (NMS) at the Manaus NCC collects all information from the Local Management Systems of each node and the Network Administration can make remote configuration on the nodes' equipment, if necessary.

3.9 Figure 3 depicts the REDDIG II concept of network management.

3.10 Another important function of the Network Administration is to compute the communication service providers (CSP) outages or link fails. Every month, the Network Administrator informs TCB the amount to be discounted for unavailability of service, applying a formula agreed in the contracted Service Level Agreement (SLA).

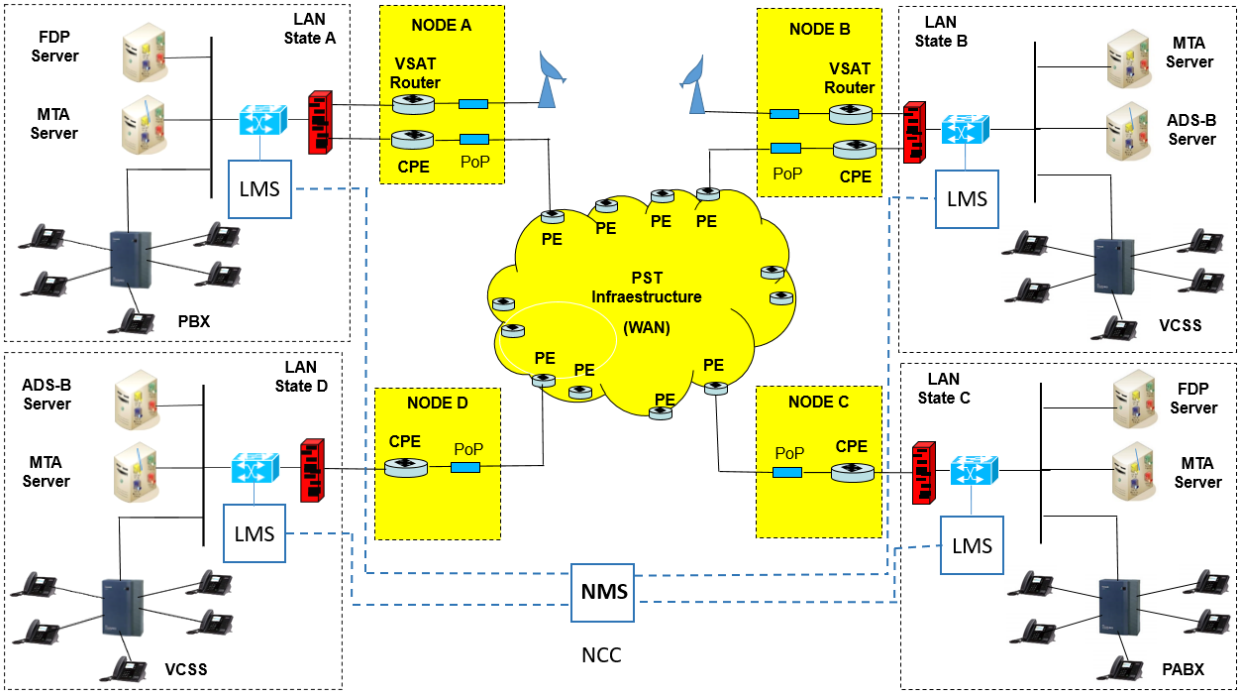

Figure 3 – REDDIG II concept of network management

4. Conclusion

4.1 All mission-critical operational aeronautical communications between participating States are carried by REDDIG, such as flight plans (FPL), operational messages for aeronautical meteorology (OPMET), advisories to aero-navigators (NOTAM), coordination between air traffic operators of adjacent control centers, coordination between search and rescue centers (SAR) and for aeronautical information (AIS) in general.

4.2 All fixed international aeronautical voice services (oral ATS), data circuits (AFTN/AMHS) and surveillance data specified in the regional air navigation plan (Document 8733) are carried by REDDIG. Without REDDIG, all the States of the SAM Region should go to local communications providers to transport services. This modality was carried out before the commissioning of REDDIG, generating a low availability of aeronautical services with interruptions of services for long periods that was completely solved with the implementation of REDDIG. Today, thanks to the high availability of REDDIG, high availability in all the services it transports is also guaranteed.

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