INTERNATIONAL CIVIL AVIATION ORGANIZATION

TWELFTH MEETING ON THE IMPROVEMENT OF THE AIR TRAFFIC SERVICES IN THE SOUTH ATLANTIC

(Sal, Cape Verde, 15 – 17 December 2004)

Agenda Item 4: Communications

- **VSAT networks: developments, consolidation, and interoperability requirements**

REDDIG TECHNICAL OVERVIEW AND FUTURE DEVELOPMENTS

Summary

This paper presents a technical overview of the REDDIG, indicating the different services connected to it, the network configuration, the operation and maintenance and a review of the next activities.

References:

- REDDIG Operation and Maintenance Manual; and
- RLA/03/901 Project.

1. REDDIG technical overview

1.1 The REDDIG is a digital satellite network that provides Air Traffic Control voice and data services at fifteen sites in thirteen countries on South America. The network uses VSAT (Very Small Aperture Terminal) technology using 3.7 m C-band antennas operating over the PAS-1R satellite.

1.2 The user services comprise three separate voice networks (two Air Traffic Services (ATS hot line and ATS switched) and one administrative voice network) and the user data services comprise four networks (Asynchronous data link for AFTN, point to point data radar using synchronous protocols, GNSS network and the ATN network).

1.3 The monitor and control service (RC& M) network of the REDDIG comprises distributed and centralized elements and is a routed bandwidth on demand IP network accessed through the Ethernet hub at every site.

1.4 The user services connect to the REDDIG network using dual redundant Frame Relay Access Devices (FRAD). The FRAD provides diverse range of interface and protocol support required by

the users of voice and data equipment. All user services are multiplexed onto a single WAN interface using frame relay protocol.

1.5 The bearer WAN network is provided by satellite terminal equipment, which implements the Multiple Frequency Time Division Multiple Access (MF TDMA). Each terminal site only contains a single modulator and demodulator on line at any time. The TDMA terminals support two types of Permanent Virtual Circuit (PVCs) Frame Relay and Internet Protocol (IP). Frame Relay PVCs are used exclusively for user traffic bearers and the IP PVCs are used for monitoring and control system.

1.6 The FR PVCs are configured in full mesh and the IP PVCs are configured in dual full star. There are 105 FR PVCs and 27 IP PVCs.

1.7 The TDMA network operates on the C band beam of the PAS 1R satellite at 45° W longitude. The PAS 1R satellite transponder used for REDDIG (3C/4C) uses linear polarization. The total lease currently allocated for the network is 4.38Mhz.

2. Services connected to the REDDIG

2.1 All the AFTN and voice circuits between States of SAM Region (with the exception of Panama) specified in Table CNS 1A and Table CNS 1C of Volume II (FASID) of CAR/SAM Air Navigation Plan, are passed through REDDIG.

2.2 Also through the REDDIG we have Radar data information between Argentina and Uruguay and frame relay data from Terminal Reference Stations of the CAR/SAM Test Bed (CSTB) for the SBAS type WAAS augmentation trials.

3. REDDIG Network Configuration

3.1 The REDDIG is composed of 15 nodes installed in the following sites: Bogotá (Colombia), Caracas (Venezuela), Georgetown (Guyana), Paramaribo (Suriname), Cayenne (French Guyana), Manaos, Recife and Curitiba (Brazil), Guayaquil (Ecuador), Lima (Peru), Santiago (Chile), Asuncion (Paraguay), Montevideo (Uruguay), Ezeiza (Argentina) and La Paz (Bolivia).

3.2 Two Network Control Systems are installed, one situated in Lima and the other, in Buenos Aires. All the equipment, except the antenna, are duplicated

4. Operation and Maintenance

4.1 The REDDIG started operations services in September 2003; currently the REDDIG administration is under the direct management of the ICAO technical cooperation project (RLA/03/901) until July 2005.

4.2 During this period, the project is going to assist States in the correct operation of the network node, to provide training, to supervise and control the network operation, to manage the network configuration, to keep the system database updated with the corresponding information, to verify periodically the network maintenance program to coordinate with the States the envoy and reception of the spare cards and equipments, to make all the coordination with Panamsat for the leased space satellite segment, to introduce new services and to add new node at the network.

4.3 Also the project is studying the mechanism for the Administration of the REDDIG after the end of the project. As a consequence of the analysis a proposal of a definitive multinational mechanism for the administration of the network will be made.

4.4 Finally the project is identifying the CNS/ATM application to be supported by the REDDIG especially for aeronautical fixed services (AMHS and AIDC).

5. **Review of the next activities**

5.1 In this moment the project, in conjunction with the company that supplied the REDDIG equipment, is completing the ISDN back up network. The ISDN network will support the REDDIG network whenever there is a catastrophic failure in one of the REDDIG nodes.

5.2 Also, there is a plan to develop a test bed on AMHS with SITA using the REDDIG. The test bed would be established, in order that the SAM States will use for a defined time the SITA AMHS services to exchange simulated traffic of operational messages. If implemented, SITA is going to supply the necessary equipments and software packages for the terminals to be connected through the REDDIG.

5.3 Finally, Trinidad and Tobago has a plan to install a REDDIG node. Coordination was made by the ICAO Technical Cooperation with the CAA administration of Trinidad and Tobago in order to implement it. Once the plan is approved, the necessary coordination for its installation will be made by the project.

5.4 The intention of Trinidad to install a REDDIG node in its territory was manifested in the Conclusion 2/10 of the second meeting of the Informal Coordination Group of the East Caribbean and North Eastern South America held in Caracas, Venezuela, from 1 to 5 December 2003.

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