INTERNATIONAL CIVIL AVIATION ORGANIZATION

EIGHTH MEETING OF CIVIL AVIATION AUTHORITIES OF THE SAM REGION (RAAC/8)

(Buenos Aires, Argentina, 23 – 25 April 2003)

Agenda Item 4: Regional Air Navigation Plan – Transition to the CNS/ATM Systems

REGIONAL TECHNICAL CO-OPERATION PROJECT RLA/98/019-SOUTH AMERICAN DIGITAL NETWORK (REDDIG)

(presented by the Secretariat)

Summary

This information paper contains general information on the REDDIG, and on the status of implementation of the nodes.

References:
- Document of the UNDP/ICAO Regional Technical Co-operation Project RLA/98/019;
- Report of the Fourth REDDIG Co-ordination Meeting (RCC/4);
- Report of the mission to the States in relation to the project; and
- PSAT documents.

1. Introduction

1.1 The REDDIG is a multi-protocol/multi-service network that will be implemented to meet current and future aeronautical fixed communication needs, in support of the ICAO CNS/ATM implementation in the SAM Region. Its implementation will permit the systematic execution of the Air Navigation Plan and communication support to other multinational services.

1.2 The REDDIG is implemented through an administrative agreement between ICAO and the States, contained in the document of the UNDP/ICAO regional project RLA/98/019. The agreement, through a collective funding by the participating SAM States (except Panama), and as the final objective for installation, will provide for the testing and start-up of the network, an initial administration for a six-month period, and the study and proposals of the most convenient institutional arrangement for its management and administration.

1.3 The network will initially use satellite communications (PanamSat PAS-1R satellite) as the primary means, with a ground alternative (through public networks) in case of failure of the satellite segment. In its 15 nodes (initial topology), the network will offer highly reliable and efficient voice and data communication services to the user. It has an expandable and flexible capacity, and a totally redundant configuration to offer high availability (99.993 %). The user will be able to connect user systems, such as the AFTN, ATN, PABX, RDP, FDP, etc., to the REDDIG nodes, in order to implement messaging, voice communications, radar data exchange, ATN (AMHS, AIDC, etc.) applications. Co-ordinations are taking place with the MEVA environment so that the MEVA II version will be consistent with the REDDIG and thus simulate a homogeneous network environment for easy interconnection of the CAR/SAM network environments. A network node is understood to be the autonomous hardware/software system that is integrated into the management system, where transmission, switching and data package addressing services are provided for all types of communications required by the user systems connected to the node.

2. Summary of activities carried out to date

2.1 REDDIG node equipment, both exterior (ODU) and interior (IDU), has been fully installed in each of the sites foreseen, and the necessary adjustment in the nodes for the satellite segment have been done with Panamsat.

2.2 The two courses foreseen in the project were conducted. The first, in Spanish, was carried out in Bogota, Colombia, and the second, in English, in the city of Recife. The participants in these courses stated that the scope of the latter was too broad and ambitious for the 10 days that they lasted, and that the practical segment of the course was insufficient. In this respect, an extension course is being scheduled during the stage in which the network will be managed by the project.

2.3 The provisional site acceptance tests (PSAT) were conducted, which consisted of the verification of a test protocol developed by the contracting company and revised by the project. The protocol includes the review of the equipment, the documentation for its operation and maintenance, and functional tests of the various sub-systems (local control, NCC, VSAT, communication interfaces, back-up network, and general supply).

2.4 During the PSAT, all of the speech circuits of the ATS speech network were connected to the REDDIG node, and the numbering system was programmed. Likewise, the respective numbering system was entered into the administrative speech network, and all of the AFTN international circuits were connected in the same way.

2.5 **Appendix A** to this information paper provides a brief description of each of the REDDIG nodes after conducting the PSAT. During these tests, some damaged equipment and cards were found, as well as incomplete technical documentation which the manufacturer will replace. Furthermore, some imcomplete implementations were found, which are the responsibility of the aeronautical administrations of the States, which will have to resolve them as soon as possible.

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APPENDIX A

PSAT ACTIVITIES AND RESULTS

Argentina

Provisional acceptance tests were conducted from 3 to 5 February 2003. During the tests, the ATS speech network circuits from the PBAX switch were connected to the REDDIG node, while the numbering plan for ATS speech communications were left pending; the administrative network was organised, while the programming of the numbering system was left pending. The circuits of the international AFTN network were connected. The adjustment and connection of the radar data to the REDDIG node, which was previously programmed to that end, could not be completed (Memotec CX950 multiplexer equipment). Likewise, the connection of the Reference Station (TRS) of the GNSS augmentation trial system could not be completed. The TRS is installed at a location which is far away from the REDDIG node and needs the appropriate physical connection. It was also noted that the aeronautical administration does not have ISDN service for the ground back-up network to be used in case of total failure of the VSAT RF equipment. A physical connection (64-Kbit digital circuit) was established between the REDDIG network control centre (NCC) and the Lima NCC. The latter will act as the main management centre during the first six months of operation of the REDDIG, and the Argentina NCC would act as back-up. The wiring identification for outdoor and indoor equipment is still pending. Likewise, the technical documentation as well as the operational and application software of the equipment was incomplete. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Bolivia

The PSAT tests were carried out from 17 to 19 February 2002. The ATS speech network circuits were connected to the REDDIG node; the numbering plan for speech circuit ATS and administrative users was co-ordinated with the personnel in charge of the installation of the communication equipment of the aeronautical administration. Likewise, the international circuits of the AFTN network were installed. The ISDN service has not been installed. The telephone line for remote connection to the network management system (NMS) is missing. The technical documentation, as well as the operational and application software, needs to be completed. The TRS of the GNSS augmentation trial system could not be connected to the REDDIG node, since the corresponding physical medium was not available. The wiring identification for outdoor and indoor equipment is still pending. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Brazil

Manaus

The PSATs were conducted from 18 to 20 March 2003. All of the AFTN circuits were configured to the REDDIG node and their functionality in the network was tested through the Manaus-Lima connection. The dialing plan, for both the ATS speech network circuits and the administrative circuits, was co-ordinated with the aeronautical administration. The aeronautical administration will complete the installation of these circuits in the REDDIG prior to the network acceptance test (NAT). The multiplexer equipment is prepared for the radar data and GNSS information connection, but, at present, no information is available. ISDN service is available and a telephone line for remote access to the node *via* modem has been installed. Marks were made on the VSAT antenna where holes will be drilled to prevent water from accumulating. This work will be

carried out by personnel from the aeronautical administration. One unit of the RF SSPA B amplifier was found damaged, and it will have to be repaired before the NAT. The wiring identification for the outdoor and indoor equipment is still pending. The technical documentation as well as the operational and application software need to be completed. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Recife

The PSATs were conducted from 21 to 23 March. All of the AFTN circuits were configured to the REDDIG node. The dialing plan, for both the ATS speech network circuits and the administrative circuits, was co-ordinated with the aeronautical administration. The aeronautical administration will complete the installation of these circuits in the REDDIG, prior to the network acceptance test (NAT). The multiplexer equipment is prepared for the radar data and GNSS information connection, but, at present, no information is available. The ISDN service is expected to be ready before the NAT. One of the Modem Linkways was found damaged. Problems in the network management system (NMS) monitor were found. The wiring identification for the outdoor and indoor equipment is still pending. The technical documentation as well as the operational and application software need to be completed. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Curitiba

The PSATs were carried out from 24 to 25 March 2003. All of the AFTN circuits were configured to the REDDIG node. The dialing plan, for both the ATS speech network circuits and the administrative circuits, was co-ordinated with the aeronautical administration. The aeronautical administration will complete the installation of these circuits in the REDDIG, prior to the network acceptance test (NAT). The multiplexer equipment is prepared for the radar data and GNSS information connection, but, at present, no information is available. ISDN data service is available, and it would be implemented prior to the NAT. For remote access to the node, a dedicated telephone line is required. The wiring identification for the outdoor and indoor equipment is still pending. The technical documentation as well as the operational and application software need to be completed. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Chile

The PSAT tests were conducted from 13 to 15 March 2003. The ATS speech network circuits were connected to the REDDIG node, and the programming of the ATS and administrative numbering plan was co-ordinated. Likewise, the international circuits of the AFTN network were connected. The ISDN service has not been installed. A telephone line for remote connection to the network management system (NMS) is pending. The technical documentation as well as the operational and application software need to be completed. The master station (TMS) of the GNSS augmentation trial system could not be connected to the REDDIG node, since the corresponding physical medium was not available. In any case, the REDDIG node should be installed close to the AACC facilities (Cerro El Colorado) and the TMS in the control tower located at the Arturo Merino Benítez international airport. Therefore, the information hast to be established through radio link. The wiring identification for the outdoor and indoor equipment is still pending. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Colombia

The PSAT tests were carried out from 27 February to 1 March 2003. The ATS speech network circuits were connected to the REDDIG node, and the programming of the ATS and administrative numbering plan was co-ordinated. Likewise, the international circuits of the AFTN network were connected. The ISDN service has not been installed. A telephone line for remote connection to the network management system (NMS) is pending. The technical documentation as well as the operational and application software need to be completed. The master station (TMS) of the GNSS augmentation trial system could not be connected to the REDDIG node, since the corresponding physical medium was not available. The wiring identification for the outdoor and indoor equipment is still pending. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Ecuador

The PSAT tests were carried out from 24 to 26 March 2003. The ATS speech network circuits were connected to the REDDIG node, and the programming of the ATS and administrative numbering plan was co-ordinated. Likewise, the international circuits of the AFTN network were connected. The ISDN service has not been installed. A telephone line for remote connection to the network management system (NMS) is pending. The technical documentation as well as the operational and application software need to be completed. The wiring identification for the outdoor and indoor equipment is still pending. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Guyana

The PSATs were carried out from 6 to 9 March 2003 in Georgetown, Guyana. Since the voice switching system (VCCS) was inoperative, two telephone terminals were installed, one in the ACC and the other in the FIS, directly connected to the REDDIG node. The numbering plan will be adjusted by the SEEE, in keeping with the final requirements of the Guyana Aeronautical Administration, prior to the network acceptance tests (NAT). Likewise, before the NAT, the audio levels specified in the terms of reference will be adjusted. Regarding the AFTN, the circuit was connected to the REDDIG node, but its operation was not verified in the network, so it was left pending for the NAT. For the back-up circuit, Guyana has no ISDN service. A telephone line for remote connection to the network management system (NMS) is pending. The Guyana Aeronautical Administration must connect the equipment of the REDDIG node to ground. The wiring identification for the outdoor and indoor equipment is still pending. The technical documentation as well as the operational and application software need to be completed.

French Guyana

The PSAT tests were conducted from 13 to 15 March 2003. The ATS speech network circuits were connected to the REDDIG node, and the programming of the ATS and administrative numbering plan was co-ordinated. Likewise, the international circuits of the AFTN network were connected. The tests on the back-up circuit with the ISDN service will be conducted during the network aacceptance tests (NAT), provided this service is available on the Recife node, in Brazil. The wiring identification for the outdoor and indoor equipment is still pending. The technical documentation as well as the operational and application software need to be completed.

Paraguay

The PSATs in Paraguay were carried out from 10 to 12 February 2003. AFTN circuits could not be connected to the multiplexer equipment because the appropriate interface was not available. The aeronautical administration has to acquire the necessary interfaces to interconnect the multiplexer equipment to the REEDIG node. Interface cards are of the current loop type at V24. With regard to ATS speech circuits, since no PBX switch or VCSS was available, the installation of three telephones had to be programmed: one for communicating with Curitiba, another one with Buenos Aires, and a third one for administrative functions. Likewise, three more were programmed for future use. There is no ISDN service. . A telephone line for remote connection to the network management system (NMS) is pending. The technical documentation as well as the operational and application software are incomplete. The wiring identification for the outdoor and indoor equipment is still pending. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Peru

The PSATs were carried out from 20 to 22 February 2003. The ATS speech network circuits were connected to the REDDIG node. The numbering plan for speech circuit ATS and administrative users was co-ordinated with the personnel in charge of the installation of the communication equipment of the aeronautical administration. Likewise, the international circuits of the AFTN network were installed. The ISDN service has not been installed. The telephone line for remote connection to the network management system (NMS) is missing. The technical documentation, as well as the operational and application software, needs to be completed. The TRS of the GNSS augmentation trial system could not be connected to the REDDIG node, since the corresponding physical medium was not available. The wiring identification for outdoor and indoor equipment is still pending. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Suriname

The PSATs were carried out from 11 to 12 March 2003, in Paramaribo. Since the voice switching system (VCCS) was inoperative, two telephone terminals were installed, one in the ACC and the other in the APP, directly connected to the REDDIG node. The numbering plan will be adjusted by the SEEE, in keeping with the final requirements of the Guyana Aeronautical Administration, prior to the network acceptance tests (NAT). Likewise, before the NAT, the audio levels specified in the terms of reference will be adjusted. Regarding the AFTN, the circuit was connected to the REDDIG node, but there are problems with the AFTN message heading in the MESSIR message switching centre. This problem is expected to be solved prior to the NAT. For the back-up circuit, Suriname has no ISDN service. A telephone line for remote connection to the network management system (NMS) is pending. The wiring identification for the outdoor and indoor equipment is still pending. The technical documentation as well as the operational and application software also need to be completed . All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Uruguay

Provisional acceptance tests were conducted from 6 to 8 February 2003. During the tests, the final configuration was established with the speech circuit switching system (VCSS) recently established by the Spanish company INDRA, the SDC 91. Likewise, the numbering plan for ATS and administrative communications was co-ordinated. The international circucits of the AFTN network were connected to the REDDIG node. The radar data were connected to the multiplexer equipment, but its operation could not be verified because of problems of adjustment to the equipment in both Argentina and Uruguay. There is no ISDN service. A telephone line for remote connection to the network management system (NMS) is pending. The technical documentation as well as the operational and application software are incomplete. The wiring identification for outdoor and indoor equipment is still pending. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

Venezuela

The PSAT tests were carried out from 3 to 5 March 2003. The configuration of all the speech circuits and the configuration of the ATS and administrative numbering plan were co-ordinated with the aeronautical administration. The international circuits of the AFTN network were connected to the REDDIG node. No ISDN service has been installed. A telephone line for remote connection to the network management system (NMS) is pending. The technical documentation as well as the operational and application software also need to be completed. The connection of the UPS to the equipment of the REDDIG node was missing. The wiring identification for outdoor and indoor equipment is still pending. All of the issues pending are expected to be resolved before the network acceptance tests (NAT).

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