



Agenda Item 1: Current situation of the MEVA II / REDDIG interconnection networks

**CURRENT AND FUTURE SITUATION OF THE SOUTH AMERICAN DIGITAL NETWORK
(REDDIG)**

(Presented by the Secretariat)

SUMMARY
This working paper presents REDDIG's current situation, as well as future actions in the short- and medium-term.
References: • Report of the eighth meeting of the REDDIG Coordination Committee (RCC/12) (Lima, Peru, 27-29 April 2005); y • Report of the twelfth meeting of the REDDIG Coordination Committee (RCC/12) (Lima, Peru, 9-10 March 2009).

1. Background

1.1 The technology of the REDDIG node equipment, as well as of the REDDIG control and management centres (NCC/NMS), date back to 2003, with the exception of the Trinidad & Tobago node, installed in 2006.

1.2 The REDDIG Administration has been autonomously managing the normal operation of the network, providing aeronautical telecommunications services with the highest quality and availability standards.

1.3 With the aim of continuing providing the quality and availability standards, the REDDIG Administration has been drafting since the eighth meeting of the REDDIG Coordination Committee (RCC/8) (Lima, Peru, 27-29 April 2005) a plan for REDDIG nodes hardware and software equipment improvement, as well as of its NCC.

1.4 In addition, to guarantee the continuity of REDDIG operations, a three-year renewal contract was signed on November 2008 between ICAO and INTELSAT, to start on 2009. The contract takes into consideration that the service will be initially provided through the IS-1R satellite (before, the PAS-1R). Thereafter, this satellite will be replaced in the last quarter of 2009 by the IS-14.

1.5 Following is an analysis of the REDDIG current and future situation as regards its equipment, the new services to be implemented in REDDIG, the bandwidth requirements, and the REDDIG management through the Regional Multinational Organization (RMO).

2. Analysis

Current situation of the REDDIG equipment and future actions

ViaSat Inc. Linkway system

2.1 The current Linkway 2100 system technology, REDDIG network's central platform, has been efficiently operating all its services since its start-up in 2003, and is also supporting the new IP protocol based services (AMHS, RADAR, VoIP), which have already been operationally proven within REDDIG.

2.2 With the aim of presenting pertinent recommendations to improve the Linkway system, queries were made regarding the continuity to manufacture the Linkway 2100 modem (satellite modem) and its corresponding Linkway 2100 NCC/NMS.

2.3 In this regard, note has been taken, through publications and information provided via web page www.viasat.com, that these products are no longer being promoted by ViaSat.

2.4 Information provided by the manufacturer is that ViaSat has developed the Linkway S2 modem (based on DVB-S2 technology for reception) and the Linkway S2 NCC/NMS software. In addition, information available indicates that the new Linkway S2 modem could be operated in a manner compatible to the Linkway 2100 modem, but the Linkway 2100 modem is not compatible with Linkway S2 modem.

2.5 Taking into consideration that the manufacturer will not continue with the development of the technology used by the Linkway 2100 system and that, nevertheless, this Linkway 2100 system, platform of REDDIG, has an operational life for the current and new services in the Region, the recommendation is to make no investment in the improvements (software and hardware updating) of the Linkway 2100 NCC/NMS.

2.6 In turn, it is proposed that this year (2009) REDDIG project increases the spare parts lot as regards the Linkway modem, with the aim of guaranteeing the operation of this equipment for a three-year minimum period, taking into account its failure statistics.

Memotec FRAD equipment (CX950/950e)

2.7 The equipment used by REDDIG, since their installation in 2002, were the CX950 with I/O cards for the processing of voice and data services through the network

2.8 The software of the CX950 equipment has been duly updated during the operation of REDDIG to solve any anomalies in the signalling process, as well as to adapt it to the operation requirements of some of the services run through REDDIG, having also the manufacturer developed a version which was initially exclusive for REDDIG.

2.9 The CX950 equipment, basic unit comprising of power supply and the motherboard, were discontinued since 2006. The CX950e equipment was indicated by the manufacturer as its equivalent replacement. It is important to mention that the I/O cards are compatible for both the CX950 equipment, as for the CX950e.

2.10 Some REDDIG nodes have been replacing the CX950 equipment, basic unit, with CX950e, basic unit, when a diagnosis was made indicating failure in the motherboard.

2.11 The CX950 and CX950e and I/O cards are totally inter-operable within REDDIG.

2.12 The CX950/950e equipment has been efficiently working all its services since 2003 and, also, is supporting the new IP protocol based services (AMHS, RADAR, VoIP), which have already been operationally tried at REDDIG.

2.13 Similarly to that carried out with respect to the Linkway 2100 system, investigations were made on the manufacturing continuity of the CX950e equipment and its I/O cards.

2.14 Note has been taken, through publications in web page www.memotec.com, that the products of this series are no longer commercially offered by Memotec. Information provided by Memotec is that the replacement product of CX950e is CX-960e, and that it will be sold only until 30 July 2009 (product's end-of-life).

2.15 Taking into consideration that the CX950/950e equipment count with an operational life for the current and new services passing through the Region and that, nevertheless, this equipment has been discontinued, the REDDIG RCC/12 meeting recommended that the CX960e equipment and I/O cards be purchased by 30 July 2009.

Paradise Datacom RF system (SSPA/LNB equipment)

2.16 Paradise Datacom, manufacturer of the SSPA equipment, has been developing its product since 2002, when this equipment (2K series) was installed in REDDIG. The changes made to their new SSPA models are compatible with the REDDIG stations' transmission requirements.

2.17 REDDIG project purchased a new SSPA model (100K series) in 2005 and, also, some States have purchased other new SSPA (200K series) models in the past years.

2.18 It is important to mention that, when new SSPA equipment is purchased, account should be given to the interoperability of the new SSPA M&C (Monitoring & Control) with the REDDIG's current RM&C system. For this, the Purchase Order must specify that the SSPA's M&C should have binary communications protocol with a 38400 Baud rate.

2.19 The LNB's current model will be able to continue operating and, in the event of purchasing new equivalent models, consideration should be given for the electrical and mechanical specifications to comply with the network's operational characteristics.

Antenna system

2.20 The antenna system can continue operating until migration is made to a new Communications platform, following the recommendations duly provided for their mechanical and electrical maintenance.

Plan for the change of the REDDIG technological

2.21 The REDDIG Administration has scheduled to present, at the next REDDIG coordination committee meeting (RCC/13) to be held in Lima in the first quarter of 2010, a study regarding the change of the REDDIG hardware and software platform, to be implemented within an initial three-year period, as of 2009. The changes programmed will not be affecting the activities corresponding to MEVA II / REDDIG interconnection.

New services to be implemented at REDDIG

2.22 During 2009, new services implementation as a result of MEVA II / REDDIG interconnection, radar data and flight plans exchange, due to automation activities planned to be implemented in the Region, and operation of AMHS international circuits among various States, are foreseen.

Bandwidth requirement

2.23 The services currently passing through REDDIG are the dedicated ATS speech service, switched ATS speech service, administrative, AFTN and radar data. GNSS data for SBAS trials and data for AMHS trials have also passed through.

2.24 The transmission speed used for these services is of 9200 bits/s for ATS and administrative speech services, 2400 bits/s for AFTN data and 9600 bits/s for radar data. For SBAS trial tests, a 9600 bits/s transmission speed was used, and for the AMHS service, 64Kbits/s.

2.25 REDDIG currently has a 4.38 Mhz band width availability for the transmission of the afore described services. For the transmission of information, three carriers are used, at the following frequencies:

- a) 6.014.496 Khz;
- b) 6.016.248 Khz; and
- c) 6.017562 Khz.

2.26 All REDDIG services are modulated through three carriers, two operating at a 1.25 Msym/s modulation speed, and the remaining, at 0.625 Msym/s. The 1.25 Msym/s modulation transmission speed corresponds to a 1.75 Mhz band width, and the 0.625Msym/s, to 0.875 Mhz.

2.27 REDDIG's capacity to transmit traffic among all the nodes, in terms of bursts, is the following:

CARRIER	SYMBOL RATE	16 KBIT/S BURSTS
1	1.25 Msym/s	32 bursts
2	1.25 Msym/s	34 bursts
3	0.625 Msym/s	17 bursts

2.28 REDDIG currently has 42 circuits installed for the dedicated ATS speech service, 49 circuits for the switched ATS speech service, 39 voice circuits for administrative purposes, 58 AFTN circuits, 2 radar circuits and y 6 circuits for meteorological data.

2.29 REDDIG is a TDMA network, and the transmission of information is carried out through 16 Kbits/s capacity bursts. REDDIG has 1,328 Kbps available in total to transmit traffic among all the network's terminals, equalling to 83 16 Kbits/s bursts.

2.30 During the network's peak traffic period, 976 Kbps are used, equalling to 61 bursts, i.e. 73.5% of the total maximum capacity available.

2.31 Taking into account that consideration should be given to having a 10% *minimum reserve* of the total bursts before reaching the burst maximum capacity, the total number of usable bursts would be of 75 (83-8), with the aim of avoiding congestion saturation.

2.32 Considering the current major traffic peak period, there is an appropriate band width available, remaining 14 bursts available as regards the required reserve before reaching 75, which would be the maximum usable number of bursts.

2.33 Since in the next years it has been foreseen to implement new services in REDDIG, such as the ATSMHS service, radar data and other ATS voice and AFTN data services for MEVA II / REDDIG interconnection, there would be need in taking previsions regarding an additional satellite band width requirement.

2.34 As regards the ATSMHS service, the following SAM States have it currently implemented: Argentina, Brazil, Paraguay and Peru. During the course of this year, this service will be implemented in Chile, Colombia and Panama. It is expected that by 2012 most States in the Region will have this system implemented.

2.35 In this regard, RCC/12 meeting established an Ad-hoc Group composed by Argentina, Brazil and the REDDIG Administration to analyze the necessary bandwidth increase, considering the implementation of new services, and formulated Conclusion 12/2 - *Study on the requirement of an additional bandwidth for REDDIG*, expecting to obtain results by mid- 2009.

2.36 Independently from the results of the bandwidth requirement study, RCC/12 meeting considered it convenient to include budgetary previsions, as of 2010, for a new 1.25 Msym/sec bandwidth carrier.

REDDIG management by the RMO

2.37 The management of REDDIG is carried out through RLA/03/901 ICAO regional technical cooperation project, programmed to operate until 2011, year scheduled for the startup of the RMO (Regional Multinational Organization).

2.38 The studies carried out by GREPECAS on the RMO were finalized with the formulation of Conclusions 14/5 – *Generic document concerning an agreement for the establishment of a Regional Multinational Organization* and 14/6 – *Technical cooperation project to facilitate the implementation of a Regional Multinational Organization (RMO)*.

2.39 The Eleventh Meeting of Civil Aviation Authorities of the SAM Region (RAAC/11) held in Santiago, Chile, from 6 to 8 May 2009, formulated Conclusion 11/3 - *Diplomatic conference for drafting the definitive text of the incorporation agreement for the establishment, operation and management of a Regional Multinational Organization (RMO)* as follow-up to the implementation of the RMO, with the aim that SAM States hold a diplomatic conference within the second semester of 2009 to approve the definite text for the establishment of the RMO.

2.40 In addition, during RAAC/11 meeting, the need to determine the headquarters for the RMO was requested, asking ICAO to send a letter to the States of the Region for them to present proposals to be headquarters of the RMO, formulating Conclusion 11/4 - *State proposals for determining the headquarters of the Regional Multinational Organization (RMO)*.

2.41 For the implementation of the RMO, a technical cooperation project was drafted for its initial phase, with the aim of being able to provide the necessary technical assistance to States. This project will be circulated to the States of the Region for its approval. In this regard, RAAC/11 meeting formulated Conclusion 11/5 - *Technical assistance for the implementation of a Regional Multinational Organization (RMO)*.

Logistical operations and implementations

2.42 The **Appendix** to this paper presents 2008 statistics pertaining to the number of services given to the network nodes, as well as the distribution regarding the type of equipment originating the service.

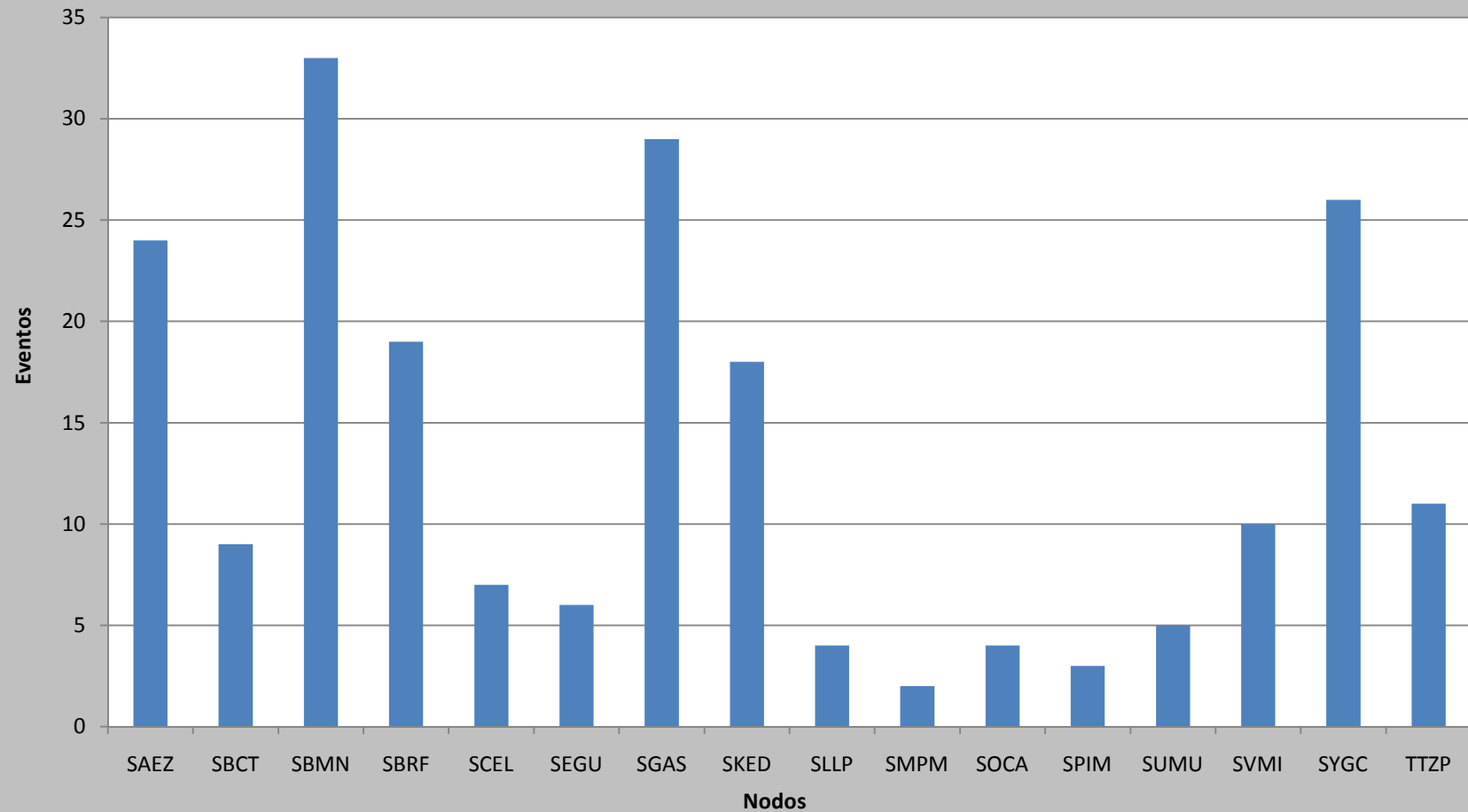
2.43 A backup circuit was implemented at the REDDIG Trinidad & Tobago node. Same is programmed so that, upon occurrence of a failure of the Trinidad & Tobago node, all the services at the Trinidad node will be sent to the Lima node.

3. Action suggested

3.1 The Meeting is invited to:

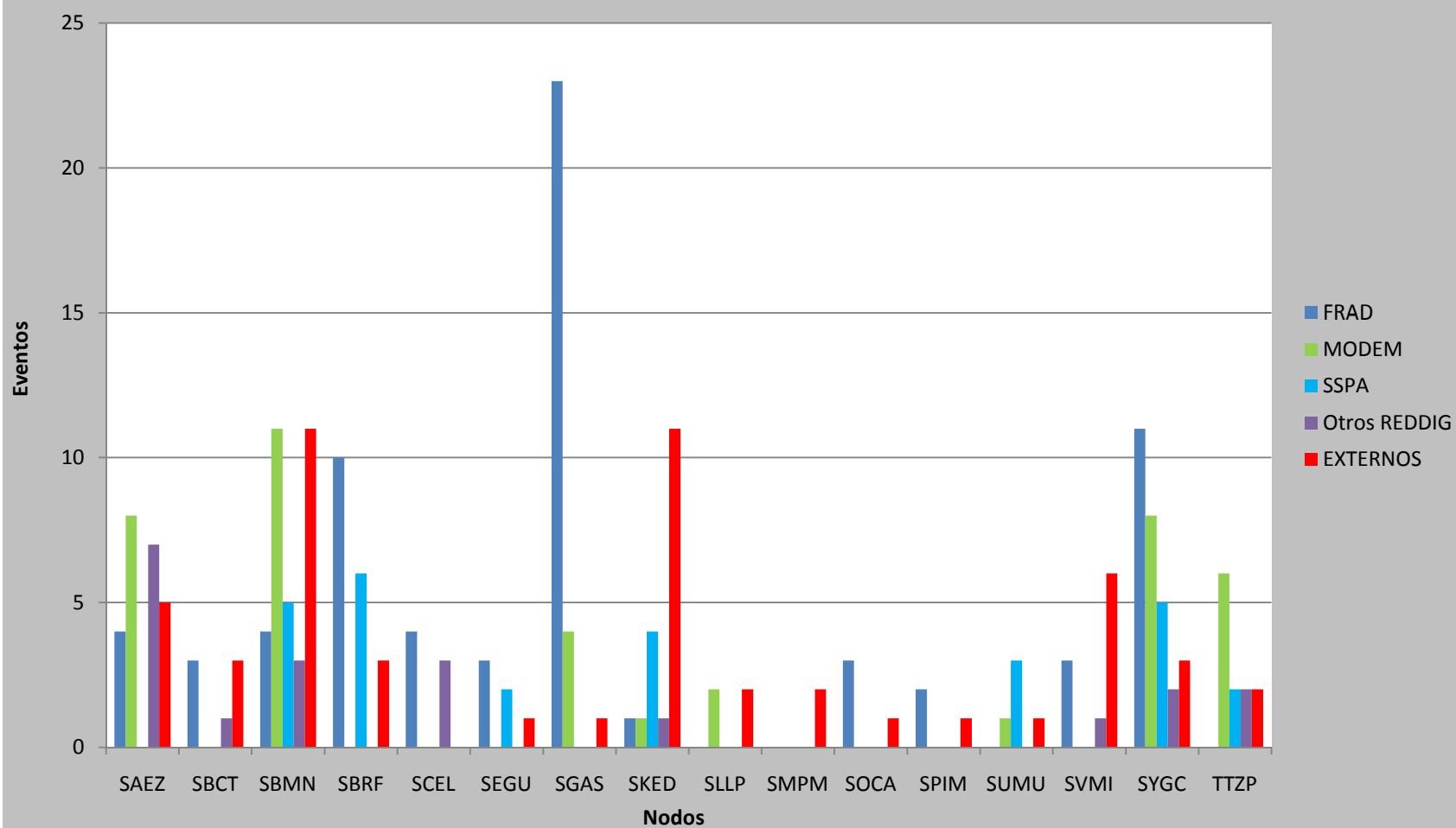
- a) Take note of the information provided; and
- b) Analyze the current and future situation of REDDIG, described in section 2 of this working paper, as well as its possible impact on the MEVA II / REDDIG interconnection.

REDDIG 2008
SERVICE TO NODES / ATENCIONES A LOS NODOS = 210



REDDIG 2008

DISTRIBUTION OF SERVICE/DISTRIBUCION DE ATENCIONES



REDDIG 2008
DISTRIBUTION OF SERVICE BY EQUIPMENT CATEGORY /
DISTRIBUCION DE ATENCION POR CATEGORIA DE EQUIPO

