Agenda Item 1: Performance of MEVA II and REDDIG networks

REDDIG PERFORMANCE SINCE LAST MEVA II / REDDIG COORDINATION MEETING

(Presented by the Secretariat)

SUMMARY

This working paper presents information on the main activities carried out / planned since the last MEVA II / REDDIG coordination meeting, with regard to equipment renewal, the satellite change from IS-1R to IS-14, implementation of new services at MEVA II, REDDIG, and other considerations in that regard. In addition, it presents information on the performance of REDDIG since the last coordination meeting, presenting information on the types of failures presented, the actions taken to solve the failures, the availability of the networks, and other relevant activities during the operation of the networks.

References

- Seventh MEVA II/REDDIG Coordination Meeting (Mexico City, Mexico, 10-11 June 2009); and
- Thirteenth Meeting of the REDDIG Coordination Committee (Lima, Peru, 9-10 March 2010).

ICAO strategic objectives:	*A – Safety* *D- Efficiency*

1. Background

1.1 REDDIG presents a 99.99% availability since its start-up, at the end of 2003. **Appendix A** to this working paper presents a chart with information on the network's availability from 2004 to April 2010.

1.2 The rate of the above indicated availability is mainly due to the redundancy of the equipment composing REDDIG, the availability of spare parts, and the preventive and corrective maintenance tasks co-ordinately carried out between the REDDIG administration and the technical personnel assigned by the REDDIG member States for the maintenance of the REDDIG node.

1.3 Since the last MEVA II / REDDIG coordination meeting (MR/7), the following activities towards keeping REDDIG within its availability rate, as well as the ATS personnel services requirements:

a) Optimisation of the Memotec FRAD equipment, purchasing of spare parts for the Viasat Linkway Modem and upgrading of NCC SUN servers;
b) REDDIG NCC and Management Centre operation alternation;
c) Logistics and spare parts management;
d) Migration to IS-14 satellite;

e) Implementation of new services; and
f) Study on bandwidth increase.

2. **Description of activities**

Optimisation of the Memotec FRAD equipment, purchasing of spare parts for the Viasat Linkway Modem and upgrading of NCC SUN servers

Optimisation of REDDIG FRAD equipment

2.1 Since the manufacturing of the Memotec FRAD equipment, presently operating on the REDDIG, was discontinued on 31 July 2009, according to the letter received from Memotec, the REDDIG Administration, in addition to purchasing spare parts, prepared, during the second semester of 2009, a plan for the optimisation of the REDDIG FRAD equipment in stations where applicable.

2.2 The purpose of this optimisation is to use a single MPS FRAD equipment instead of two pieces of equipment (MUX + MPS) but keeping all the services offered in the node, in such a way that the operation with a single FRAD equipment is transparent to all users of the services. Likewise, the station maintains redundancy of the FRAD equipment and its corresponding monitoring and control.

2.3 To this end, the REDDIG Administration analysed the current conditions of each of the network stations that used two FRAD pieces of equipment (MUX + MPS), and concluded that it was possible to carry out this optimisation in the following stations:

SBCT – Curitiba, Brazil
SBRF – Recife, Brazil
SCEL – Santiago, Chile
SGAS – Asuncion, Paraguay
SLLP – La Paz, Bolivia
SMPM – Paramaribo, Suriname
SOCA – Cayenne, French Guyana
SYGC – Georgetown, Guiana
TTZP – Piarco, Trinidad and Tobago

2.4 To date, FRAD equipment has been optimised and is operating satisfactorily in the following stations:

SBRF – Recife, Brazil
SGAS – Asuncion, Paraguay
SMPM – Paramaribo, Suriname
SYGC – Georgetown, Guiana

2.4.1 Optimisation of FRAD equipment in the other five stations will be completed in 2010.

2.5 The main benefit of this optimisation of FRAD equipment is that, once completed, each station will have spare parts on site: two (2) complete basic CX-950 units (in addition to the *motherboard*, power source, and ringer) and two (2) V.35H cards.

2.6 Likewise, from a global point of view and taking into account the spirit of cooperation existing among all of the REDDIG members, these optimisations would yield eighteen (18) basic CX-950 units, some of which, subject to administrative arrangements, could be used as spare parts for any of the REDDIG stations.

Purchasing of spare parts for the Viasat Linkway Modem

2.7 Taking into consideration that Viasat will discontinue with the development of the technology used for the Linkway 2100 Modem and that, nevertheless this system, platform of REDDIG, still has operational validity for the current and new services for the Region, the REDDIG Administration increased the spare parts lot as regards the Linkway Modem, with the aim of guaranteeing the operations of this equipment for a minimum period of three years, taking into account its failure statistics.

Upgrading of the NCC SUN servers

2.8 The hardware versions of the SUN equipment used as NCC servers since the onset of REDDIG operations, both in Ezeiza and Manaus, are SunBlade 100 and Ultra 5. The Ultra 5 equipment, although it properly executes the application programme, has to be rebooted on a monthly basis to continue operating. This is due to its technical features and specifications. The SunBlade 100 equipment belongs to a different hardware version and thus does not require rebooting.

2.9 In late 2008, the REDDIG Administration coordinated with each of the technical areas of the Argentine and Brazilian Administrations to determine whether or not it was possible to obtain SUN equipment (with a better hardware version than that of the Ultra5 equipment), as a loan, for use as NCC servers.

2.10 Both Argentina and Brazil answered promptly and positively and made the corresponding internal coordination. Each Administration has made available to the REDDIG Administration one (1) SunBlade 150 unit on loan.

2.11 The REDDIG Administration fully installed the Unix SUN Solaris8 operating system on both units, in Manaus and Ezeiza, with the corresponding patches and the LINKWAY NCC application. The equipment in Ezeiza was configured at the end of 2008 while the Management Centre was temporarily in Ezeiza.

2.12 After preliminary testing, on 27 April 2009, the SunBlade 150 equipment was commissioned at the Manaus NCC and has been operating satisfactorily non-stop since then. The SunBlade 100 stands as the local ‘hot stand-by’ redundant NCC equipment.

2.13 The SunBlade 150 located in Ezeiza first needs to be tested off-line and then commissioned as NCC in 2010, when the Management Centre is temporarily moved to Ezeiza during the period of alternating operation of the NCCs, scheduled for the third quarter of 2010.

REDDIG NCC and Management Centre operation alternation

2.14 The operation alternation of the NCC and Management Centre is a recommendation from the REDDIG Administration in order to keep the network’s redundancy; it is carried out once a year, by transferring the operations from the Manaos NCC to the one in Ezeiza (alternate NACC).

2.15 In February 2009, due to a failure in the Manaos external watch subsystem (GPS time base reference), the Ezeiza, Argentina NCC became operational (SUN equipment). The Ezeiza NCC was kept operational for eleven (11) weeks, working satisfactorily until the end of April, when the Manaos NCC (SUN equipment) became again operational. During the time which the Ezeiza NCC was operating, the Management Centre was kept in Manaos providing attention to calls, specialized network support, logistics and network management.

Logistics and spare part management

2.16 Logistics, mainly activated by equipment failures, entails the delivery of equipment or parts from the REDDIG spare part stock in the warehouse located at the Lima Regional Office or from any other node to the nodes that require them; coordinating with the manufacturers for the repair of the equipment; payment for transportation of equipment or parts; payment to manufacturers for repair of equipment; coordinating with and supporting the States for the import/export of the equipment and parts needed at the nodes. This support also includes the purchase and transportation of equipment on behalf of the States for their corresponding nodes.

2.17 In 2009, twenty-four logistics operations were conducted. **Appendix B** presents a summary of equipment and part failures and statistics for 2009 on the numbers of the main repairs of network nodes as well as their distribution in terms of type of equipment requiring the service.

2.18 An important aspect worth mentioning is that, thanks to the level of failure diagnosis available to the REDDIG Administration, a failure in one of the power supply sources of the Linkway2100 MODEM equipment was identified. Accordingly, spare parts were purchased as a preventive measure, and the broken equipment could be quickly repaired and put back into operation, thus attaining significant savings, since there was no need to send the equipment to the manufacturer for this type of repair.

Migration to IS-14 satellite

2.19 At the beginning of 2009, Intelsat informed that the IS-1R satellite in use by REDDIG would be replaced in the same orbit position by the IS-14 satellite, and that the change was planned for September 2009. In this respect, Intelsat also indicated that they would provide the exact date and procedure to follow for the transition to the new satellite.

2.20 There were many re-scheduling dates from Intelsat (15 November and 7 December) for the migration to the new satellite. Finally, Intelsat sent a letter on 30 November, indicating the definite date and time, 15 December at 06:45 UTC, for the migration to the IS-14 satellite.

2.21 For the coordination of activities required for the migration to the new satellite, the REDDIG administration held a technical-operational meeting in Maiquetia, Venezuela, for the Spanish-speaking REDDIG members (22 to 23 October 2010) and another meeting in Paramaribo, Suriname, for the English-speaking members (15 to 16 October 2010). In these meetings, recommendations were formulated in the event of requiring some type of mechanical adjustments in the antenna of any network station, as well as of having availability of basic tools and facilities at the antenna site (electrical power, telephone line, illumination). In accordance with information from Intelsat, no adjustments were expected to be made at the stations, only at the main station (with MRT), if the case.

2.22 A course on Introduction to Satellite Communications and REDDIG operation was held before the technical-operational meetings in Paramaribo and Maiquetía, as part of the REDDIG training programme for 2009. The course dealt with aspects related with the migration of the Intelsat IS-1R satellite to the IS-14.

2.23 Days before the migration date, coordinations were made with the technical representatives of all REDDIG nodes, and letters were also sent to the respective Administrations requesting support from the technical personnel, for their presence at the time scheduled for the migration.

2.24 In turn, the REDDIG Administration carried out a comparative analysis between the uplink G/T and downlink EIRP values of both satellites for all the network stations and, before the migration, made adjustments to the EIRP of some remote stations.

2.25 The migration to the IS-14 satellite was carried out at the date and time scheduled by Intelsat without any inconveniences, being the operation transparent for REDDIG. The transponder of the IS-14 satellite in which REDDIG operates is the A28CV/A28CV with AMCV/AMCV beam and V/V polarization.

2.26 After the migration and becoming the IS-14 satellite operational, the REDDIG Administration made offset frequency adjustments at some remote stations, as part of regular procedure.

2.27 It is important to highlight the cooperation received from the technical personnel of all REDDIG stations, who were present and ready during the migration process, in the event of any contingency presenting itself.

Implementation of new services

Implementation of a backup network at the Piarco node (Trinidad &Tobago)

2.28 In April 2009, the REDDIG Administration implemented a backup network, via international ISDN circuit, for the Piarco, Trinidad & Tobago, TTZP station. To this end, new PVC virtual circuits were established, as well as in the TTZP station FRAD equipment, and in all of its counterparts: SOCA, SMPM, SYGC and SVMI. Also, new virtual PVC circuits were created in the Lima, Peru, SPIM station, which serves as a substitute only when the ISDN backup network is activated for communications to/from the TTZP station with its counterparts. The implementation of the ISDN backup network at the Piarco REDDIG station was carried out by the REDDIG Administration without cost to the Trinidad & Tobago aeronautical administration.

Implementation of circuits for the AMHS service

2.29 As a result of the AMHS service implementation among States of the Region currently counting with AMHS systems, new PVC virtual circuits have been implemented in the REDDIG, in addition to the circuits previously established for this circuit between Argentina-Brazil, Argentina-Paraguay y Argentina-Perú:

Colombia - Peru
End to end connectivity and message exchange tests were satisfactorily carried out in November 2009.

Chile – Peru
End to end connectivity tests are awaited for.

2.30 In addition, upon request from Argentina, a new PVC virtual circuit has been created, with the respective FRAD equipment configuration, for the exchange of radar data (with IP protocol) between:

Argentina (Quilmes radar) – Uruguay (Durazno radar)

2.30.1 To date, the radar information from Quilmes is available at the Montevideo ACC, and the transfer of information from the Durazno radar to Ezeiza is scheduled to be completed by mid-May 2010.

Study on the increase of bandwidth

2.31 Since the study on REDDIG bandwidth requirements has been unable to be completed, the REDDIG members approved, during the last meeting of the REDDIG Committee Coordination Meeting (RCC/13, Lima, Peru, 9 to 10 March 2010), a budgetary prevision to extend the current carrier's bandwidth from 0.625 Msym/sec to 1.25 Msym/sec. In this manner, REDDIG would count with a total of three 1.25 Msym/sec carriers. The final bandwidth study is scheduled to be ready by the end of 2010.

3. Action suggested

3.1 The Meeting is invited to:

a) Take note of the information provided;

b) Analyze the activities carried out since the seventh MEVA II / REDDIG coordination meeting (MR/7), presented in Section 2 and in Appendices A and B to this working paper; and

c) Analyze any other consideration that the Meeting might deem pertinent in this respect.

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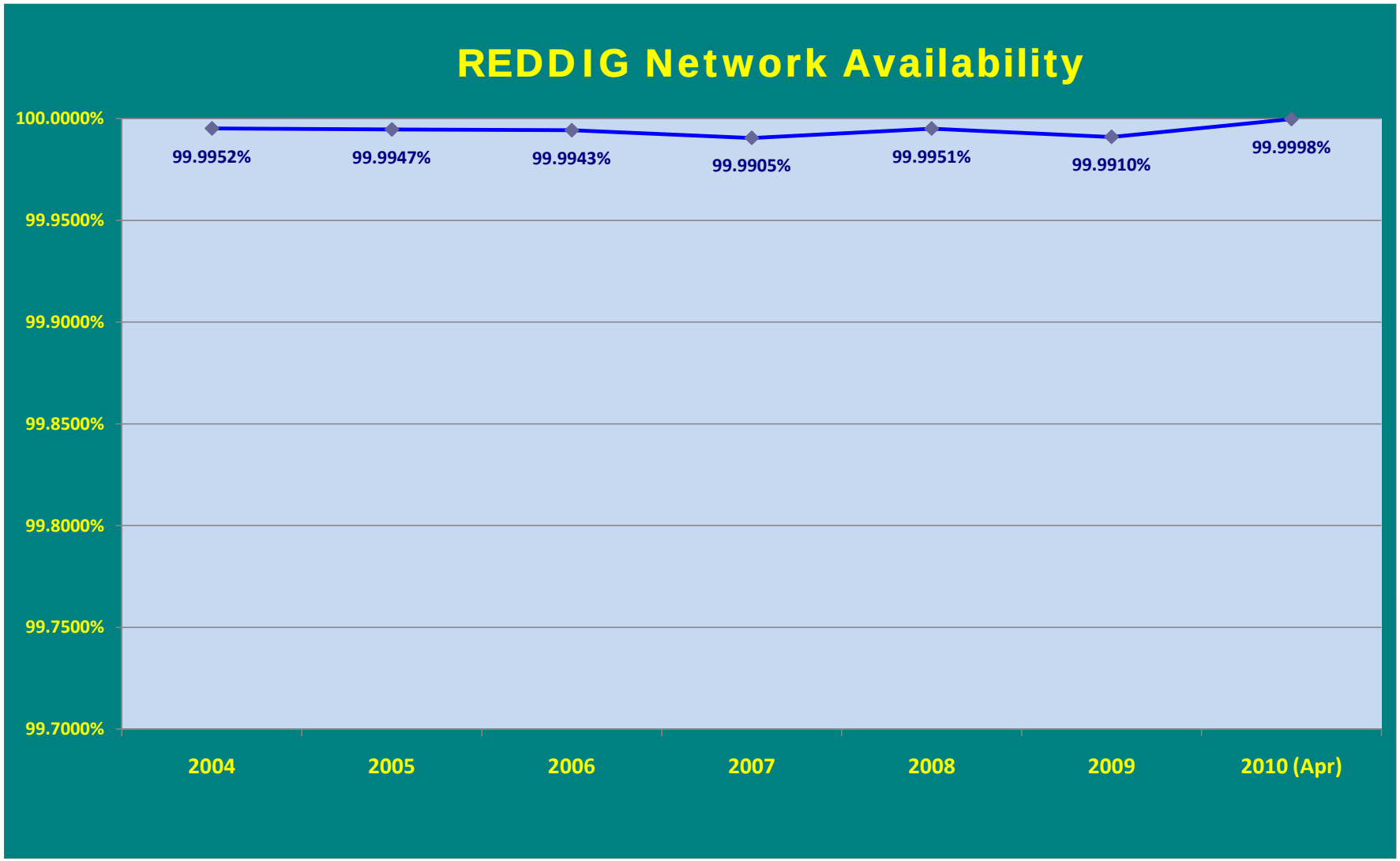
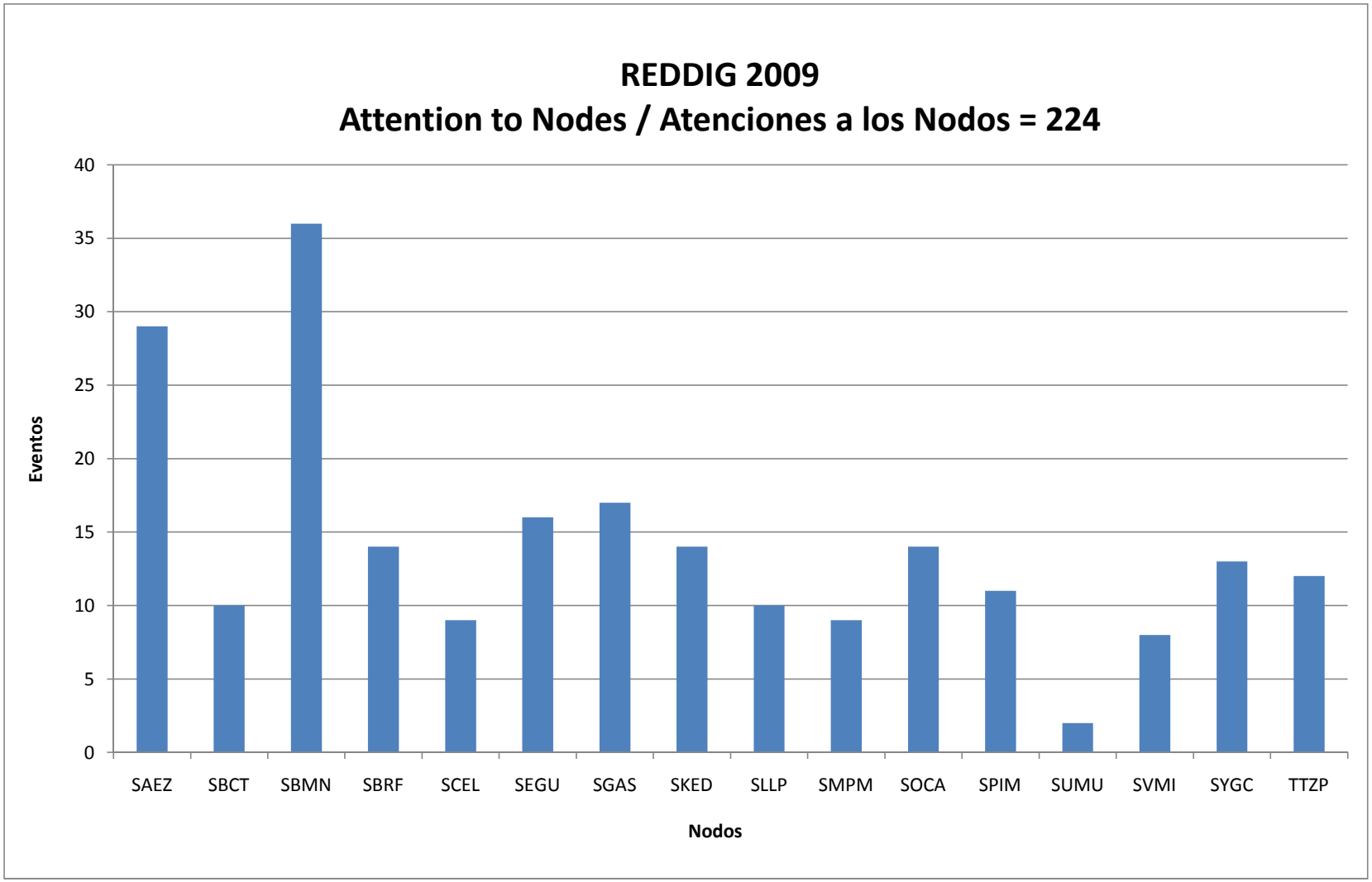

REDDIG Network Availability
100.0000%
99.9500%
99.9000%
99.8500%
99.8000%
99.7500%
99.7000%
99.9952%
99.9947%
99.9943%
99.9905%
99.9951%
99.9910%
99.9998%
2004
2005
2006
2007
2008
2009
2010 (Apr)

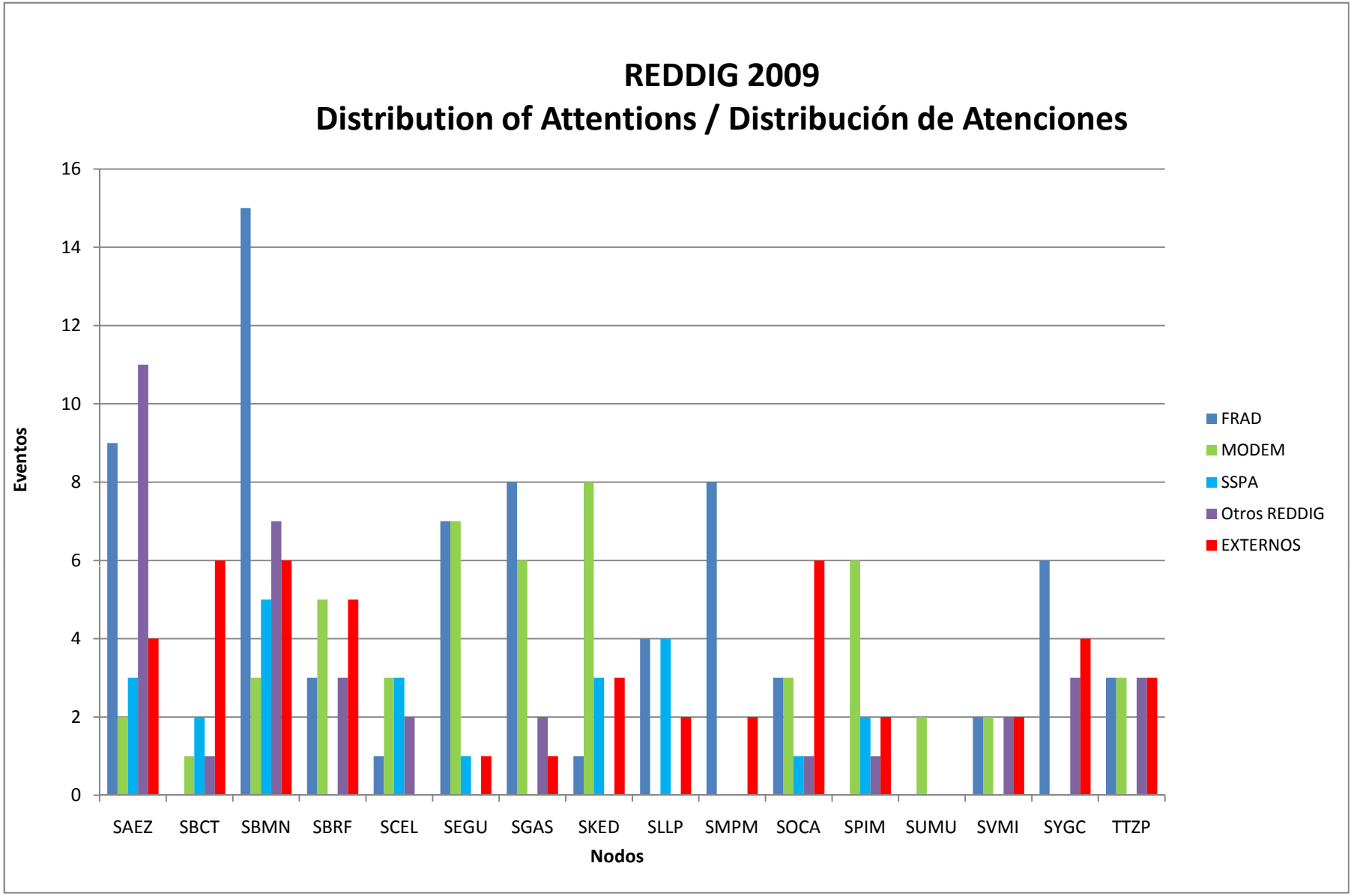
APPENDIX B / APENDICE B

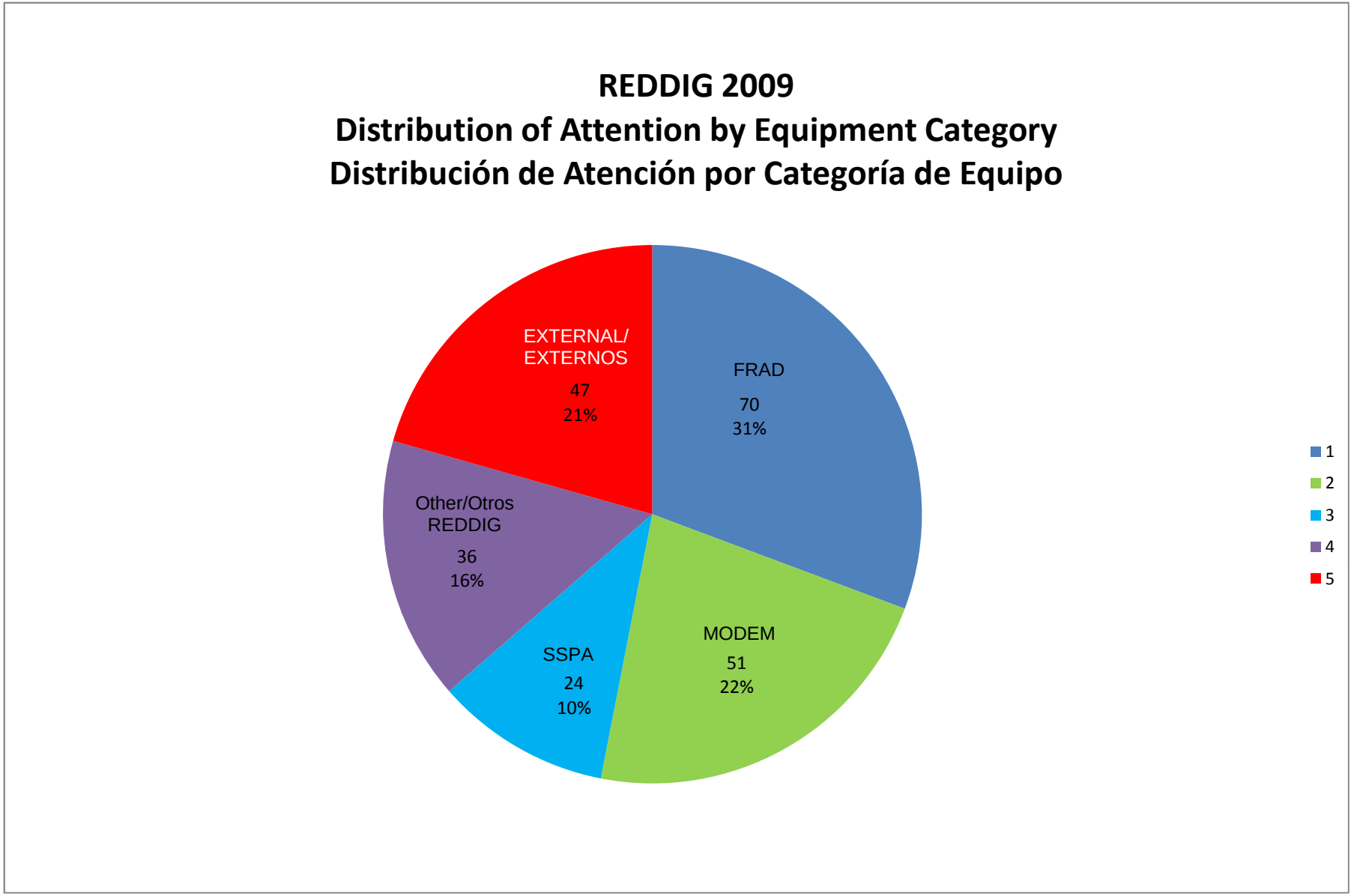
SUMMARY OF EQUIPMENT AND SPARE PARTS FAILURES AND ATTENTION TO NODES
RESUMEN DE AVERÍAS DE EQUIPOS Y PARTES Y ATENCION A LOS NODOS

EQUIPMENT AND SPARE PARTS FAILURES / AVERIAS DE EQUIPOS Y PARTE

FRAD	***Manufatcurer/Fábrica: Memotec***	
(1)	Power Supply Module	: (1) SLLP
(4)	Universal I/O Card	: (1) SAEZ, (2) SBMN, (1) SKED
(2)	Motherboard CX950	: (1) SGAS, (1) SAEZ
(1)	E&M SLIM Card	: (1) SVMI
(3)	FXS SLIM Card	: (3) SYGC
(1)	DAV Card	: (1) SBRF
(4)	Internal Fan	: (2) SBMN, (2) SAEZ
MODEM	***Manufacturer/Fábrica: ViaSat***	
(13)	Quad Output P.S.	: (2) SPIM, (2) SEGU, (3) SKED, (2) SCEL, (1) SBRF (1) SGAS, (1) SOCA, (1) SVMI
(1)	Terminal LW2100	: (1) SUMU
SSPA	***Manufacturer/Fábrica: Paradise Datacom***	
(2)	SSPA M&C	: (1) SBMN (1) ADM
Others REDDIG / Otros REDDIG		
(1)	Time Reference GPS	: (1) SBMN
(1)	I/O Card PC Linux	: (1) SCEL


REDDIG 2009
Attention to Nodes / Atenciones a los Nodos = 224
Eventos
40
35
30
25
20
15
10
5
0
SAEZ
SBCT
SBMN
SBRF
SCEL
SEGU
SGAS
SKED
SLLP
SMPM
SOCA
SPIM
SUMU
SVMI
SYGC
TTZP
Nodos


REDDIG 2009
Distribution of Attentions / Distribución de Atenciones
Eventos
16
14
12
10
8
6
4
2
0
SAEZ
SBCT
SBMN
SBRF
SCEL
SEGU
SGAS
SKED
SLLP
SMPM
SOCA
SPIM
SUMU
SVMI
SYGC
TTZP
Nodos
FRAD
MODEM
SSPA
Otros REDDIG
EXTERNOS


REDDIG 2009
Distribution of Attention by Equipment Category
Distribución de Atención por Categoría de Equipo
EXTERNAL/
EXTERNOS
47
21%
FRAD
70
31%
Other/Otros
REDDIG
36
16%
SSPA
24
10%
MODEM
51
22%
1
2
3
4
5