**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**RLA/03/901**

# SIXTH MEETING ON THE TECHNICAL-OPERATIONAL IMPLEMENTAITON OF THE NEW REDDIG II DIGITAL NETWORK (RTO/6)

# FINAL REPORT

**(Manaus, Brazil, 12 June 2017)**

**INDEX**

# HISTORY

## ii-1 PLACE AND DURATION OF THE MEETING

The Sixth Meeting on the Technical-Operational Implementation of the New REDDIG II Digital Network (RTO/6), was held on 12 June 2017 at the premises of the Technical Instruction and Update Section of the Cuarto Centro Integrado de Defensa Aérea y Control del Tránsito Aéreo – CINDACTA IV, Manaus, Brazil,

## ii-2 OPENING

Coronel Engineer Dalmo José Braga Paim, Commander from the Department of Air Space Control (DECEA), welcomed the participants highlighting the topics to be debated and wished success in their deliberations. Following, proceeded to inaugurate the meeting.

## ii-3 WORKING LANGUAGES

The working languages of the meeting were Spanish, English and Portuguese.

## ii-4 PARTICIPANTS AND ORGANIZATION

The Meeting counted with the assistance of 11 member States (Argentina, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Suriname, Trinidad and Tobago and Venezuela), making a total of 40 participants, including ICAO specialist. List of participants is presented in page iii-1.

Mr. Luis Alejos, REDDIG Administrator, acted as Secretary assisted by Mr. Cristian Javier Vittor from the REDDIG Administration.

## ii-5 LIST OF CONCLUSIONS

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**
**South American Regional Office**

**RLA/03/901 REDDIG**
**Sixth Meeting on the Technical/Operational Implementation of the New REDDIG II (RTO/6)**

(Manaus, Brazil, 12 June 2017)

# LIST OF PARTICIPANTS

**ARGENTINA**

1. Hernán Gabriel Canna
2. Hernán Jose Antonio Aguirre

**BRAZIL**

3. Eduardo Alberto do Nascimento Fontes
4. Alessandro Stefson Mamede Alves
5. Claudio Alves Baptista
6. Joao Magno Macedo
7. Aguinaldo Brasil da Motta
8. Rodolfo Barbosa Santos
9. Thiago De Melo Maia
10. Jefferson Miecznikowski Cheron
11. Einar Vogt Filho
12. Carlos Eduardo Ferreira Paes
13. José Alexandre de Albuquerque
14. Carlos Magno Rodrigues de Oliveira
15. Leandro Cabral Dias
16. Sandro Israel de Moura Mendes
17. Marcelo Mello Fagundes
18. Iggo Cesar Malcher Fonseca

**COLOMBIA**

19. Jorge Armando Lora Martínez
20. William Orlando Fonseca Roa

**CHILE**

21. Christian Vergara
22. Pedro Pastrián

**ECUADOR**

23. Raúl Alfredo Avellán Oña

**GUYANA**

24. Mortimer Barrington Salisbury
25. Troy Gavin Gittens

**PARAGUAY**

26. Ronald Gabriel Benítez Florentín
27. Ricardo Cardozo

**PERU**

28. Ricardo José Arteaga Chávez
29. Moisés Canicela Quispe

**SURINAME**

30. Mitchell Henk Themen
31. Patrick Ismael Tarnadi
32. Jurgen Cicilson
33. Maria Boobe
34. Marcel Mendelzoon

**TRINIDAD & TOBAGO**

35. Shiraz Gopaul
36. Andrew Ramkissoon

**VENEZUELA**

37. Giulio Cesare Zoino Tarife
38. Sabrina Rodríguez Medina

**ICAO**

39. Luis Alejos
40. Javier Vittor

**Agenda Item 1: Performance of the REDDIG II to date**

1.1 Under this agenda item, the meeting was informed on the follow up on the REDDIG II operation, describing the following activities:

- Skywan Satellite Network, and
- Terrestrial Network Level 3

1.2 Although it was stated that the expected levels of availability and functionality are being worked on, it is agreed that this result is mainly due to the work done by the REDDIG Administration and the technical staff of the Nodes.

***Skywan Satellite Network***

1.3 It was reported that since the installation of the Skywan satellite network, the company INEO has been carrying out various actions in order to be able to deliver a stable satellite network with no operational problems.

1.4 Among the issues observed, the problem of freezing in the master equipment of the NCC of Manaus stands out.

1.5 On May 19 the company INEO made the “upgrade” of the Skywan satellite system to a new firmware version. Despite this upgrade, the problem of freezing of the Manaus Skywan master continues. This defect occurs between eight (8) to ten (10) days. This condition forces to restart said equipment to normalize its operation.

1.6 It was mentioned to those present, that there is only one master in Manaus and one backup master in Ezeiza, in both sites, identified as Skywan "A".

1.7 Depending on the analysis performed by the Administration, with actions such as traffic capture using the "wireshark" application, the suggestion was made that the inconvenience could be in the configuration of the Manaus Skywan "A" master equipment.

1.8 It was also reported that INEO only provides supports remotely, accessing through the Nodes of Brasilia and Ezeiza via a VPN connection.

1.9 In early June, INEO had to make a regrouping of network stations to recover the conditions of distribution of the same ones. This is due to a clustering error in a single carrier when performing the "upgrade" by INEO. This situation was normalized and the stations were again distributed in the three carriers.

1.10 It was highlighted that the freezing of the Skywan Master in Manaus has been taking place, including replacing the equipment serial 7000 with a similar one that was in the Lima Regional Office as spare part. In addition, it was emphasized that the freezing is at the LAN level and that when this occurs, the Skywan "B" equipment of Manaus assumes the operation of the services.

1.11 The Meeting was informed that because the network has not yet been delivered by the INEO contractor, the REDDIG Administration and the States should not make changes to the configurations of the equipment and systems of the current network. It was also reported that the final

acceptance of the (FNAT) network is pending. From the FNAT will start the warranty period of 24 months.

1.12 Regarding satellite interference, RF level adjustments have been made in coordination with INTELSAT. Although operating frequencies were to be changed, this action is in stand-by until the freezing problem of the Manaus Skywan Master is solved.

1.13 About the inquiries of some participants regarding what considerations / support actions INEO company is carrying out, it became clear that it is not giving a concrete answer to the cause (s) of the problem (s) of the equipment's and on the alarms that are presented. INEO, as a concrete action, replaces the equipment's. This demonstrates the importance of having statistics in order to forecast the causes of errors and the convenience of buying spare parts.

1.14 It was also reported on the calculation and consumption of bandwidth (Kbps) per node. Although it is pending the delivery of a procedure to obtain the above-mentioned, the Administration investigated and made measurements, obtaining a procedure for this purpose using the facilities of Skywan equipment with the WhatsUp Gold application.

1.15 The company INEO has provided a procedure that provides cumulative 'byte' consumption of Skywan equipment which makes it necessary to manually make additional calculations and conversions. With this procedure the captures are realized by day and by month in both Skywan equipment of each Node. However, inconsistencies were observed in the values obtained with these captures with the expected actual values of consumption. In this regard, the contractor was consulted, but to date no answers have been obtained.

***Terrestrial network Level 3***

1.16 It was reported that all backup circuits in each of the stations are 256 kbps. Tunnels (VPN-MPLS) are used with a "full mesh" topology.

1.17 It was stated that the overall performance of the backup network is acceptable except in Manaus, where recurring de-activation times are reiterated. Monthly reports are made of non-compliance circuits with credits.

1.18 The availability monitoring practice is made from three nodes: Lima, Ezeiza and Manaus. This makes it possible to appreciate the availability more precisely.

1.19 As an example, the case of Ezeiza was 99.89%, compared to 75.05% registered in Manaus; readings obtained during the month of May.

1.20 Through the use of this tool, since January 2016, the monthly availability (numerical and graphical) of each of Level 3's terrestrial circuits has been calculated, which is used to analyze compliance with the respective SLA (Service Level Agreement).

1.21 Likewise, it was reported that the REDDIG Administration is holding monthly meetings with a representative of Level 3 in the Lima Office or via teleconference to analyze SLA compliance. It was highlighted that Level 3 and INEO are in different and independent contracts.

1.22 It was also informed about a change of the Level 3 portal that was going to take effect on June 15, 2017 and for this reason Level 3 was being asked for the respective procedure with the updated user and password.

**Agenda Item 2: Review and update of the procedures for the maintenance and operation of the REDDIG II**

2.1 The following points were addressed under this agenda item: REDDIG telephone directory, network information back-up, Level (3) circuit's errors reporting, standardization of REDDIG connections, revision of the cables / connectors of the ODU equipment and aspects about the GBB router.

***REDDIG telephone directory***

2.2 It was informed that the REDDIG Administration needs to update the REDDIG Telephone Directory (ATS and Administrative). In this regard, the States were requested, following the regular procedure, to revise this Telephone Directory and send its update to the REDDIG Administration until **June 30, 2017**. To this end, participants of the Meeting were given the Telephone Directory that is presented as **Appendix A** to this part of the Report.

2.3 In addition, it was coordinated to include in the respective nodes, the numbering of services that are considered important to include in the Directory.

2.4 Regarding in how to obtain a copy of the information on each of the NMS servers of the network stations, it was reported that, as indicated by the INEO company, the copy ('ghost image') is performed automatically on the second disk that the server has.

2.5 In order to comply with the technical terms of the SDD (System Design Document), it was considered necessary to have an external back-up copy for each of the stations, meaning outside of the NMS server for each one of the servers in the network.

2.6 Consequently, INEO provisioned the nodes with an external hard disk in order to make an image of the server disks. The server works with RAID technology (Redundant Array Independent Disc). With this you can perform an external back up copy.

2.7 It was noted that for Manaus and Ezeiza, these are special cases since, depending on the discs delivered by INEO, the delivery of three more discs for Manaus and an additional disc for Ezeiza would be missing. In addition, INEO will be consulted on the delivery of the external disk to the Brasilia station.

2.8 Participants were presented with the general procedure sent by INEO to perform the backup task of the server's disk. This procedure is presented as **Appendix B** to this part of the Report.

2.9 The REDDIG Administration recommends that the backup has to be performed once a month, after coordination with them.

2.10 The REDDIG Administration reported that it has copies of all configurations of the routers, switches, and other configurable equipment. As for the satellite part, there is a copy of the configuration of each Skywan equipment, obtained from the SkyNMS software.

# Telephone Directory

# (ATS and Administrative)

# of the REDDIG

| NODE INFORMATION | | | |
|---|---|---|---|
| | **Node:** | **SAEZ** | **City: Buenos Aires - ARGENTINA** |
| | Address: | Aeropuerto Ministro Pistarini (Ezeiza), 4to piso, DECODI | |
| | Telephone: | 5411 4480 2362 | |
| | Fax: | 5411 4480 2363 | |
| | E-mail: | javiervittor@gmail.com (Javier Vittor), hernangabriel1@gmail.com (Hernán Canna), hja.aguirre@gmail.com (Hernan Aguirre), aegonzalez82@gmail.com (Antonio Gonzalez) | |
| | Administrative Network Telephones: | 2057362 | |

| Technical Personnel | Job Title | REDDIG Telephone | Public Network Telephone | Mobile Number |
|---|---|---|---|---|
| Javier Vittor | | 2057350 | 5411 4480 2350 | |
| Hernán Canna | | 2057357 | 5411 4480 2357 | |
| Hernan Aguirre | | 2057377 | 5411 4480 2377 | |
| Antonio Gonzalez | | 2057376 | 5411 4480 2376 | |

| REGIONAL ATS | USER | REDDIG Telephone | Comments |
|---|---|---|---|
| | Ezeiza Turno Técnico REDDIG (DECODI) | 2000 | |
| | Torre de Control de Vuelo (TWR) Ezeiza | 2005 | |
| | Supervisión del Tráfico de la Red AFTN - Ezeiza | 2006 | |
| | TWR San Fernando | 2016 | |
| | FPL Aeroparque Jorge Newbery | 2017 | |
| | TWR Gualeguaychu | 2018 | |
| | TWR Marambio | 2019 | |
| | ACC Córdoba (Principal) | 2032 | |
| | ACC Comodoro Rivadavia | 2033 | |
| | ACC Mendoza | 2034 | |
| | ACC Córdoba (Secundaria) | 2035 | |
| | ACC Resistencia (Principal) | 2036 | |
| | ACC Mendoza (Alternativa) | 2037 | |
| | TWR Aeroparque Jorge Newbery | 2038 | |
| | TWR Iguazu (Alternativo) | 2039 | |
| | TWR San Carlos de Bariloche (Principal) | 2040 | |
| | TWR Iguazu | 2041 | |
| | TWR Paso de los Libres | 2042 | |
| | TWR Concordia | 2043 | |
| | Ezeiza I Turno Técnico ACC | 2044 | |
| | Ezeiza II Turno Técnico ACC | 2045 | |
| | ACC Sur (Control Visual) Manual APP 2 Ezeiza | 2050 | |
| | ACC 1Norte I Radar DEO EZEIZA | 2051 | |
| | ACC 2 APP 1 DEO TMA ESTE/OESTE/NORTE- Ezeiza | 2052 | |
| | TWR Ushuaia (Alternativa) | 2055 | |
| | TWR Río Gallegos (Alternativa) | 2056 | |
| | ACC Ezeiza Supervisor | 2060 | |
| | ACC Sur Radar APP2 - Ezeiza | 2061 | |
| | ACC Radar Norte II DEO - Ezeiza | 2062 | |
| | ACC Radar Norte III DEO - Ezeiza | 2063 | |
| | TWR San Carlos de Bariloche (Alternativa) | 2064 | |
| | ACC Mendoza Hot-Line punto a punto DOZ-CHI | 2065 | |
| | ACC Córdoba (Alternativa) | 2066 | |
| | ACC Resistencia (Alternativa) | 2067 | |
| | TWR Río Gallegos | 2068 | |
| | TWR Ushuaia | 2069 | |
| | ACC Resistencia | 2090 | |

| ADMIN | AUTHORITIES | REDDIG Telephone | Comments |
|---|---|---|---|
| | Jefe Dpto Proyectos - Dpto DECODI Ezeiza | 2068424 | |
| | Jefe Dpto Relaciones Institucionales | 2068423 | |
| | Jefe Centro de Comunicaciones Digitales EZEIZA | 2057350 | |
| | Responsable Area Datos y REDDIG | 2057357 | |
| | Responsable Area Enlaces Terrestres - Servicios de VOZ | 2057377 | |
| | Responsable Area A.F.T.N.-A.M.H.S. | 2057376 | |
| | CCAM Centro de Comunicaciones Ezeiza | 2057269 | |
| | Sala Técnica y Supervisión para los Sistemas Oral ATS, REDDIG, AFTN, A.M.H.S., Red Local Administrativa - Departamento Comunicaciones Digitales EZEIZA | 2057362 | |
| | | 2057363 | ***FAX*** |
| | | 2057364 | |
| | | 2057365 | |
| | | 2057500 | |
| | | ***2001*** | ***REDDIG*** |

| COSPAS SARSAT | AUTHORITIES | REDDIG Telephone | Comments |
|---|---|---|---|
| | Jefe ARMCC | | |
| | Jefe Aux. ARMCC | 2055128 | |
| | Encragado Sistema ARMCC | 2055132 | |
| | Turno Sistema ARMCC | 2055131 | |
| | | 2057486 | |
| | Telefono Red Publica Turno Sistema ARMCC (FAX) | FAX | 5411 4751 2935 |
| | | | 5411 4480 2486 |

Notes: 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )
2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SLLP** | **City:** | **La Paz - BOLIVIA** | |
| | Address: | Aeropuerto Internacional El Alto | | | |
| | Telephone: | 5912 281 0119 | | | |
| | Fax: | | | | |
| | E-mail: | titohernanh@latinmail.com | | | |
| | Administrative Network Telephones: | 2501 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Remigio Blanco | Punto Focal REDDIG | 252141 | 5912 2370340 | |
| | Hernán Tito | Técnico | 2501 | 59122129901 | |
| | Javier Campos | Técnico | 2501 | | |
| | | | | | |

| ATS | **USER** | **REDDIG Telephone** | **Comments** |
|---|---|---|---|
| | Coordinación ACC | 2551 | |
| | ACC 1 | 2552 | |
| | ACC 2 | 2560 | |
| | | | |
| | APP Puerto Suárez | 2533 | |
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| ADMIN | **USER** | **REDDIG Telephone** | **Comments** |
|---|---|---|---|
| | AASANA - Dirección Ejecutiva | 252101 | |
| | AASANA - Dirección Técnica | 252104 | |
| | AASANA - Dirección Administrativa | 252107 | |
| | AASANA - Directorio | 252110 | |
| | AASANA - Jefatura de Obras Civiles | 252132 | |
| | AASANA - Jefatura Comercial | 252135 | |
| | AASANA - Jefatura de Ingeniería Electrónica | 252138 | |
| | AASANA - Jefatura División de Telecomunicaciones | 252141 | |
| | AASANA - Oficina de Planificación | 252145 | |
| | Mantenimento Técnico de la REDDIG | 2501 | |
| | Departamento Técnico | 252233 | |
| | | 252235 | |

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2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| | | | | | |
|---|---|---|---|---|---|
| NODE INFORMATION | **Node:** | **SBBR** | **City:** | **Brasília - BRASIL** | |
| | Address: | CINDACTA I - SHIS QI 05 - Área Especial 12 - Lago Sul – CEP: 71615-600 – Brasília-DF – Brasil | | | |
| | Telephone: | 55-61-3364-8000 55-61-3364-8474 | | | |
| | Fax: | 55-61- 3364-7030 | | | |
| | E-mail: | | | | |
| | Administrative Network Telephones: | 3401 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Titel** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Tecnico de Dia | Sala Técnica | 34376 | (61) 3364-8474 / 8517 | x |
| | Cap Vitor / Ten Fábio | Chefia S. de Enlaces | 34412 | (61) 3364-8511 | x |
| | 1S Barros | Seção de Enlaces 1 | 34494 | (61) 3364-8480 | x |
| | 3S Maia | Seção de Enlaces 2 | 34388 | (61) 3364-8532 | x |
| | CV Ricardo | Seção de Telefonia | 34380 | (61) 3364-8485 | x |
| | | | | | |

| | | | |
|---|---|---|---|
| ATS | **USER** | **REDDIG Telephone** | **Comments** |
| | Supervisor | 3402 | Brasília |
| | FMC | 3402 | |
| | RCC | 3403 | |
| | Sala PLN | 3404 | |
| | Sala Técnica | 3405 | |
| | | | |
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| | | | |
|---|---|---|---|
| ADMIN | **USER** | **REDDIG Telephone** | **Comments** |
| | Mantenimiento REDDIG-BR | 3401 | Brasília |
| | Supervisor del Centro de Mensajes (CTMA-BR) | 34401 | |
| | CTMA-BR Jefe | 34429 | |
| | Sala Técnica | 34376 | |
| | Chefia Seção de Enlaces | 34412 | |
| | Seção de Enlaces | 34494 | |

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2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| | | | | | |
|---|---|---|---|---|---|
| NODE INFORMATION | **Node:** | **SBCT** | **City:** | **Curitiba - BRASIL** | |
| | Address: | Av. Erasto Gaertner, 1000. CEP 82515-000, Curitiba - PR, Brasil | | | |
| | Telephone: | 55 41 3251 5315 / 5318 / 5416 / 5278 | | | |
| | Fax: | 5541 3251 5341 | | | |
| | E-mail: | dennielsancho@hotmail.com / jeffersonjmc@cindacta2.gov.br | | | |
| | Administrative Network Telephone: | 305545, 305441 y/o 3001 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Jefferson Cheron | Ingeniero | 305315 | 5541 3256 1121 | - |
| | Emerson Zuckert | Técnico | 305315 | 5541 3018 1925 | - |
| | | | 305440 | - | |
| | Técnico 24 horas | | **305315** | 5541 3251 5315 | - |

| | | | |
|---|---|---|---|
| ATS | **USER** | **REDDIG Telephone** | **Comments** |
| | Supervisor Curitiba | 3060 | Curitiba |
| | Asistente Porto Alegre | 3051 | Curitiba |
| | Asistente Florianopolis | 3052 | Curitiba |
| | Asistente de Red | 3053 | Curitiba |
| | Asistente Sorocaba | 3054 | Curitiba |
| | Asistente Foz de Iguazú | 3055 | Curitiba |
| | Asistente Campo Grande | 3056 | Curitiba |
| | Asistente de Reserva | 3050 | Curitiba |
| | Control Porto Alegre | 3071 | Curitiba |
| | Control Florianopolis | 3072 | Curitiba |
| | Control de Red | 3073 | Curitiba |
| | Control Sorocaba | 3074 | Curitiba |
| | Control Foz de Iguazú | 3075 | Curitiba |
| | Control Campo Grande | 3076 | Curitiba |
| | Control de Reserva | 3070 | Curitiba |
| | ACC Brasilia U5 | 3031 | Brasilia |
| | ACC Brasilia U4 | 3032 | Brasilia |
| | Supervisor Brasilia | 3033 | Brasilia |
| | APP Foz de Iguazú | 3041 | Foz de Iguazú |
| | APP Corumba | 3091 | Corumba |
| | APP Uruguaiana | 3083 | Uruguaina |

| | | | |
|---|---|---|---|
| ADMIN | **USER** | **REDDIG Telephone** | **Comments** |
| | DECEA Director General | 306200 | RJ |
| | DECEA Sub-Departamento de Operaciones (SDOP) | 306241 | RJ |
| | DECEA Sub-Departamento de Logística (SDLO) | 306205 | RJ |
| | CECATI | 306250 | RJ |
| | CERNAI | 306200 | RJ |
| | División CNS | 306267 | RJ |
| | División ATM | 306273 | RJ |
| | División de Telecomunicaciones | 306220 | RJ |
| | Oficial CNS (Florianopolis) | 305545 | Florianópolis |
| | CINDACTA 1 (Brasilia) Supervisor AFTN CCAM-BR | 308377 | Brasilia |
| | CINDACTA 2 (Curitiba) Mantenimiento 1 | 3001 | Curitiba |
| | CINDACTA 2 (Curitiba) Mantenimiento 2 | 305315 | Curitiba |

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2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| | | | | | |
|---|---|---|---|---|---|
| NODE INFORMATION | **Node:** | **SBMN** | **Taruma** | **Manaus - BRASIL** | |
| | Address: | CINDACTA IV - Av. Do Turismo, No. 1350, Tarumã<br>CEP: 69045-630, Manaus, Brasil | | | |
| | Telephone: | 55-92-3652 5713 - 55-92-3652 5712 | | | |
| | Fax: | | | | |
| | E-mail: | 1Ten. Magno: joan.magno@gmail.com | | | |
| | Administrative Network Telephone: | 3601 / 3602 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | 1T Magno | Jefe Sala Técnica | 3622 | +55-92-3652 5470 | +55-92-98212-6374 |
| | Sandro Mendes | | 3601 / 3602 | +55-92-3652 5712 | +55-92-99112-8089 |
| | Magno Rodrigues | | 3601 / 3602 | +55-92-3652 5712 | +55-92-98241-3087 |
| | Cleber de Souza | | 3601 / 3602 | +55-92-3652 5712 | +55-92-98173-5423 |
| | Eraldo Menezes | | 3601 / 3602 | +55-92-3652 5712 | +55-92-98125-7348 |
| | Leandro | | 3601 / 3602 | +55-92-3652 5712 | +55-92-98247-7414 |
| | Webston | | 3601 / 3602 | +55-92-3652 5712 | +55-92-99122-4791 |

| | | | |
|---|---|---|---|
| ATS | **USER** | **REDDIG Telephone** | **Comments** |
| | Sector 1(BL) | 3660 | |
| | Sector 2(BL) | 3662 | |
| | Sector 3(BL) | 3661 | |
| | Sector 4(BL) | 3664 | |
| | Sector 5(BL) | 3666 | |
| | Sector 6(MN) | 3667 | |
| | Sector 9(MN) | 3663 | |
| | Sector 10(MN) | 3668 | |
| | Sector 11(PH) | 3665 | |
| | Sector 12(PH) | 3669 | |
| | Sector 13(PH) | 3680 | |
| | Sector 14(PH) | 3682 | |
| | Sector 15(PH) | 3683 | |
| | RCC MN | 3674 | |
| | SBTT (Tabatinga) | 3671 | |
| | NCC Manaus - Número Operacional | 3612 | |

| | | | |
|---|---|---|---|
| ADMIN | **USER** | **REDDIG Telephone** | **Comments** |
| | DT (Jefe) | 3620 | |
| | TEL (Jefe) | 3621 | |
| | Sala Técnica (Jefe) | 3622 | |
| | NCC Manaus -Técnico 24Horas | 3601/3602 | |
| | Administrador REDDIG Tel: 55-92-3652 5714 | 3611 | |

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2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SBRF** | **City:** | **Recife - BRASIL** | |
| | Address: | Av. Centenario Santos Dumont, s/n, Ibura, Recife-PE. CEP 51250-020 | | | |
| | Telephone: | 5581 2129 8376 | | | |
| | Fax: | 5581 2129 8116 | | | |
| | E-mail: | carlosefpaes@gmail.com | | | |
| | Administrative Network Telephone: | 3801 / 388376 / 388399 / 388166 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Cap. Carlos Paes | Jefe Enlaces | 388180 | 5581 2129 8180 | 55-81-997001049 |
| | | | 388376 | 5581 2129 8376 | |
| | | | 388376 | 5581 2129 8376 | |
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| ATS | **USER** | **REDDIG Telephone** | **Comments** |
|---|---|---|---|
| | Supervisor Recife | 3860 | Recife |
| | Asistente Sector 1 | 3851 | Recife |
| | Asistente Sector 2 | 3852 | Recife |
| | Asistente Sector 3 | 3853 | Recife |
| | Asistente Sector 4 | 3854 | Recife |
| | Asistente Sector 5 | 3855 | Recife |
| | Asistente Sector 6 | 3856 | Recife |
| | Asistente Sector 7 | 3857 | Recife |
| | Control Sector 1 | 3871 | Recife |
| | Control Sector 2 | 3872 | Recife |
| | Control Sector 3 | 3873 | Recife |
| | Control Sector 4 | 3874 | Recife |
| | Control Sector 5 | 3875 | Recife |
| | Control Sector 6 | 3876 | Recife |
| | Control Sector 7 | 3877 | Recife |
| | Atlantico ACC - Control 1 | 3878 | Recife |
| | Atlantico ACC - Control 2 | 3879 | Recife |

| ADMIN | **USER** | **REDDIG Telephone** | **Comments** |
|---|---|---|---|
| | DECEA Director General | 306200 | RJ |
| | DECEA Sub-Departamento de Operaciones (SDOP) | 306241 | RJ |
| | DECEA Sub-Departamento de Logística (SDLO) | 306205 | RJ |
| | CECATI | 306250 | RJ |
| | CERNAI | 306200 | RJ |
| | División CNS | 306267 | RJ |
| | División ATM | 306273 | RJ |
| | División de Telecomunicaciones | 306220 | RJ |
| | CINDACTA 1 (Brasilia) Supervisor AFTN CCAM-BR | 308377 | Brasilia |
| | CINDACTA 3 (Recife) Mantenimiento 1 | 3801 | Recife |
| | CINDACTA 3 (Recife) Mantenimiento 2 | 388166 / 388376 | Recife |
| | | 388399 | |

Notes 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SKED** | **City:** | **Bogotá - COLOMBIA** | |
| | Address: | Aeropuerto Internacional El Dorado, Centro Nacional de Aeronavegación | | | |
| | Telephone: | 571 2962062 / 571 2962272 / 571 2962237 | | | |
| | Fax: | 571 2962749 | | | |
| | E-mail: | csua@aerocivil.gov.co luis.lozanos@aerocivil.gov.co | | | |
| | Administrative Network Telephone: | 4501 / 4502/ 45258 | | | |
| | | | | | |
| | **Technical Personell:** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Ciro Sua | Técnico Aeronáutico | 4501 / 45258 | | 57 3142043758 |
| | Luis Lozano | Técnico Aeronáutico | 4501 / 45258 | | |
| | Gonzalo Meléndez | Técnico Aeronáutico | 4501 / 45258 | | |
| | | | | | |

| ATS | USER | REDDIG Telephone | Comments |
|---|---|---|---|
| | ACC SWP Bogotá (SKBO) | 4545 | |
| | ACC NWP Bogotá (SKBO) | 4550 | |
| | ACC NEP Bogotá (SKBO) | 4551 | |
| | ACC SWP Bogotá (SKBO) | 4552 | |
| | ACC SER Bogotá (SKBO) | 4553 | |
| | ACC Supervisor Bogotá (SKBO) | 4560 | |
| | ACC Barranquilla (SKEC) | 4531 | |
| | ACC Sector Sur Barranquilla (SKEC) | 4554 | |
| | ACC Centro de Información de Vuelo Barranquilla (SKEC) | 4555 | |
| | ACC Supervisor Barranquilla (SKEC) | 4556 | |
| | TWR Pasto ( SKAN ) | 4518 | |
| | ACC Cali ( SKCL ) | 4541 | |
| | TWR Leticia ( SKLT ) | 4546 | Ext 5785924562 |
| | APP Cucuta ( SKCC ) | 4557 | |

| ADMIN | USER | REDDIG Telephone | Comments |
|---|---|---|---|
| | Dirección General Aerocivil | 45122 | |
| | Subdirector General | 45299 | |
| | Secretario Técnico | 45260 | |
| | Director de Telecomunicaciones | 45277 | |
| | Director SKED | 45277 | |
| | Técnico Mantenimiento REDDIG | 4501 / 4502 | |
| | Técnico Mantenimiento REDDIG | 45258 | |
| | Técnico Planta HARRIS (Técnico grupo teléfonos) | 4590 | |
| | Técnico Planta HARRIS (Técnico grupo teléfonos) | 45200 | |
| | Comunicaciones AFTN (Operador) | 45268 / 4503 | |
| | Técnico BOGOTA (Técnico grupo comunicaciones) | 45281 | |

Notes 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SCEL** | **City:** | **Santiago - CHILE** | |
| | Address: | San Pablo N° 8411 , Pudahuel, Santiago, Chile | | | |
| | Telephone: | 562 6448345 | Estación SCEL en Centro de Control : 562 8364007 | | |
| | Fax: | | | | |
| | E-mail: | cvergara@dgac.gob.cl<br>ppastrian@dgac.gob.cl | | | |
| | Administrative Network Telephone: | 404006 / 404007 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Christian Vergara | Pto. Focal REDDIG | **404005** | 562 6448345 | 569 888 6452 |
| | Pedro Pastrian | Pto. Focal REDDIG | **404011** | 562 6448345 | 569 083 3739 |

| ATS | USER | REDDIG Telephon | Comments |
|---|---|---|---|
| | San Pablo ACC 1 (Ruta Norte) | 4057 / 4058 | |
| | San Pablo ACC 2 (Sector Norte) | 4050 | |
| | San Pablo ACC 4 (APP Terminal) | 4051 | |
| | San Pablo ACC 5 (Salidas Terminal) | 4052 | |
| | San Pablo ACC 6 (Terminal Sur) | 4051 | |
| | San Pablo ACC 7 (Sector VFR) | 4053 | |
| | San Pablo ACC 8 (Ruta Sur) | 4059 | |
| | San Pablo Supervisor ACCS | 4060 | |
| | Aeródromo Teniente Rodolfo Marsh | 4039 | |
| | San Pablo Mantenimiento ACCS - REDDIG | 4044 | |
| | CCAM | 4036 | |
| | Arica APP | 4040 | |
| | Iquique APP | 4046 | |
| | Iquique ACC SECTOR A | 4028 | 56 57 2418217 |
| | Iquique ACC SECTOR B | 4029 | 56 57 2461327 |
| | Antofagasta APP | 4030 | |
| | Puerto Montt SCTE | 4032 | |
| | Punta Arenas SCCI | 4033 | |
| | Puerto Williams APP | 4049 | |
| | Centro Oceanico - ACCO | 4045 | |
| | | 4055 | |

| ADMIN | USER | REDDIG Telephon | Comments |
|---|---|---|---|
| | Dirección General Aeronáutica Civil | 402500 | EAC |
| | Secretario General | 402504 | EAC |
| | Director Logístico y Telecomunicaciones | 402418 | EAC |
| | Subdirector de Telecomunicaciones | 402415 | EAC |
| | Director de Meteorología | 403340 | EAC |
| | Departamento de Planificacion, Seccion RAI | 402443 | EAC |
| | Director TIC, Jefe de Proyecto REDDIG | 402878 | EAC |
| | ACC Iquique | 401321 | IQUIQUE |
| | ACC Iquique | 401322 | IQUIQUE |
| | Jefe Centro de Control (ACCS) | 404016 | ACCS Sn. Pablo |
| | Supervisor ACCS | 404019 | ACCS Sn. Pablo |
| | Operaciones ACCS | 404018 | ACCS Sn. Pablo |
| | Entrenamiento ACCS | 404020 | ACCS Sn. Pablo |
| | Aeródromo Teniente Rodolfo Marsh | 405707 | Antartica |
| | Comunicaciones AFTN, Supervisores | 404029 | ACCS Sn. Pablo |
| | | 404030 | ACCS Sn. Pablo |
| | Banco de Datos NOTAMs (NOF Internacional) | 404033 | ACCS Sn. Pablo |

Notes 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

3. Edificio Aeronáutico Central, Miguel Claro 1314, Santiago

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SEGU** | **City:** | **Guayaquil - ECUADOR** | |
| | Address: | Aeropuerto Internacional Simón Bolivar, Av. de las Américas, Guayaquil | | | |
| | Telephone: | 5934 269 2829 / 5934 2287236 | | | |
| | Fax: | 5934 2692829 | | | |
| | E-mail: | ravellan1@yahoo.com | | | |
| | Administrative Network Telephone: | 502308 / 502309 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Raúl Avellán, Jefe Area | Jefe Comunic. Satelitales | 502309 | 5934 269 2829 | |
| | Washington Aguilar | Sec. Comunic. Satelitales | 502308 | 5934 269 2829 | |
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| ATS | USER | REDDIG Telephone | Comments |
|---|---|---|---|
| | ACC 1 | 5051 | |
| | ACC2 | 5053 | |
| | APP | 5052 | |
| | ACC SPV | 5060 | |
| | ACC (Con COCESNA) | 5071 | Interconexión |
| | | | |
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| ADMIN | USER | REDDIG Telephone | Comments |
|---|---|---|---|
| | Técnico REDDIG | 502308 | |
| | Jefatura Comunicaciones Satelitales | 502309 | |
| | Técnico Electrónico de Telecomunicaciones | 502121 | |
| | | | |
| | Comunicaciones (Centro Mensajes) QUITO | 502357 | QUITO |

Notes 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SOCA** | **City:** | **Cayena - GUYANA FRANCESA** | |
| | Address: | Aviation Civile, Aeroport de Rochambeau, 97351 Matoury, Guyane Francaise | | | |
| | Telephone: | 594 594 359317 (Sala Técnica) - 594 594 359321 (Estación Antena) | | | |
| | Fax: | 594 594 356166 | | | |
| | E-mail: | cayenne.ttd@aviation-civile.gouv.fr | | | |
| | Administrative Network Telephone: | 9201 | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Emmanuel RHONE | | | | |
| | Alain Burtin | | 9201 | 594,594,359,317 | |
| | Serge | | 9201 | | 594 694273437 |
| | Jean-François | | 9201 | | 594,694,465,059 |
| | Philippe | | 9201 | | 594 694155978 |

| ATS | USER | | REDDIG Telephone | Comments |
|---|---|---|---|---|
| | ACC | | 9254 | |
| | ACC | | 9255 | |
| | ACC | Hotline | 9251 | >>> PIARCO |
| | ACC | Hotline | 9253 | >>> MANAUS |
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| ADMIN | USER | REDDIG Telephone | Comments |
|---|---|---|---|
| | Sala Técnica, Manteniniento 1 | 9201 | |
| | Estación REDDIG Antena, Mantenimiento 2 | 9202 | |
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Notes 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SYGC** | **City:** | **Georgetown - GUYANA** | |
| | Address: | Control Tower complex, Cheddi Jagan Int'l Airport, Timehri, East Bank Demerara, Guyana | | | |
| | Telephone: | 592 261 2569 | | | |
| | Fax: | 592 261 2279 | | | |
| | E-mail: | mbsalisbury2000@yahoo.com | | | |
| | Administrative Network Telephone: | 9001 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Mortimer Salisbury | | 9001 | 592 261 2569 | |
| | | | 9001 | 592 261 2569 | |
| | | | 9001 | 593 261 2569 | |
| | | | 9001 | 594 261 2569 | |

| ATS | USER | REDDIG Telephon | Comments |
|---|---|---|---|
| | ATS - ACC | 9051 | |
| | ATS - FIS | 9053 | |
| | ATS - Supervisor | 9060 | |
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| ADMIN | USER | REDDIG Telephon | Comments |
|---|---|---|---|
| | Mantenimiento Técnico | 9001 | |
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Notes 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SGAS** | **City:** | **Asunción - PARAGUAY** | |
| | Address: | Aeropuerto Internacional Silvio Pettirossi, Luque, Paraguay | | | |
| | Telephone: | 595 21 7585208 / 201 / 205 | | | |
| | Fax: | | | | |
| | E-mail: | moranchu@gmail.com aldopereira26@gmail.com | | | |
| | Administrative Network Telephones | 5501, 55100 | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Victor Morán | Jefe Dpto. COM | 5501 / 55100 | 595 21 7585208 | 595961764376 |
| | Aldo Pereira | Jefe Sección Radiocom. | 5501 / 55100 | 595 21 7585208 | 595985890679 |
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| ATS | **USER** | **REDDIG Telephone** | **Comments** |
|---|---|---|---|
| | ACC | 5551 | |
| | ACC | 5541 | (hotline con Curitiba) |
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| ADMIN | **USER** | **REDDIG Telephone** | **Comments** |
|---|---|---|---|
| | Oficina Técnica de Mantenimiento | 5501 / 55100 | |
| | Jefatura de Control de Area ACC | 55101 | |
| | Sala de Control de Area ACC | 55102 | |
| | Oficina de la Gerencia de Telecomunicaciones y Electrónica - GTE | 55103 | |
| | Oficina de la Gerencia de Tránsito Aéreo - GTA | 55104 | |
| | Secretaría Técnica GTE/GTA | 55105 | |
| | Centro de Control de Aproximación ASU-APP | 55106 | |
| | Torre de Control y Servicio de Rodaje ASU | 55107 | |
| | Centro de Control Automático de Mensaje - CCAM | 55108 | |
| | Oficina del Servicio Móvil Aeronáutico - SMA | 55109 | |
| | Oficina del Servicio Meteorológico - MET | 55110 | |
| | Oficina de Notificación de los Servicios de Tránsito Aéreo - ARO | 55111 | |
| | Aeropuerto Int'l Guaraní, Minga Guasú, Alto Paraná | 55113 | |
| | Aeropuerto Int'l Dr. Luis M. Argaña, Mcal. Estigarribia, Chaco Paraguayo | 55114 | |
| | Centro de Investigación de Accidentes | 55115 | |

Notes:
1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )
2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SPIM** | **City:** | **Lima - PERU** | |
| | Address: | Aeropuerto Internacional Jorge Chávez, Callao, Perú | | | |
| | Telephone: | 511 5153015 / 511 4141250 | | | |
| | Fax: | 511 5153015 | | | |
| | E-mail: | reddig@corpac.gob.pe ; lsilva@corpac.gob.pe | | | |
| | Administrative Network Telephone: | 6001 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Public Network Telephone 2** |
| | | | ADM | | |
| | Simeón Velásquez | Técnico | 6001 | 511 5153015 | 511 4141250 |
| | Ricardo Arteaga | Técnico | 6001 | 511 5153015 | 511 4141250 |
| | Andrés Arango | Técnico | 6001 | 511 5153015 | 511 4141250 |
| | Moises Canicela | Técnico | 6001 | 511 5153015 | 511 4141250 |
| | Mario Kuan | Técnico AMHS | 6040 (ATS) | 511 6261214 | |
| | Jeme Arteaga | Técnico AMHS | 6040 (ATS) | 511 6261214 | |
| | R. Peralta/H. Peñaranda | Sala VSAT | 6014 (ATS) | | |

| ATS | USER | REDDIG Telephone | Comments |
|---|---|---|---|
| | Hot Line con Santiago | 6002 | |
| | Hot Line con Bogotá | 6003 | |
| | Hot Line con Guayaquil | 6004 | |
| | Hot Line con La Paz | 6005 | |
| | ACC-SUR Asistente | 6051 | |
| | ACC-NE Asistente | 6052 | |
| | ACC-NORTE Asistente | 6053 | |
| | Nuevo ACC-NORTE Ejecutivo | 6034 | Nuevo ACC-Lima |
| | Nuevo ACC-NORTE Planificador | 6035 | Nuevo ACC-Lima |
| | Nuevo ACC-SUR Ejecutivo | 6036 | Nuevo ACC-Lima |
| | Nuevo ACC-SUR Planificador | 6037 | Nuevo ACC-Lima |
| | Nuevo ACC-NOR ESTE Ejecutivo | 6038 | Nuevo ACC-Lima |
| | Nuevo ACC-NOR ESTE Planificador | 6039 | Nuevo ACC-Lima |
| | Supervisor 1 (ACC) | 6060 | |
| | Tacna TWR | 6024 | |
| | CCAM AFTN (Supervisor) | 6078 | |
| | Técnico AFTN | 6040 | |
| | Tecnico ATS | 6044 | |

| ADMIN | USER | REDDIG Telephone | Comments |
|---|---|---|---|
| | Técnico REDDIG | 6001 | |
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Notes 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| | | | | | |
|---|---|---|---|---|---|
| NODE INFORMATION | **Node:** | **SMPM** | **City:** | **Paramaribo - SURINAME** | |
| | Address: | J. A. Pengel International Airport Zanderij, District Para | | | |
| | Telephone: | 597 325123 | | | |
| | Fax: | 597 498901 | | | |
| | E-mail: | Mitchell Themen mickiano@live.com | | | |
| | Administrative Network Telephone: | 9401 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Mitchell Themen | | 9401 | 597 325123 | |
| | | | 9401 | 597 325172 | |
| | | | 9401 | 597 497143 | |
| | | | | | |
| | | | | | |
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| ATS | **USER** | | | **REDDIG Telephone** | **Comments** |
| | ACC | | | 9451 | |
| | APP | | | 9452 | |
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| ADMIN | **USER** | | | **REDDIG Telephone** | **Comments** |
| | Technical Maintenance | | | 9401 | |
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Notes 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SUMU** | **City:** | **Montevideo - URUGUAY** | |
| | Address: | Aeropuerto Internacional de Carrasco | | | |
| | Telephone: | 5982 6040408 / 5982 6010932 INT. 4520 | | | |
| | Fax: | 5982 6040408 / 5982 6010932 INT. 4501 | | | |
| | E-mail: | miguelvera@vera.com.uy ; wiledda@hotmail.com | | | |
| | Administrative Network Telephone: | 5982 6040408 / 5982 6010932 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Wilson Pelayo | Director Div. Com. | 6501 | 5982 6826224 | 5982 99694790 |
| | Miguel Vera | Responsable REDDIG | 6501 | 5982 2093859 | 5982 99680521 |
| | | | | | |
| | | | | | |

| ATS | USER | REDDIG Telephon | Comments |
|---|---|---|---|
| | ATS ACC | 6551 | |
| | ATS APP | 6552 | |
| | | | |
| | APP Colonia | 6550 | |
| | | | |
| | | | |

| ADMIN | USER | REDDIG Telephon | Comments |
|---|---|---|---|
| | **Dial 6541 to contact the operator and request the following numbers** | | |
| | Recepción - Edificio Centro de Control | 6541 | NO USAR |
| | Director de Circulación Aérea | 5102 | |
| | Jefe del Departamento Operativo de Tránsito Aéreo | 5105 | |
| | Director de la División de Telecomunicaciones (AFTN) | 5107 | |
| | Jefe del Departamento Técnico de Tránsito Aéreo | 5109 | |
| | Director de la División Comunicaciones / Wilson Pelayo | 4519 | |
| | Sala de Control Radar ACC y APP Carrasco | 5119 | |
| | Torre de Control | 5250 | |
| | Sala de CXK AFTN | 5123 | |
| | Sala Técnica REDDIG 2 6501 | 5124 | |
| | Area Técnica Comunicaciones / Miguel Vera | 4517 | |
| | | | |
| | D.G.A.C. Central General : 5982 6040408 / 5982 6010932 | | |

Notes: 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| INFORMATION NODE | | | | | |
|---|---|---|---|---|---|
| | **Node:** | **SVMI** | **City:** | **Maiquetía - VENEZUELA** | |
| | Address: | Edificio ATC, 2do Piso, Depto de Comunic., Maiquetía, Edo. Vargas, Venezuela | | | |
| | Telephone: | 58212 3552143 / 58212 3551412 | | | |
| | Fax: | 58212 3551412 | | | |
| | E-mail: | v.fiore@inac.gob.ve | | | |
| | Administrative Network Telephone: | 8001 | | | |
| | | | | | |
| | **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** |
| | Vicente Fiore | Jefe Reg. MIQ | 8001 | 58212 3551412 | 4127080132 |
| | | | 8001 | | |
| | | | 8001 | | |
| | | | 8001 | | |
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| ATS | USER | REDDIG Telephone | Comments |
|---|---|---|---|
| | RCC - TODOS | 8051 | |
| | ACC 5 - ATS-W | 8053 | |
| | ACC 3 - ATS-W | 8053 | |
| | ACC 4 - ATS-E | 8044 | |
| | ACC 6 - ATS-E | 8044 | |
| | | | |
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| ADMIN | USER | REDDIG Telephone | Comments |
|---|---|---|---|
| | Mantenimiento REDDIG | 8001 | |
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| | | | |

Notes 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

| NODE INFORMATION | | | | | |
|---|---|---|---|---|---|
| **Node:** | **TTZP** | | **City:** | **Piarco -TRINIDAD & TOBAGO** | |
| Address: | | | | | |
| Telephone: | 1-868-669-1859 | | | | |
| Fax: | | | | | |
| E-mail: | rbaboolal@gmail.com | | | | |
| Administrative Network Telephone: | 9101 - Maintenance; 9140 - DGCA | | | | |
| | | | | | |
| **Technical Personnel** | **Job Title** | **REDDIG Telephone** | **Public Network Telephone** | **Mobile Number** | |
| Rupnarine Baboolal | | | 1-868 6694706 | 1-868-774-4249 | |
| Steve Saroop | | | 1-868 6694706 | 1-868-754-9343 | |
| Shiraz Gopaul | | | 1-868 6694706 | 1-868-4679717 | |
| | | | | | |

| ATS | **USER** | | **REDDIG Telephone** | **Comments** |
|---|---|---|---|---|
| | ACC-1 | ATSd(Hot Line) | | >>> Maiquetia |
| | ACC-2 | ATSd(Hot Line) | | >>> Georgetown |
| | ACC-3 | ATSd(Hot Line) | | >>> Cayenne |
| | ACC-4 | ATSd(Hot Line) | | >>> Paramaribo |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| ADMIN | **USER** | **REDDIG Telephone** | **Comments** |
|---|---|---|---|
| | Maintenance | 9101 | |
| | | | |
| | DGCA Office | 9140 | |
| | | | |
| | | | |

Notes 1. For ATS, dial the corresponding output enable prefix of the calling node 57072 - 2- 7 xxxx ( This if you are not calling from an ATS phone )

2. For ADMIN, dial the corresponding output enable prefix of the calling node 57062 - 7 xxxxxx (The number of digits needed)

# REDDIG II

General procedure sent by INEO to perform the backup task of the server´s disk

# REDDIG 2

## NT 2022 30039942 Ind B - HDD backup for REDDIG-II NMS

Technical note to all REDDIG-II Focal Points

# Revision Follow-up

| | | |
|---|---|---|
| Rev A | Document creation | 23/01/2017 |
| Rev B | § 3.1 Update (Save the current Cisco configuration) | 21/03/2017 |
| | | |
| | | |
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| | | |
| | | |
| | | |

# SUMMARY

# 1. PURPOSE OF THE DOCUMENT

REDDIG II NMS is using two HDD in redundancy
(RAID 1 - https://en.wikipedia.org/wiki/RAID - data mirroring).
In order to keep a backup disk of the current situation, here is a global procedure in order to back up the NMS on a new HDD.

# 2. REFERENCES

REDDIG-II Project - Contract N° 22501200

# 3. PROCEDURE STEPS

## 3.1 STEP 1: SAVE THE CURRENT CISCO CONFIGURATION

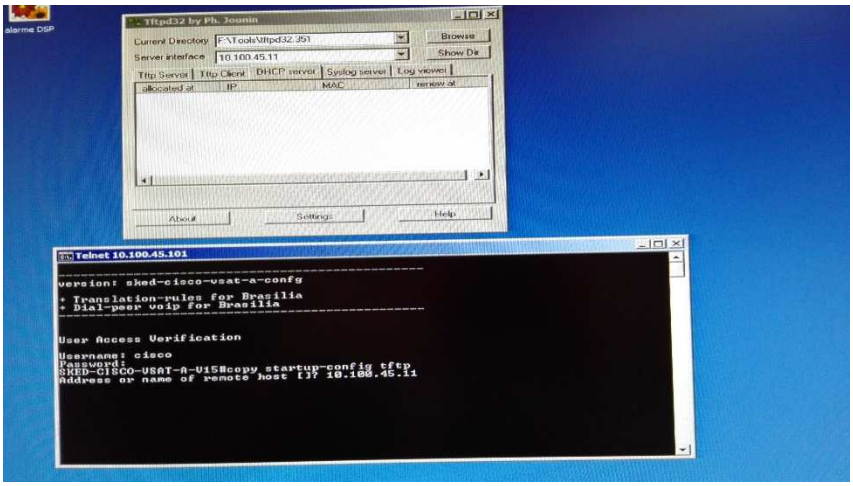
Save the current Cisco configurations on the local disk, so that the backup will include these Cisco configurations.

The IP addresses of the Ciscos are:

- Cisco VSAT A : 10.100.XX.101
- Cisco VSAT B : 10.100.XX.102
- Cisco GBB : 10.100.XX.121

where XX is your current station code.

- Open the App Tftpd32 and the Cmd window



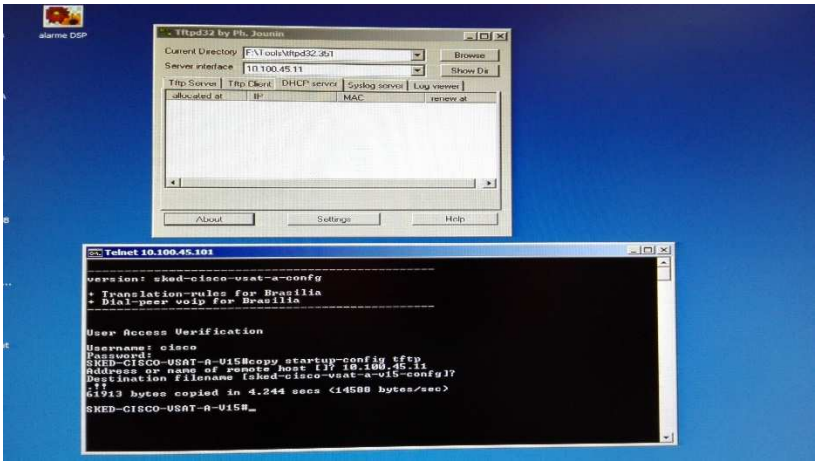

On the Tftpd32 window, check for the current directory where the configuration files will be saved.

- Telnet the Ciscos, respectively: 10.100.XX.101, 102, 121
  - Username : cisco
  - Password : *there is no password , so press enter.*

- Type : *copy startup-config tftp*

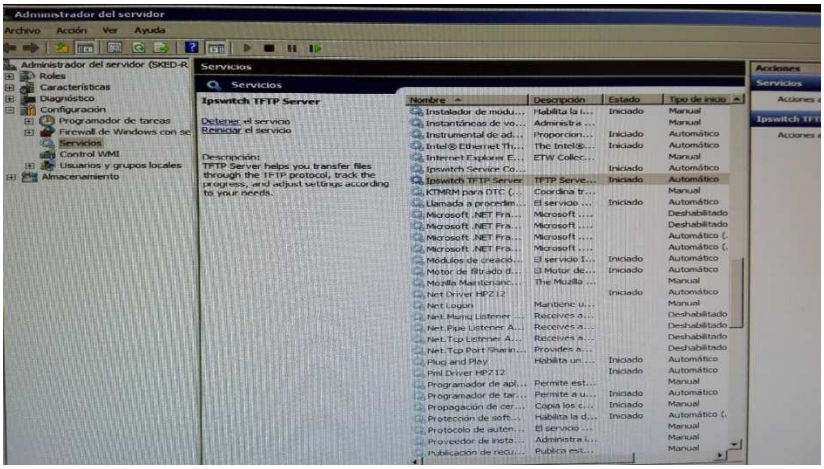
- At prompt Address or name of remote host [ ], type the *Remote host IP address 10.100.XX.11*

  You will be asked for the destination filename: *just press enter*



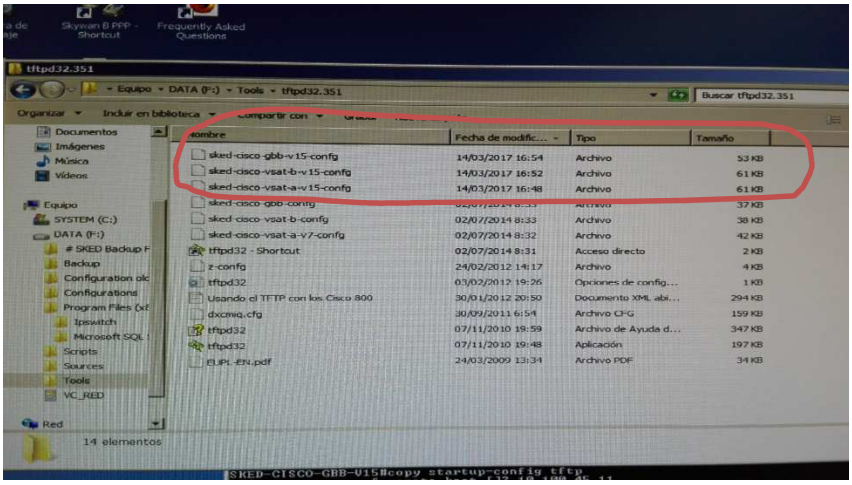

If everything is fine, the configuration file is saved to the directory you've selected (here F:\Tools\tftpd32 )

- In case there is an error while saving the config file, you may go to the Services configuration and stop the service for "Ipswitch TFTP server". The reason is because Ipswitch is using the same TFTP port than the app. Tftpd32 and the transfer of the config. file cannot be done.




- Resume Step1→ Close telnet and Tftpd32 windows and start the process again.

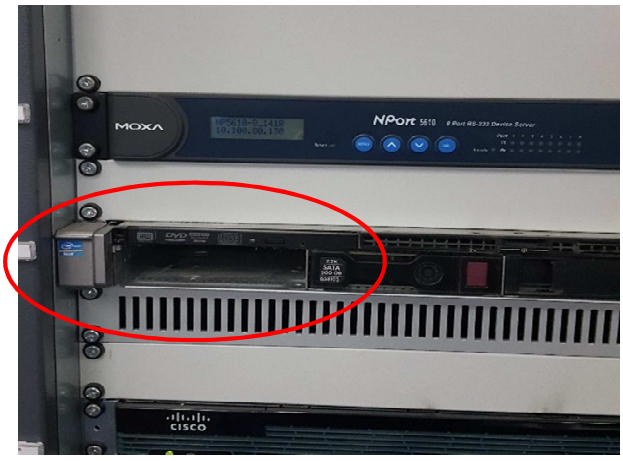
- Once you end the configuration backup, check for the files and save them where you want, and remember it.



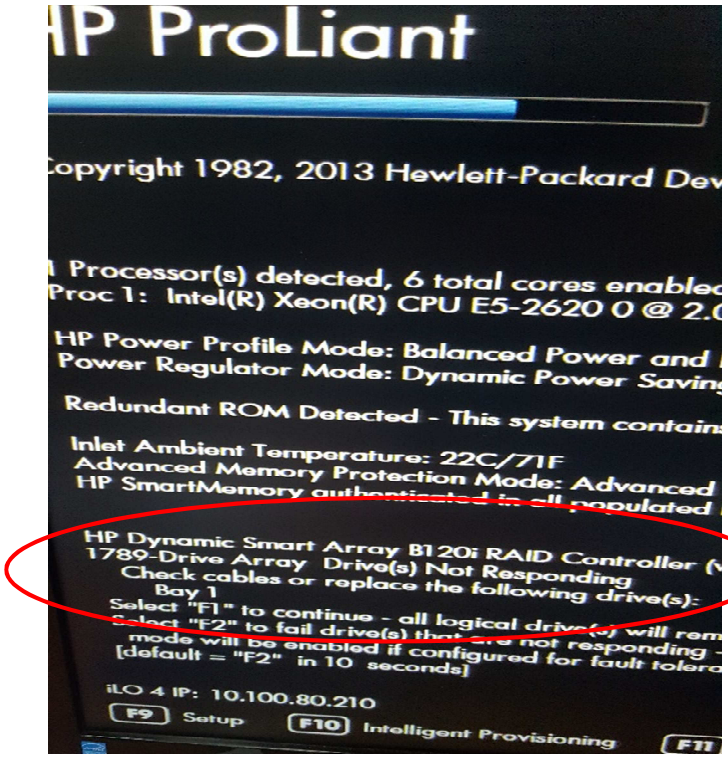

- Restart the Ipswitch TFTP server, so that the NMS (What´s Up Gold ) can run normally.

## 3.2 STEP 2: TEST THE CURRENT HDD

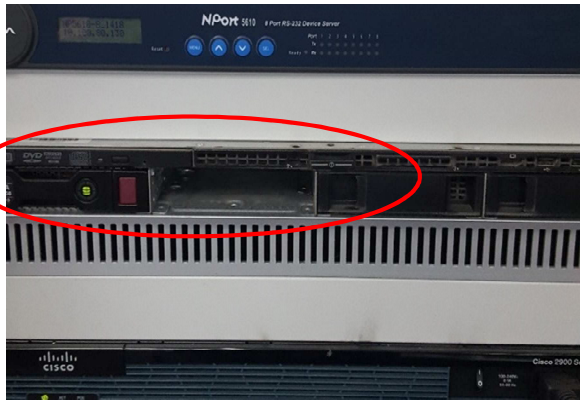
- Shutdown the NMS.
- Remove the disk 1, located on the left side of the server (take a moment to clean the space and disk from dust):



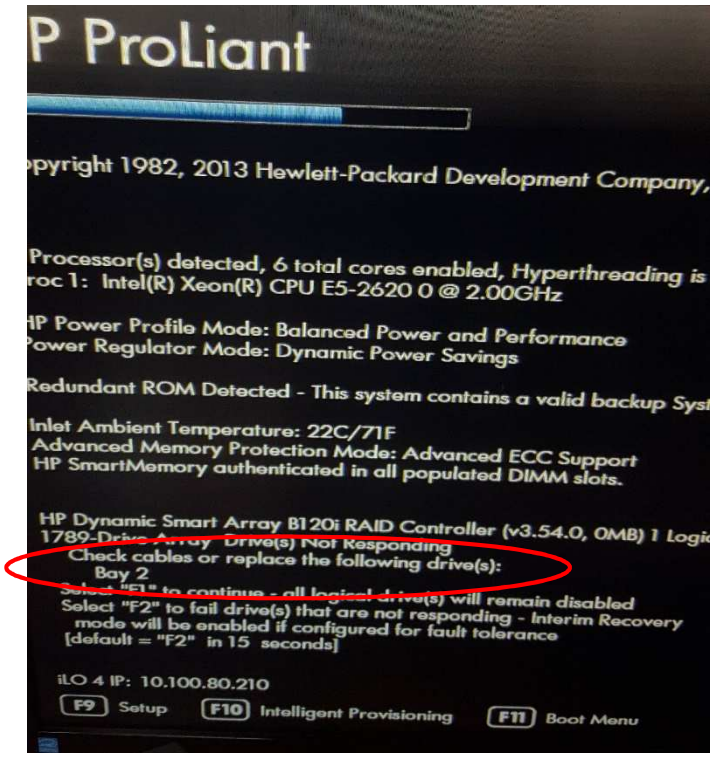
- Start the NMS. Before Windows initialization, you will see the following screen informing of the removal:




- Press **F2** or either wait.
- Once Windows is operational, check that What'sUpGold initiates correctly.
- Shutdown the NMS.
- Remove disk 2, re-insert disk 1.



- Start the NMS. Before Windows initialization, you will see the following screen informing of the removal:

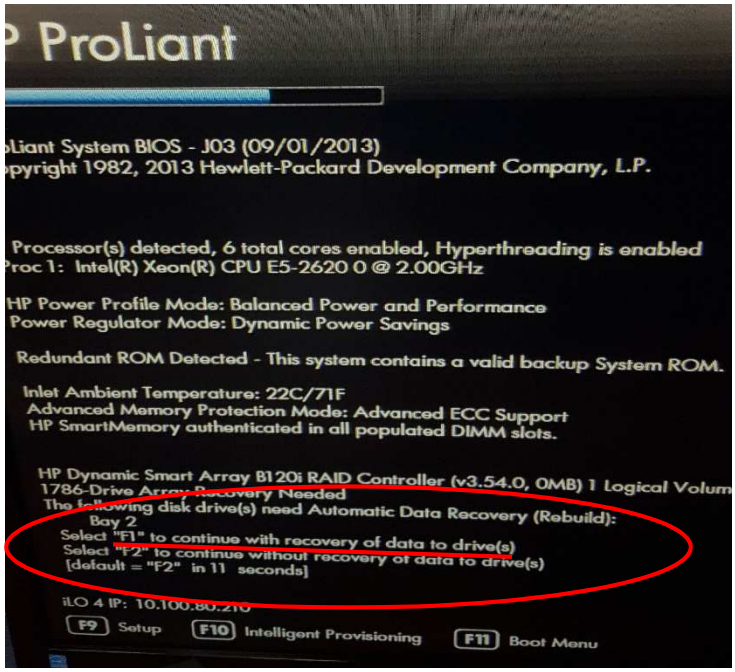



- Press F2 or either wait.
- Once Windows is operational, check that What'sUpGold initiates correctly.
- Shutdown the NMS.

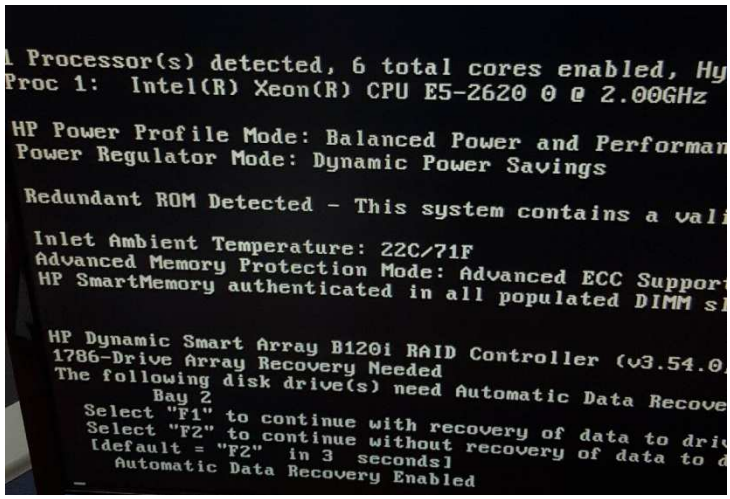
**Both NMS HDD are checked and operational.**

## 3.3 STEP 3: BACKUP COPY

- Insert the new HDD (empty) in bay 2.
- Start the NMS.
- The following message appears:




- Press **F1** this time.
- The following screen appears:




- Press **F1.**
- Once Windows initiates, **wait at least for two (2) hours** to be sure that the full data has been copied.

## 3.4 STEP 4: TEST THE HDD

- Shutdown the NMS.
- Remove disk 1 so that the NMS remains only on the backup HDD (now called disk 3).
- Start the NMS and check correct operation.
- Shutdown the NMS, re-insert disk 1 and either exchange disk 3 for disk 2, or remain on the disk 3 and store disk 2.

## *3.5* STEP 5: *"HOUSTON WE'VE GOT A PROBLEM"*

If the NMS is down due a system crash and/or both disk are corrupted, as a result, if the only recovery possibility is using the backup disk, then follow these instructions:

- Shutdown the server.
- Remove both HDD on arrays 1 and 2.
- Insert the stored HDD.
- Start the NMS on the stored disk.
- Both removed disk should be erased before been copied again, for new backup.

➔ To prevent any configuration mismatch or manipulation error, please, issue a RMA from INEO-ES, in order to get the proper advice (Disk erase procedure or Disk replacement).

**Clement CHEVALLIER**

Technical project manager

**Agenda Item 3: Analysis of the security in the REDDIG and its recommendations**

3.1 Under this agenda item, general aspects related to security in REDDIG were addressed such as updating the anti-virus software of the servers, classification and analysis of the 'threats' and respective recommendations. Likewise, it was informed about the teleconference on Security Analysis in the REDIGG held on May 5, 2017 and its results.

***Anti-virus software on NMS servers***

3.2 It was informed about the need and importance of updating the anti-virus software on the servers, and that INEO will be asked to renew the license. Once obtaining the license, a procedure will be sent including the file transfer, for updating the antivirus and the database. The update will be monthly.

3.3 The general procedure for updating was mentioned during the meeting and is presented as **Appendix A** to this part of the Report. On this issue, emphasis was placed on the steps to follow and the importance of respecting this procedure.

3.4 It was established that previously the external devices that are to be connected to the servers of the network must be scanned previously.

***"Passwords" in the REDDIG***

3.5 It was informed about the "Passwords" of the equipment and applications of the network for the current situation, during the warranty period and after the same. This information is presented as **Appendix B** to this part of the Report.

***Classification and analysis of the "threats"***

3.6 In this regard, it was mentioned that the 'threats' or risks are classified into two groups, internal and external to REDDIG, indicating the following:

**a) Internal Level**

In this regard, the potential risk factors to be taken into account and the respective recommendations to eliminate or minimize such factors were mentioned.

- Level 3 Network

Level 3 sent a letter confirming that it complies with standard RFC 5920 regarding the security of its service using MPLS technology.

- VPN access via Internet

It was reported that as of to date the company INEO has been using on a recurring basis the VPN accesses in Manaus, Ezeiza and Brasilia to correct network problems or to make updates on the equipment configurations and that it will continue to use these accesses until the final acceptance of the network. After this, the cables connected to the Internet will be removed on all VPN routers in the network and will be switched to on-demand mode (Internet cable will be connected when required). This mode will be applicable to

all VPN routers in the network. An instruction for configuring remote access via VPN is presented as **Appendix C** to this part of the Report.

- Human factor

It was recommended that no files are copied to/from the NMS server using a USB port, not before it has been verified (scanning with an anti-virus) that the pen drive is free of viruses.

As for the access password to the NMS servers, once the network is received, the REDDIG Administration will change the access password of all the servers in the network. In this way those responsible for the maintenance of the station will only have access to the equipment of its own station.

**b) External level**

- It was reported that this level refers mainly to users and their teams that connect to REDDIG. In this regard, it was highlighted the importance of implementing the standardization of the connection to REDDIG.

- Likewise, radio-frequency interferences that could occur at REDDIG stations, causing degradation or even annulment of aeronautical communications services, were also considered as a 'threat' to the operation and security of the network. In this respect it was recommended to be aware to any new installation of the public telecommunications operators in the vicinity of the REDDIG station and to have a close communication and coordination with the local authorities that administer the radio electric spectrum.

3.7 An introduction was made on how external and internal threats can be defined with the statistics provided by all REDDIG Nodes.

**Internal threats**

3.8 Work was done on the reports of the Ad-Hoc Group and the following were observed:

a) need to standardize the security equipment throughout the network;
b) prevent unauthorized external and internal intrusions;
c) address the lack of a border router in some nodes; and
d) management by the administrator of the REDDIG II of all firewalls (today subject to each State).

3.9 Regarding the modifications that can be made to the network, the Meeting was informed that the terms of the contract must be reviewed before any such action is taken.

3.10 In terms of the acquisition of firewall, it must comply with certain requirements (NAT, ACL, etc.), and create a plan of implementation by stages to avoid inconveniences.

3.11 It was also recommended; independent of the current REDDIG contract, to make a purchase of a redundant firewall from a recognized company specialized in the subject and to provide the necessary support. A General Analysis of the Security in the REDDIG is presented as **Appendix D** to this part of the Report.

3.12 In this regard, the Meeting adopted the following conclusion:

**Conclusion RTO/6-1 Purchase of redundant equipment (router/firewall/switch) to standardize connection and security in REDDIG**

That the REDDIG Administration submit a technical-economic study with the pertinent recommendations so that RCC/21 approves the purchase authorization of the redundant equipment (router / firewall / switch) for all REDDIG Nodes for its operation in 2018 and include them under the REDDIG Administration.

**External threats**

3.13 A presentation on external threats was made and a summary of the results obtained from the survey carried out on all Nodes of REDDIG with the most outstanding aspects was presented. The work of the ad hoc group is presented as **Appendix E** to this part of the report.

# Appendix A

## Update of the REDDIG Anti-virus Software

**1. Renewal of the product license**

The license is usually renewed for a period of one (1) year.

1.1 General Procedure

Once the "key file" (.key) is obtained from the supplier, which enables the renewal, the REDDIG Administration will transfer this file via 'Remote Desktop Connection' (RDC) to each of the REDDIG servers and proceed with the renewal of the license following the specific procedure.

**2. Updating the anti-virus database**

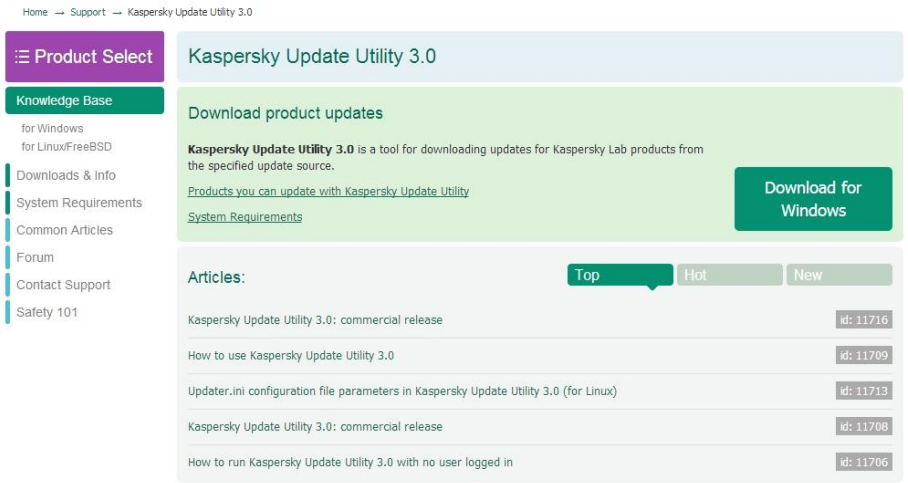
Because no REDDIG server is connected to the Internet, the update of the anti-virus database must be performed 'manually' on each of the servers in the network following the specific procedure.

2.1 Periodicity

The update will be monthly. If necessary, the period may be reduced.

2.2 General procedure

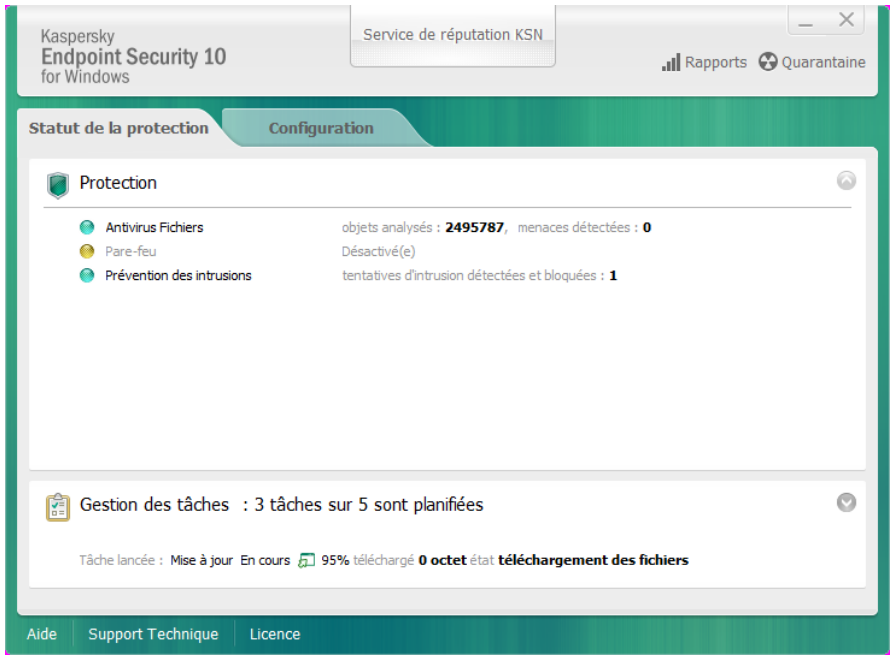
a) The REDDIG Administration will download the database from the Kaspersky Lab company web page using a utility program for this purpose. The size of the database is in the order of 400 to 450 Mbytes.

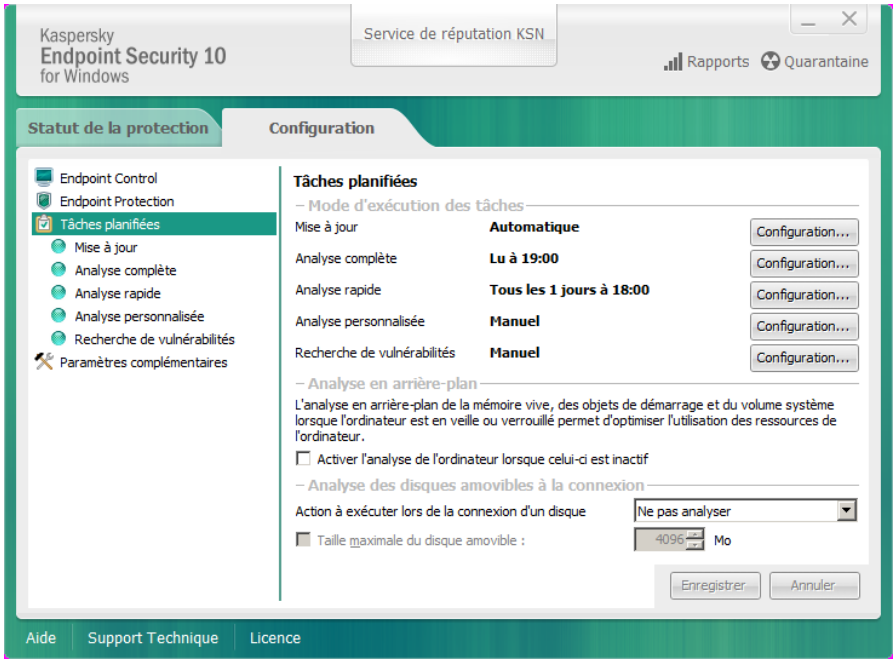


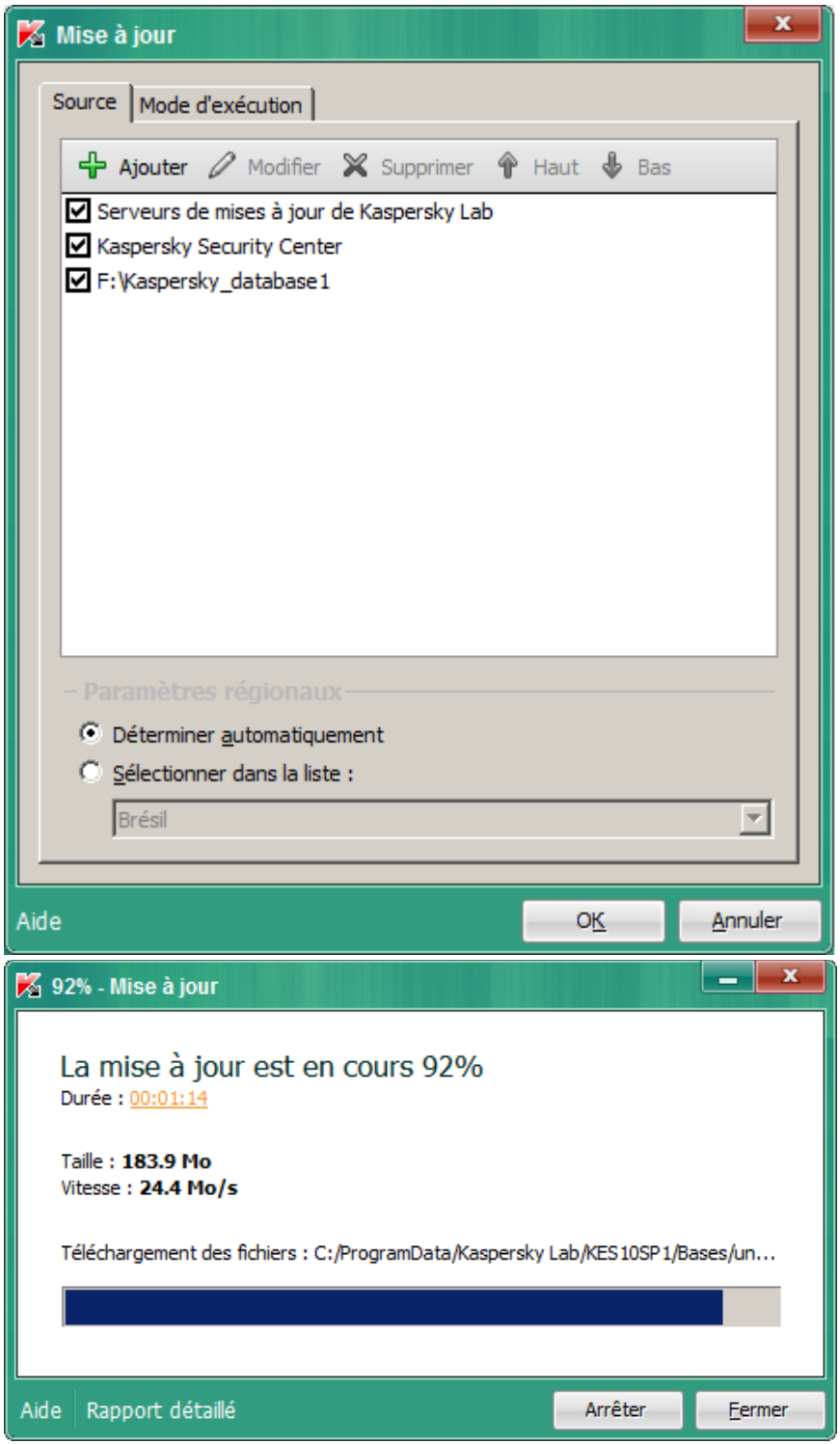

b) The REDDIG Administration will upload the "Updates" folder, containing the database, to a cloud storage server (OneDrive, Dropbox, Google Drive, Mega) and send by e-mail to the focal points of each station the link for that folder to be downloaded.

c) By using a USB device, previously scanned with an anti-virus program and preferably dedicated for this purpose, the "Updates" folder will be copied to the local server under the "Kaspersky_ database" folder previously created for the purpose of the update.

d) Once the previous step is completed, the REDDIG Administration will coordinate with the focal point or the designated manager for this activity, for the instruction with the specific procedure. Some samples as follow :






e) Only after updating the database, the last folder "Updates" should be renamed with the date the update was made, for example "Updates_17May2017". This is to avoid conflicts with the name of the folder of the next update which will always have the name of "Updates".

f) In order to avoid excessive storage of update folders, it is recommended to keep only the last two folders.

# Appendix B

## "Passwords" of the equipment and applications in REDDIG

### 1. Current situation

1.1 All the "passwords" for access and modification of the configurations of the equipment and applications of the REDDIG were established by the company INEO.

1.2 The REDDIG Administration (A\R) has been using these "passwords" for the operation and maintenance of the network since the signing of the PSAT.

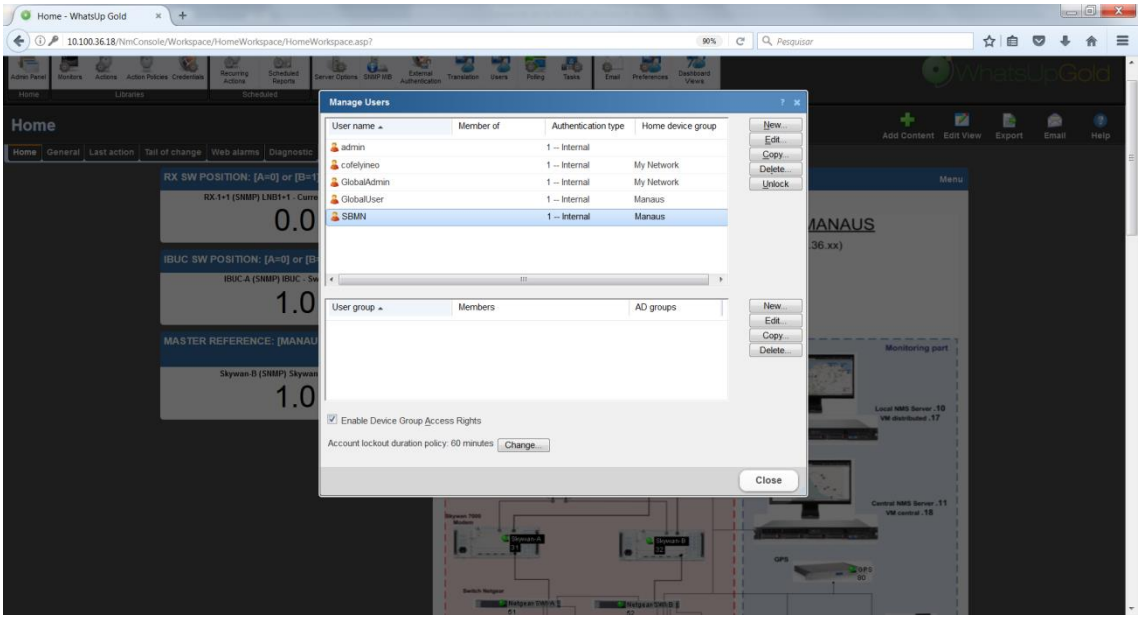
1.3 In the same way, the focal points or station managers have knowledge and diligent use of these same passwords to monitor the operation status of their respective stations.

### 2. During the warranty period (24 months)

2.1 According to the stipulated in the contract, once the final acceptance of the network called FNAT has been signed, the warranty period will begin for 24 months.

2.2 Throughout this period, the contractor, INEO, shall continue to use the current "passwords" in order to comply with the provisions of clause 16 of the contract related to the Network / Equipment Warranty.

2.3 Regarding the "WhatsUp Gold" (WUG) application, access to this application in each station will be through the local user account, for example in Manaus will be <SBMN> and will use the corresponding password that will be delivered by the A\R. For this purpose, in the local user window of each station, the A\R is adding the monitoring contents so that it is displayed in the same way as it is in the main user account.




The A\R will deliver to each station the corresponding 'name' and 'password' for this local user account.

**3. Posterior al período de garantía After the warranty period**

Upon expiration of the warranty period, the A\R will change the 'names' of the users and the 'passwords' of the network equipment and applications according to the following criteria:

- Station
  - Equipments: Station User
  - Servers: Admin User
    Local User

---

# Appendix C

## Instructive on the steps needed to proceed with the implementation of VPN access in REDDIG II nodes

1.1 In order to have remote access by the company Engie, the REDDIG administrator or the focal points in case the need to check the system status or develop any other changes, have a remote connection through A VPN Router.

1.2 To establish this connection, must have a line with access to Internet with a public IP exclusive for this (**see Annex A**). This is because the configuration of the Netgear VPN Router is made taking into account the following data :

- IP Address
- Subnet mask
- Default gateway

As an example, the Paraguay connection data is shown below. There is a 3Mbps Symmetric Internet line with fixed Public IP via optical fiber with the following data:

- IP Address: 190.128.179.186
- Mask: 255.255.255.252
- Gateway: 192.128.179.185

1.3 Procedure for VPN Connection to the REDDIG II

In the configuration panel, create a new VPN connection, type PPTP

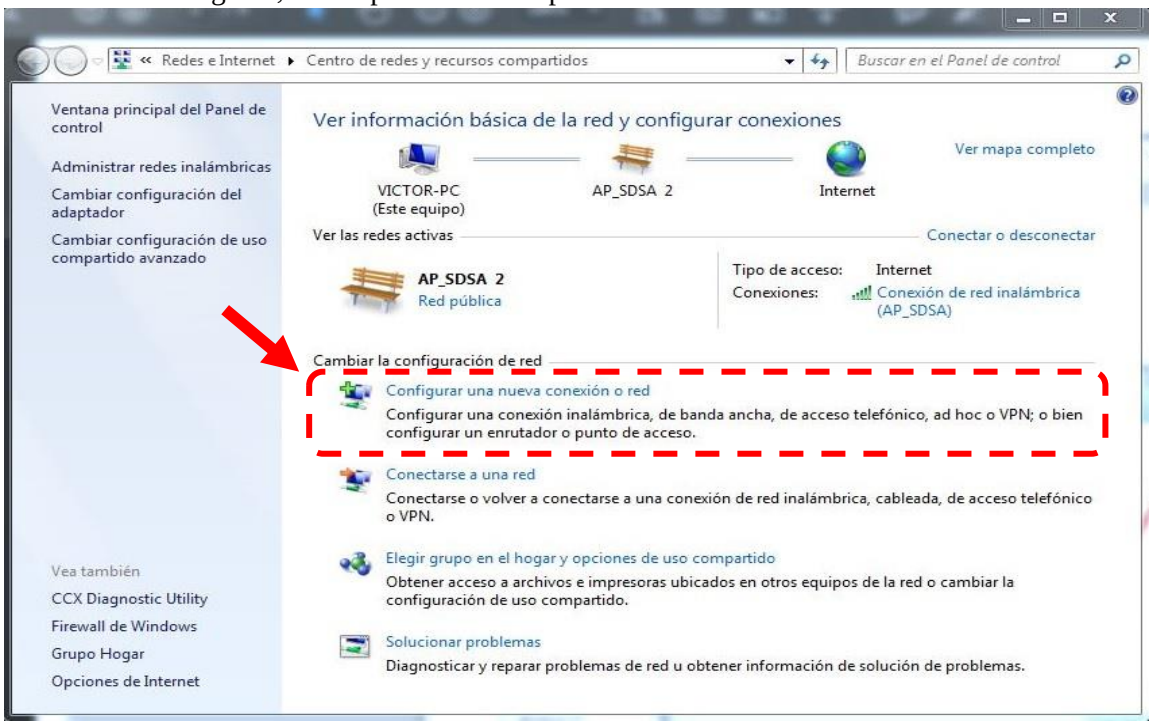
The IP is: 190.128.179.186

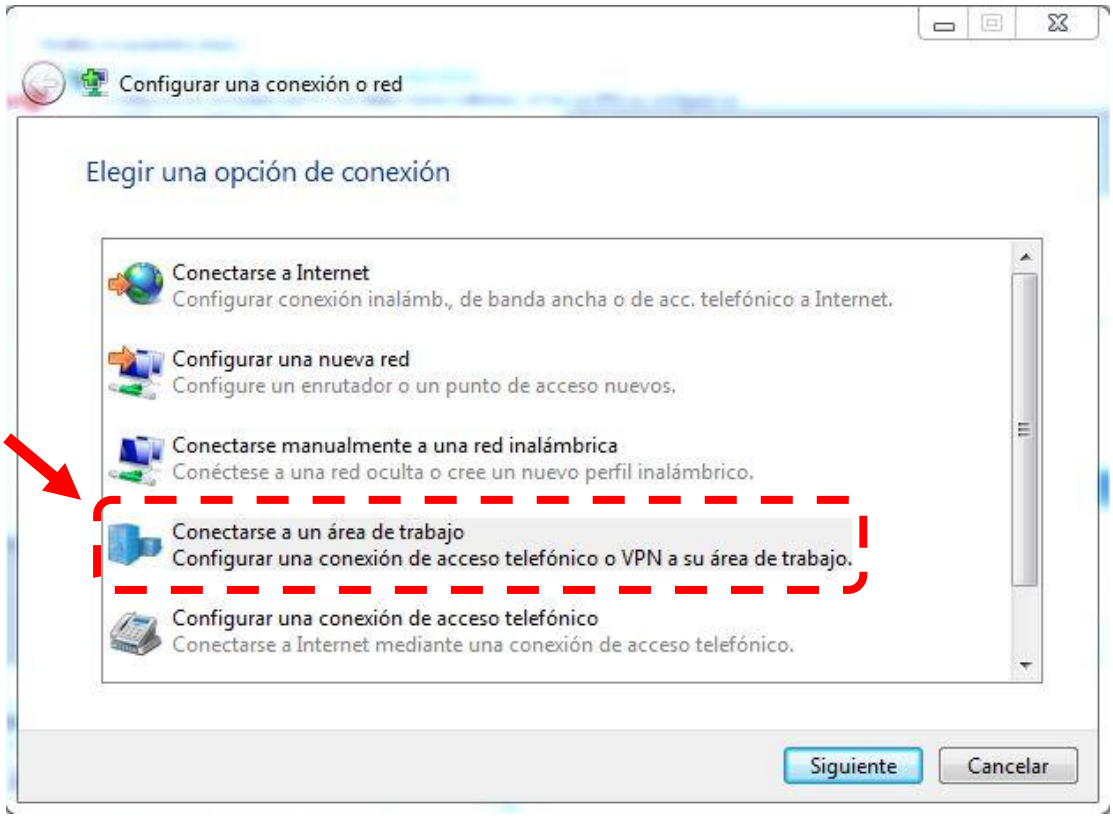
The Access is:

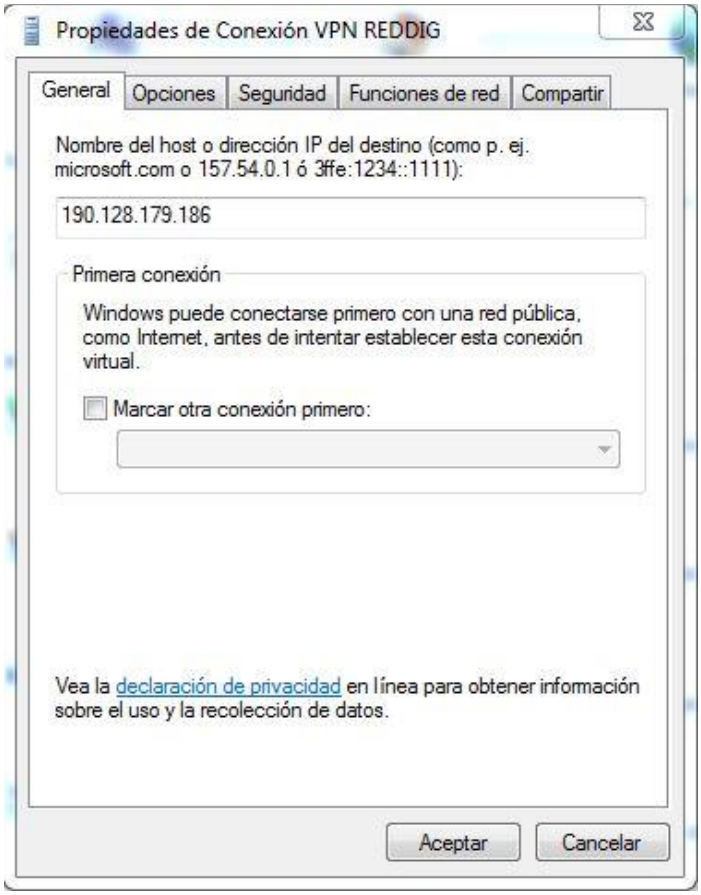
Username: PPTP_User

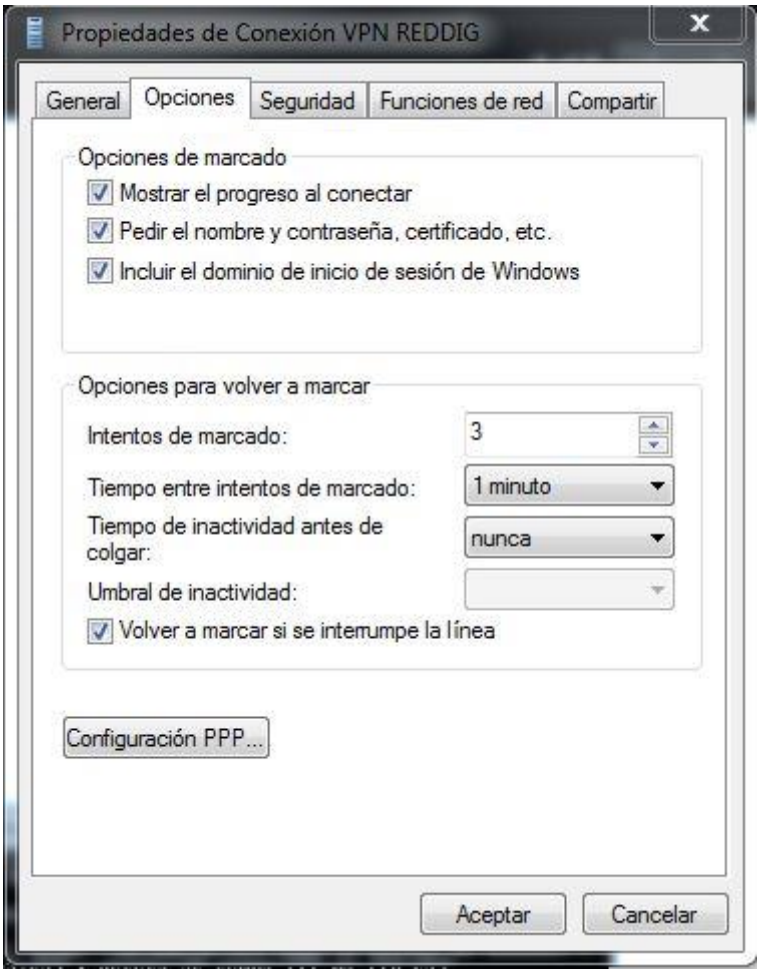
Password: PPTP_Password

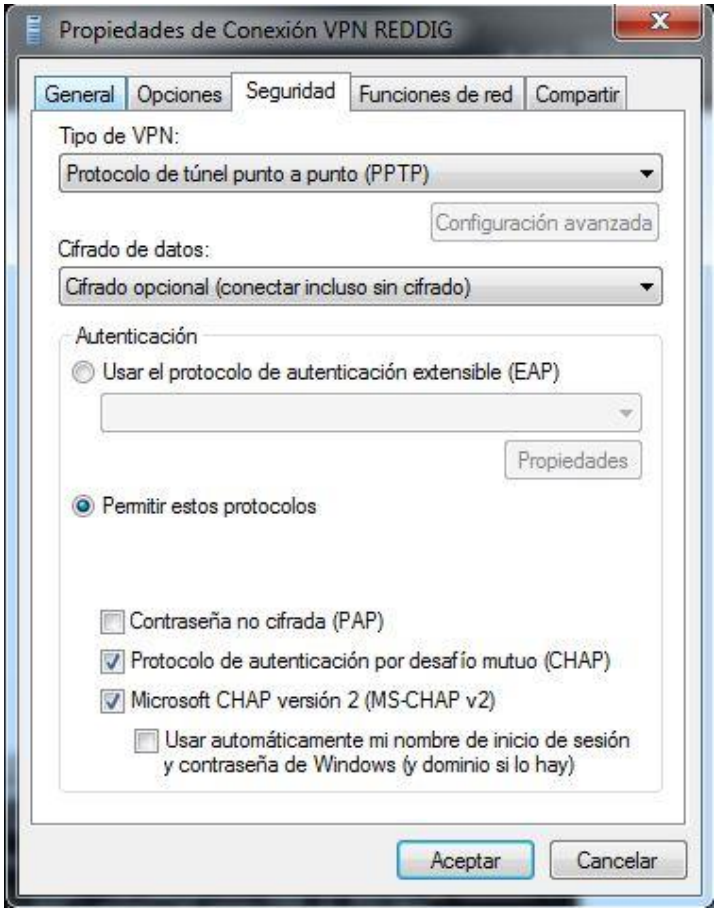
As a guide, below please find the parameter views with Windows.

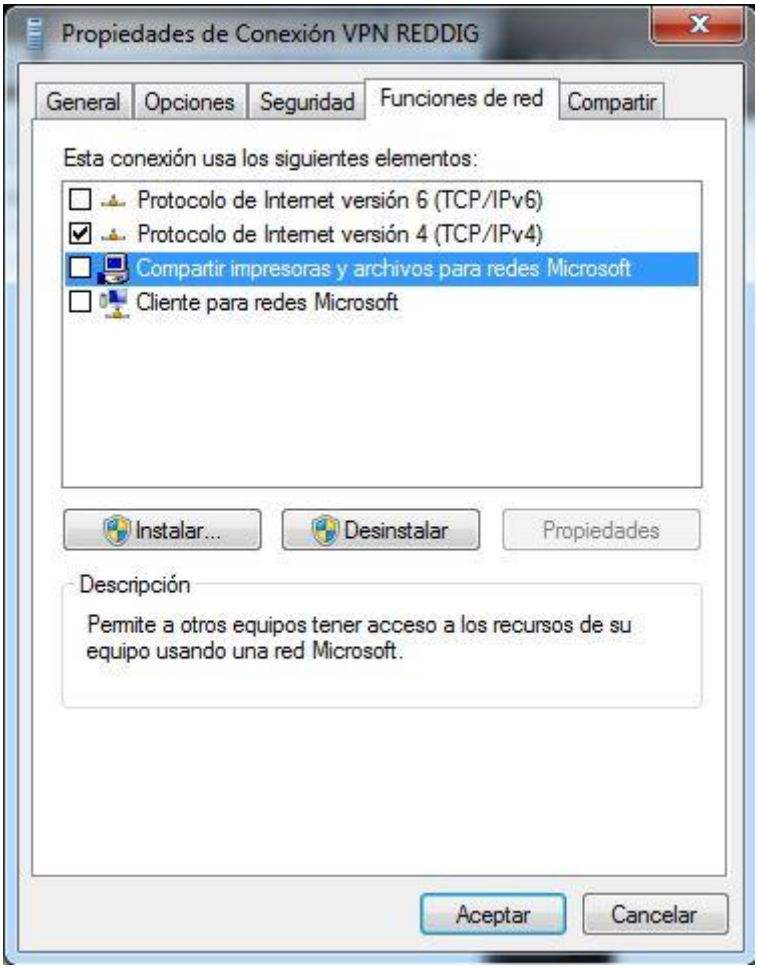


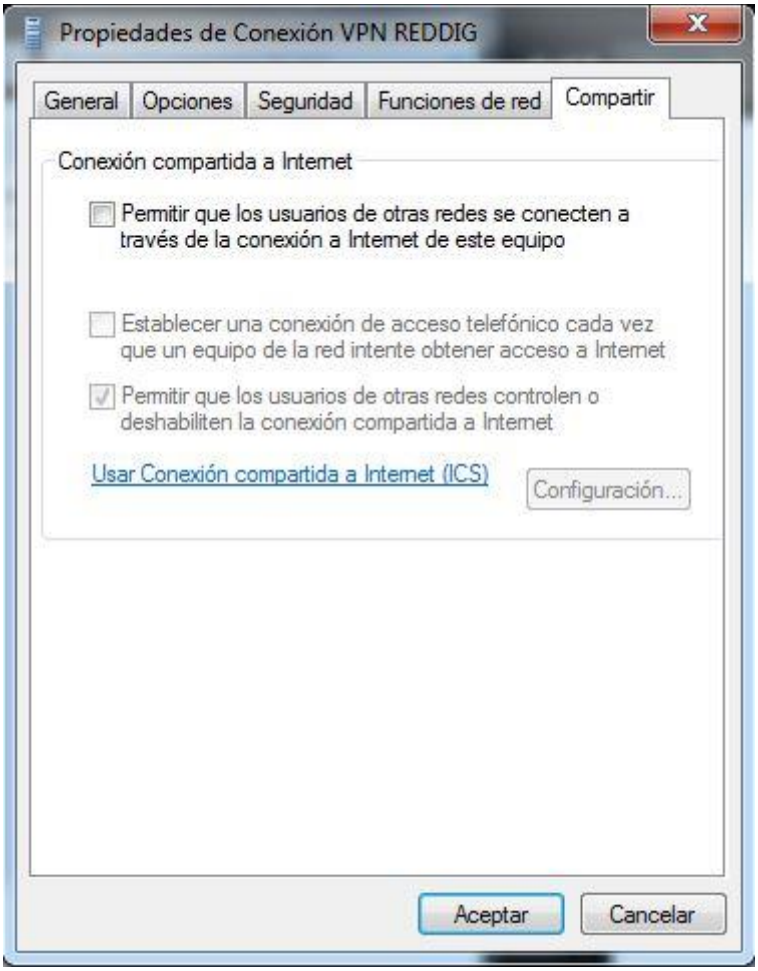




Propiedades de Conexión VPN REDDIG
General
Opciones
Seguridad
Funciones de red
Compartir
Nombre del host o dirección IP del destino (como p. ej. microsoft.com o 157.54.0.1 ó 3ffe:1234::1111):
190.128.179.186
Primera conexión
Windows puede conectarse primero con una red pública, como Internet, antes de intentar establecer esta conexión virtual.
Marcar otra conexión primero:
Vea la declaración de privacidad en línea para obtener información sobre el uso y la recolección de datos.
Aceptar
Cancelar


Propiedades de Conexión VPN REDDIG
General
Opciones
Seguridad
Funciones de red
Compartir
Opciones de marcado
Mostrar el progreso al conectar
Pedir el nombre y contraseña, certificado, etc.
Incluir el dominio de inicio de sesión de Windows
Opciones para volver a marcar
Intentos de marcado:
3
Tiempo entre intentos de marcado:
1 minuto
Tiempo de inactividad antes de colgar:
nunca
Umbral de inactividad:
Volver a marcar si se interrumpe la línea
Configuración PPP...
Aceptar
Cancelar

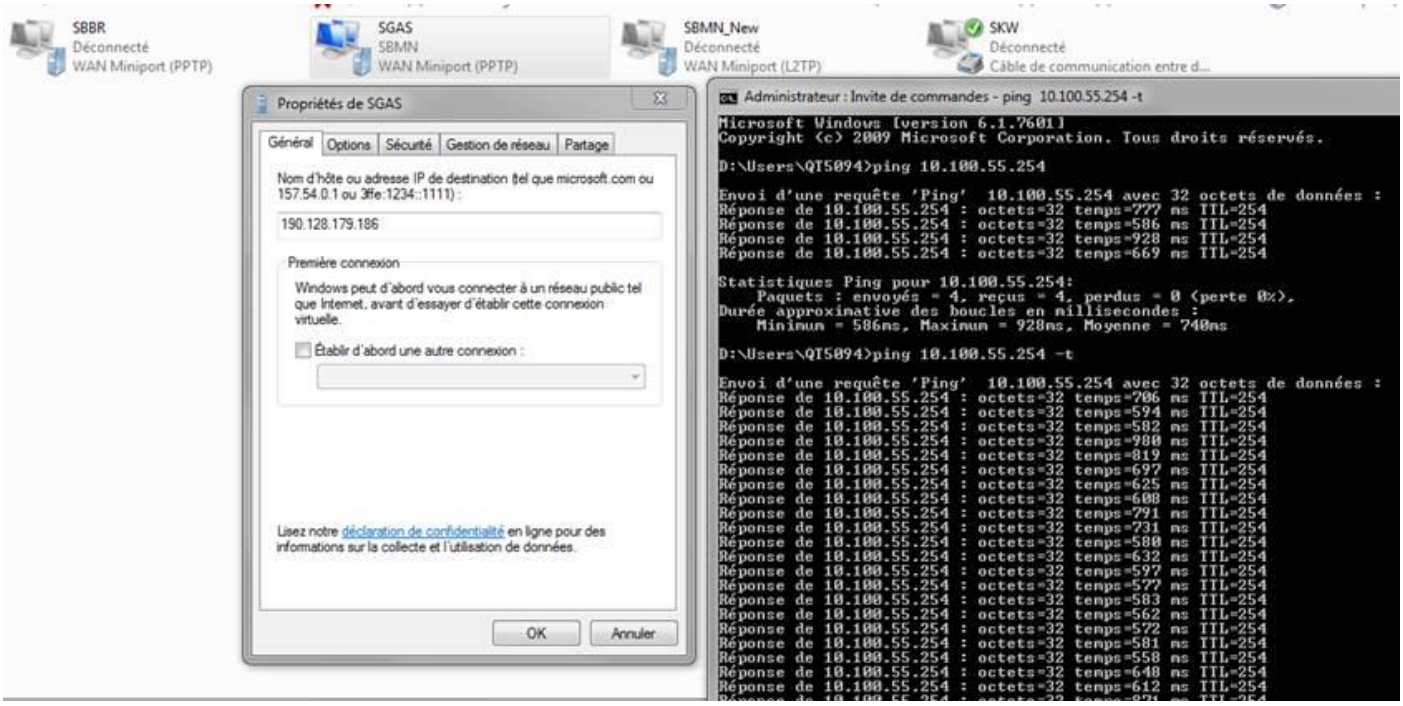

Propiedades de Conexión VPN REDDIG
General
Opciones
Seguridad
Funciones de red
Compartir
Tipo de VPN:
Protocolo de túnel punto a punto (PPTP)
Configuración avanzada
Cifrado de datos:
Cifrado opcional (conectar incluso sin cifrado)
Autenticación
Usar el protocolo de autenticación extensible (EAP)
Propiedades
Permitir estos protocolos
Contraseña no cifrada (PAP)
Protocolo de autenticación por desafío mutuo (CHAP)
Microsoft CHAP versión 2 (MS-CHAP v2)
Usar automáticamente mi nombre de inicio de sesión y contraseña de Windows (y dominio si lo hay)
Aceptar
Cancelar


Propiedades de Conexión VPN REDDIG
General
Opciones
Seguridad
Funciones de red
Compartir
Esta conexión usa los siguientes elementos:
Protocolo de Internet versión 6 (TCP/IPv6)
Protocolo de Internet versión 4 (TCP/IPv4)
Compartir impresoras y archivos para redes Microsoft
Cliente para redes Microsoft
Instalar...
Desinstalar
Propiedades
Descripción
Permite a otros equipos tener acceso a los recursos de su equipo usando una red Microsoft.
Aceptar
Cancelar




1.4 For the configuration of the Netgear VPN Router side, currently is in charge of the company ENGIE, but in the following link is the procedure to do it: https://kb.netgear.com/24288/Configuring-a-PPTP-VPN-Tunnel-to-ProSAFE-ProSECURE-routers

1.5 Once the connection is configured and activated, tests can be developed with the internal network of the node:



## ANNEX A

### Considerations for hiring the Internet Link for VPN Access

Internet access is mainly based on one parameter: speed. When someone is going to hire the internet provision service, this is the first argument of most sellers.

There are other factors to consider when hiring the service. The main ones are the symmetry of the speed and the sharing of the bandwidth.

**Public IP**

In this case, the advantage of having a fixed Public IP is to enable remote connections from any location to computers in our local network. This allows us to work from any Internet access; and if we have correctly configured the redirection and opening ports, work directly connected to the system.

**Symmetry of speed**

Service offerings usually show the speed of descent, not rise.

Depending on the consumption needs, you should consider this. There are suppliers that deliver a symmetrical speed, which means, the same descent and rise speed.

**Bandwidth sharing**

Most Internet service providers offer their service with 8 to 1 sharing. This is usually hidden, since at a given time, through the same provisioning channel, they can travel up to 8 connections simultaneously. The 1 to 1 sharing is something that is most commonly seen in corporate Internet service providers, but today, there are providers that offer this range of sharing for homes.

**Number of simultaneous users**

If one user logs in, it takes full advantage of the speed, but if there are more users connected at a time from different devices, the speed will definitely be affected.

---

# Appendix D

## Security Analysis of REDDIG II

## 1 Introduction

1.1 Based on what was established in the teleconference of May 5, 2017, related to Conclusion RCC/20-3, Security Analysis of REDDIG II (formulated at the Twentieth Coordination Meeting of REDDIG - Project RLA/03/901 (RCC/20), and the work being done by the ad hoc group nominated at the Nineteenth REDDIG Coordination Meeting, with the objective of analyzing the security of REDDIG (conformed by Argentina, Brazil, Colombia, French Guiana (France), Paraguay, Peru and the Secretariat) to prepare a plan of action, specifying implementation dates for proposed actions, which are presented as Appendix H to the Agenda Item 3 of the final report of the RCC/20.

**Action plan for the implementation of the security analysis of the REDDIG II**

*REDDIG II threats*

1.2 Regarding the REDDIG II internal threats analysis, it was recalled that in each of the REDDIG II nodes should be installed redundant routers together with an "Ethernet switch", which will support all the "VLANs" of all IP services, the current and the future ones. This requirement was formulated at the third operational technical meeting of REDDIG through Conclusion RTO/3- *Installation of a router and redundant Ethernet switch for native IP services*

1.3 In order to standardize the configuration of the routers and switches, their technical characteristics, IP addressing, firewall, NAT application and other protocols, **an initial study** is presented below. This initial study will be distributed to delegates of the ad hoc group for their comments and **will be presented to the Sixth Operational Technical Meeting of REDDIG II** to be held in Manaus Brazil from June 12 to 16, 2017 for review. This study will subsequently be presented at the RCC/21 (March 2018) **for approval of the implementation** as an extension of the REDDIG II contract.

## 2. Initial Study

2.1 Timely it was established that all States should have implemented edge routers and it could be assumed that not all nodes have performed this action.

2.2 As mentioned in different circumstances, security in REDDIG II should be defined as the process by which resources are protected. Security objectives should be :

1) Protect confidentiality.
2) Maintain integrity.
3) Ensure availability.

2.3 Objectives that determine the imperative to protect the entire network in order to avoid threats and vulnerabilities.

2.4 A threat is an unauthorized access to a network or network device. Typically, threats are persistent due to vulnerabilities, which are problems that can arise as a result of poor hardware or

software configuration, poor network design, inherited technology weaknesses, lack of training, or neglect of the final user.

2.5 El riesgo asumido se basa en el costo que se quiera tomar para salvaguardar la información. The security risks cannot be removed or prevented altogether; however, effective risk management and valuation can significantly minimize its existence. The risk assumed is based on the cost that is taken to safeguard the information.

2.6 The three main objectives of security seem very simple. However, the challenge of securing the network while taking operational needs into account can be a complex task. Administrators must carefully manage security policies to maintain the balance between transparent access, usage, and network security.

2.7 In relation to the above, and to the need for security external access, it is suggested:

1) To acquire networking equipment (routers firewall) for all nodes in order to:

   a) standardize the security equipment throughout the network,
   b) avoid unauthorized external and internal intrusions,
   c) address the lack of a border router in some nodes,
   d) management by the REDDIG II administrator of all firewalls (now subject to each state.

2) Implement a TACACS Server to control the accesses, create a community on the network computers to install a SISLOG (monitors all the events of the network, with the possibility of sending event information by mail), etc.

3) Define the assignment of user levels and keep a record on a server where all events will be hosted, which commands were executed, who entered, and so on.

4) Also, all of the above allows creating events for automatic backup when configuration changes are made to all networking computers.

2.8 It is extremely necessary to have a security plan to accurately define the architecture and operations, risks and security policies.

2.9 Subsequently, perform a joint analysis with the network personnel, to determine what type of events it is advisable to record (eg access to devices, changes in network interface status, hot restarts, changes in configuration parameters, etc.).

## 3. Firewalls

3.1 The most used application in recent years is the well-known firewall, a combination of hardware and software used by businesses and users to isolate the private network from abroad.

3.2 A firewall is a simple access control of the incoming / outgoing traffic of the user's network. In this control, the datagrams or packages that pass through it are reviewed and according to the rules imposed by the network administrator, will act accordingly: eliminating, forwarding or asking the administrator.

3.3 There are four types of firewalls: packet filtering, application level gateways, multilevel state inspection, and Circuit Level Gateways. The first two are the most used, but the multilevel inspection is the best considered. The big difference between them is the level of the OSI layer in which they work.

3.4 From the "Guide on Security Guidance for the Implementation of IP Networks" can be extracted:

3.4.1 Management must ensure adequate acquisition of the necessary resources for the protection of information, including network assets (routers, switches, etc.) and security (firewalls, IDS, IPS, etc.).

3.4.2 Each network must have a topology that takes into account the security aspects, considering at least the following:

a) Points of interconnection with other networks must have security assets, such as firewalls and IDS/IPS, installed and properly configured and monitored.

b) IP addresses should be designed so that they are not known on the Internet

c) Firewalls must be configured, at least, with the following rules:

- Deny all default policy;
- Web protocols (http, https, for example) only outgoing;
- E-mail protocols in both directions.

d) The routers must be configured considering the use of ACLs and NAT, as well as hiding the IP addresses.

e) Routers must be constantly updated, with different passwords and login from the factory.

f) The network interconnections with REDDIG II must be made with redundancy of assets, including those of security, and other measures that guarantee the availability and integrity of the information, as well as the performance of the network according to its specifications;

g) Connections with public networks (internet) must have a topology that guarantees security in multiple layers.

h) The network management must be done via the SNMP protocol version 3, with the activation of alerts and SNMP traps. Access to devices must be made using secure authentication;

i) Management links must be encrypted.

3.5 The Reference Guide constantly mentions the use of a firewall

## 4. Acquisition of firewalls routers for the whole network

4.1 The main objective is security, and in that sense the standardization and installation of networking equipment of the same characteristics will allow a greater robustness to the mitigation of vulnerabilities.

4.2 The administration of these equipments by the REDDIG II Administrator, and eventually the allowed access, with certain levels of privileges, to the different technicians that can intervene, will facilitate the control of accesses with good or bad intentions.

4.3 In this sense, the equipment required must have at least the following benefits:

1) A firewall as a combination of hardware and software used to isolate the private network from outside.

2) Allow reliable connections through proper firewall functions and access lists (ACLs).

3) Allow to configure NAT

4) Configuring Service Policies

5) Configuring access rules

6) Configuring AAA settings for access

7) Allow protocols inspection of each application layer

8) Provide information about the communications functions of the equipment

9) Allow the configuration of connection settings and quality of service (QoS)

10) Complex configurations for network protection.

11) Configuration of different modules.

**5. Quantities and costs**

5.1 In order to contemplate the installation of a firewall at all nodes and to have a backup, it is desirable to acquire 20 firewall equipment at an estimated value of around US$ 1000 to US$ 2000 each one. However, the value varies according to brand, model, license plates and licenses.

5.2 Take in consideration that equipment should be of a brand and supplier available in most States in order to be able to respond immediately to a contingency. Likewise, take in consideration the networking equipment that currently integrates the nodes of REDDIG II.

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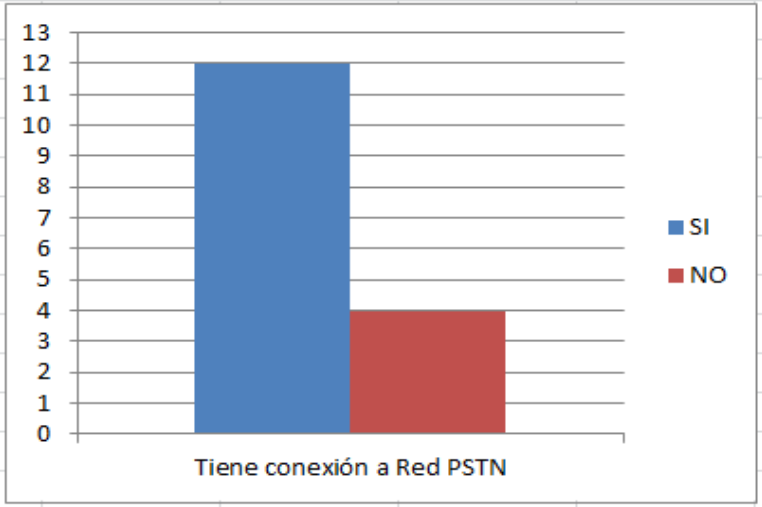
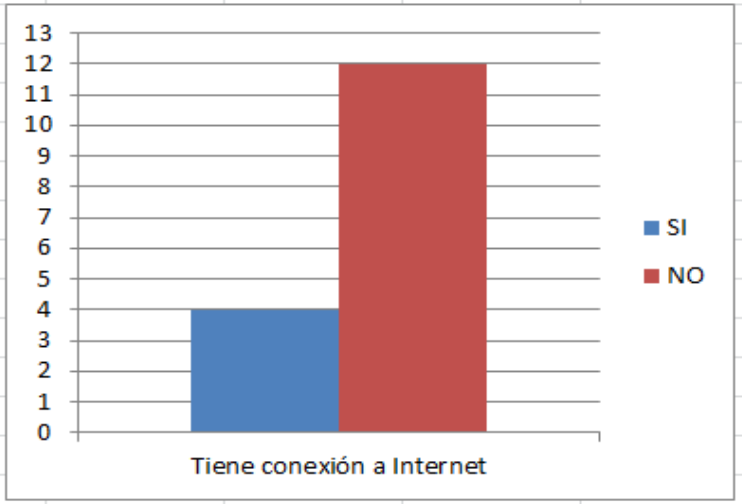
# Appendix E

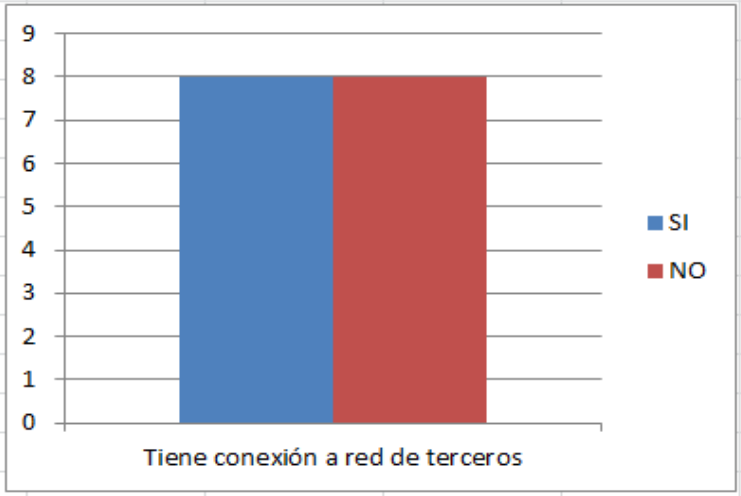
## Results of the Survey on the REDDIG External Threats

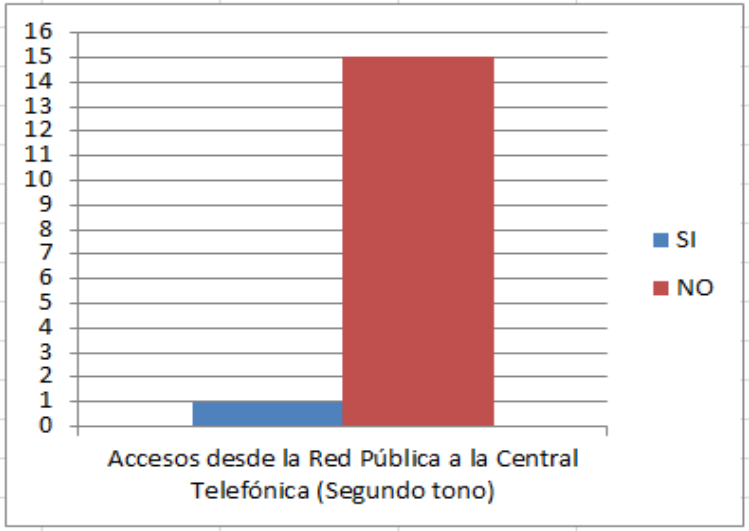
| | | Central Telefónica | | | | AMHS | | VPN | | Acceso a Sala Reddig | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nodo | | Tiene conexión a Red PSTN | Tiene conexión a Internet | Tiene conexión a red de terceros | Accesos desde la Red Pública a la Central Telefónica (Segundo tono) | Tiene conexión a Internet | Tiene conexión a red de terceros | Existe la conexión VPN - REDDIG instalado a la fecha | Conexión VPN-REDDIG conectada todo el tiempo al sistema REDDIG | Existe Control eletrónico | Existe Control personal | Solo personal asignado ingresa a la Sala REDDIG | Solo personal asignado tiene acceso a los equipos REDDIG |
| SAEZ | Argentina | SI | SI | SI | SI | SI | SI | SI | SI | SI | SI | NO | NO |
| SLLP | Bolivia | NO | NO | NO | NO | NO | SI | NO | NO | NO | NO | SI | SI |
| SBCT | Curitiba | SI | NO | NO | NO | NO | NO | NO | NO | SI | SI | NO | SI |
| SBMN | Manaos | SI | NO | SI | NO | NO | SI | SI | NO | SI | SI | SI | SI |
| SBRF | Recife | SI | NO | NO | NO | NO | SI | NO | NO | SI | SI | NO | SI |
| SCEL | Chile | SI | SI | SI | NO | SI | SI | NO | NO | NO | SI | NO | NO |
| SKED | Colombia | | | | | | | | | | | | |
| SEGU | Ecuador | NO | NO | SI | NO | SI | SI | NO | NO | NO | NO | NO | SI |
| SGAS | Paraguay | SI | NO | NO | NO | SI | NO | SI | NO | SI | NO | NO | SI |
| SPIM | Perú | NO | NO | NO | NO | SI | NO | SI | NO | NO | SI | NO | SI |
| SYGC | Guyana | SI | SI | NO | NO | NO | NO | NO | NO | SI | SI | NO | NO |
| SOCA | French Guayana | SI | NO | SI | NO | SI | SI | NO | NO | NO | SI | SI | SI |
| SMPM | Surinam | SI | NO | SI | NO | NO | SI | NO | NO | NO | SI | SI | NO |
| TTPP | Trinidad y Tobago | SI | NO | NO | NO | NO | NO | NO | NO | SI | SI | NO | NO |
| SUMU | Uruguay | SI | SI | NO | NO | NO | SI | NO | NO | NO | NO | NO | NO |
| SVMI | Venezuela | NO | NO | SI | NO | SI | SI | SI | SI | SI | SI | NO | SI |
| SBBR | Brasilia | SI | NO | SI | NO | NO | SI | SI | SI | SI | SI | NO | NO |

## CENTRAL TELEFÓNICA



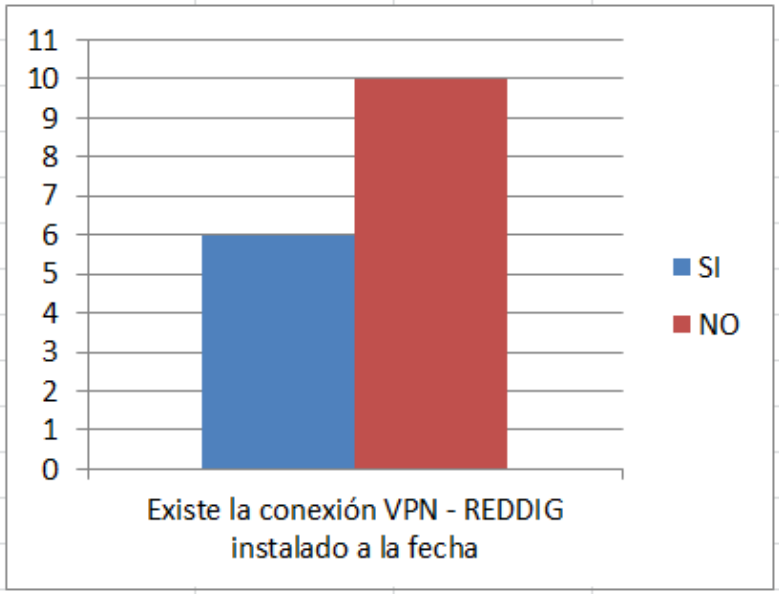



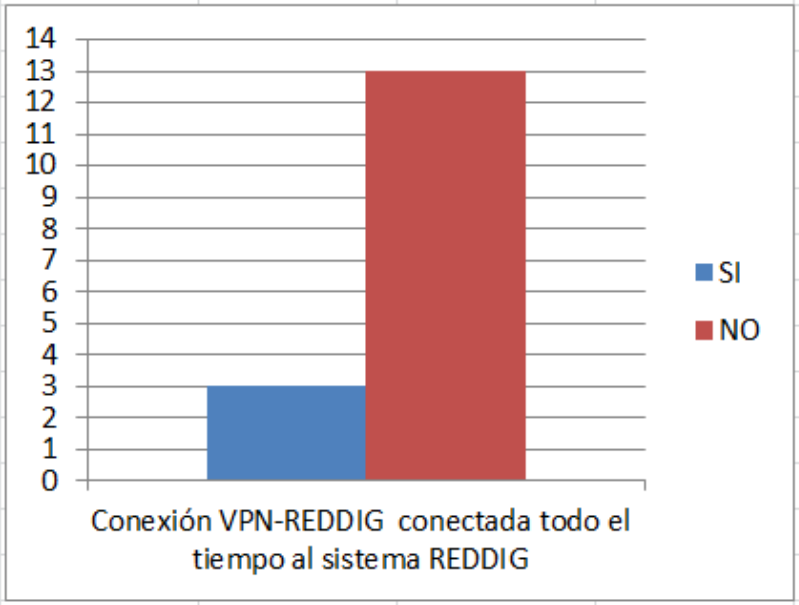



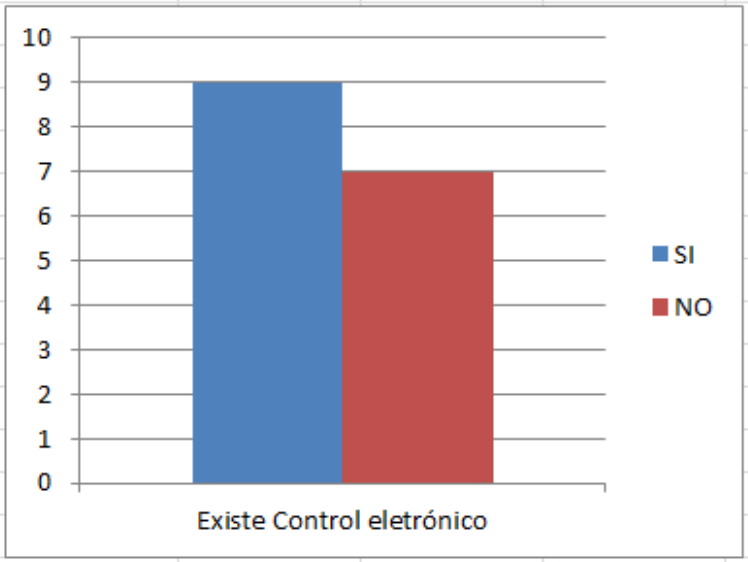

AMHS
10
9
8
7
6
5
4
3
2
1
0
SI
NO
Tiene conexión a Internet
12
11
10
9
8
7
6
5
4
3
2
1
0
SI
NO
Tiene conexión a red de terceros

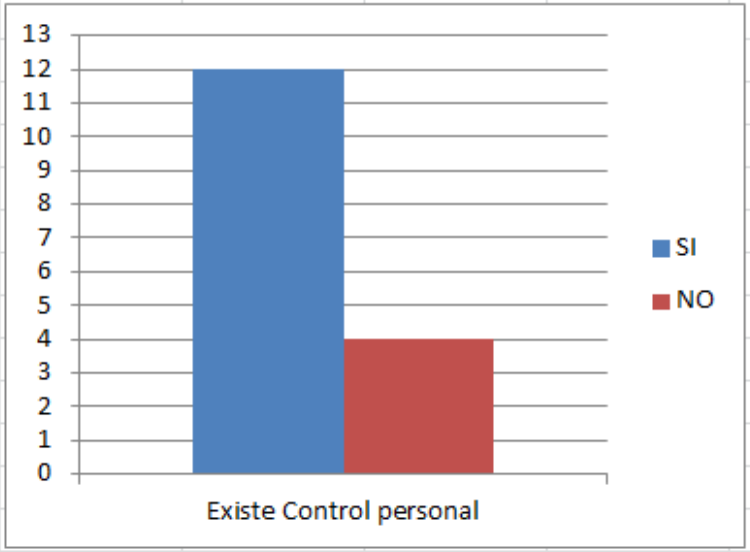
VPN

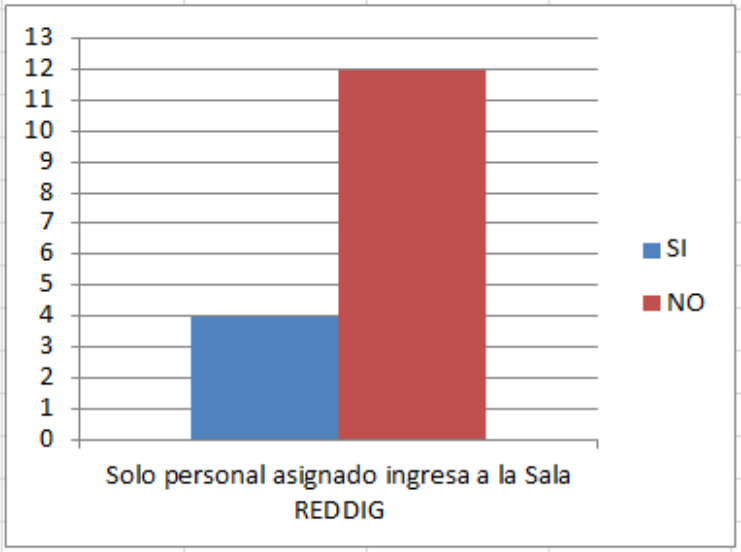

11
10
9
8
7
6
5
4
3
2
1
0
SI
NO
Existe la conexión VPN - REDDIG instalado a la fecha

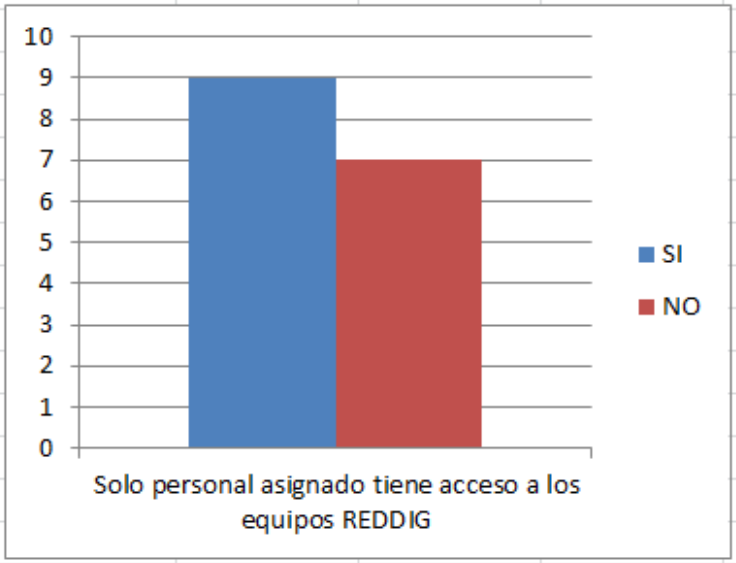

14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
SI
NO
Conexión VPN-REDDIG conectada todo el tiempo al sistema REDDIG

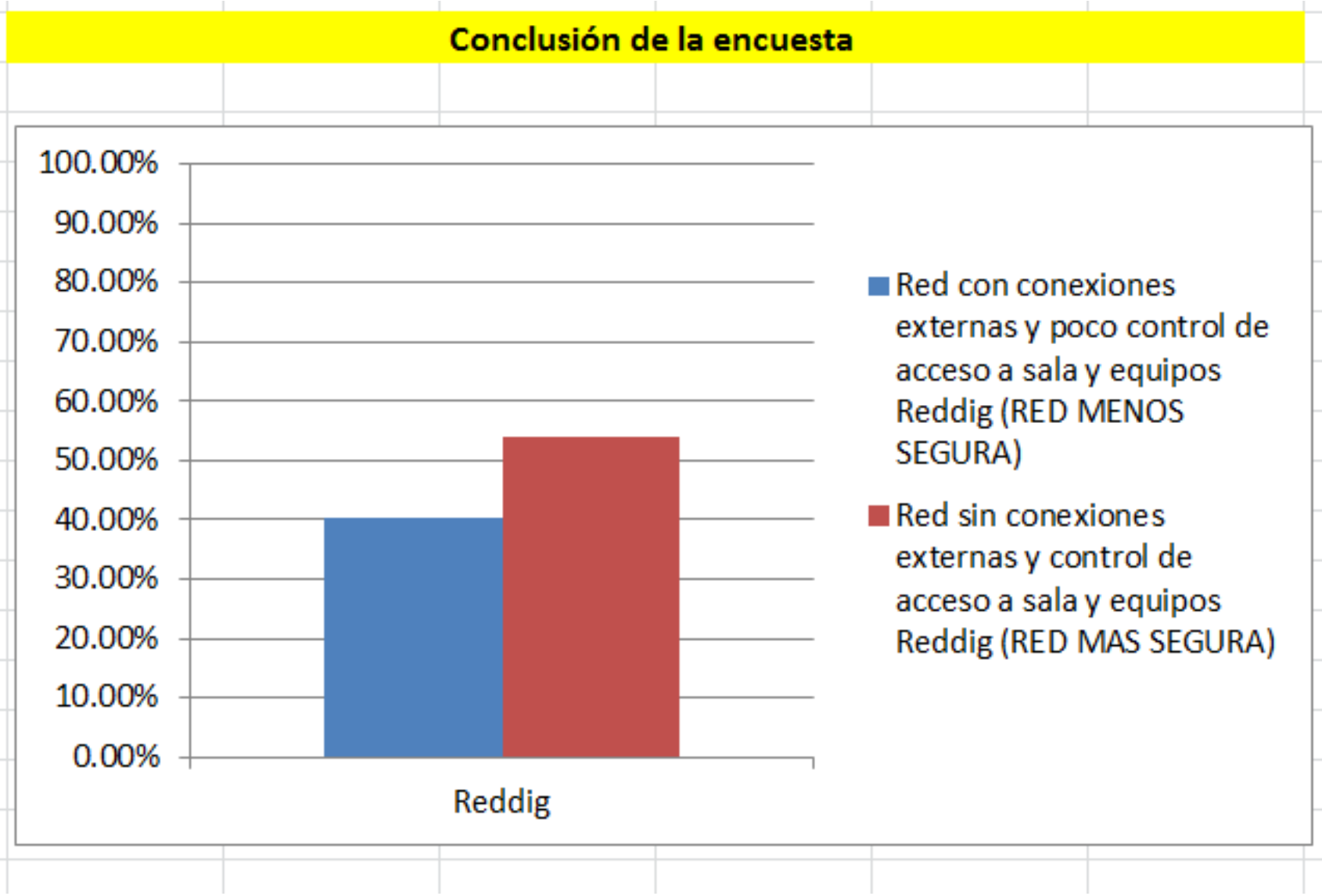
## ACCESO A SALA REDDIG




Conclusión de la encuesta
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Reddig
Red con conexiones externas y poco control de acceso a sala y equipos Reddig (RED MENOS SEGURA)
Red sin conexiones externas y control de acceso a sala y equipos Reddig (RED MAS SEGURA)

**Agenda Item 4: Other business**

4.1 It was informed that as agreed in the RCC/20, a course on IP technology (ICND) applied to REDDIG II is scheduled for October. In this regard, the REDDIG Administration, after the pertinent consultations, nominated Mr. Jefferson Cheron of the Node of Curitiba, Brazil and Mr. Hernán Canna of the Node of Ezeiza, Argentina to prepare and deliver this course. The course will be directed to the technical personnel who already have knowledge about networks and operate in the Nodes of the REDDIG.

4.2 Regarding the request of the Peruvian delegates regarding the donation of Memotec equipment in favor of CORPAC Peru, the Meeting recommended that CORPAC formally make the request to the Lima Regional Office in order to make the donation of the Memotec equipment from the Nodes that have so stated.

4.3 It was also informed that for asynchronous serial circuits (AFTN service), the monitoring of the status of their interfaces ('up'/'down') is available. In this respect, and in order to effectively monitor the status of these interfaces, it was requested to standardize the RTS = UP control signal at the user's terminal (Gateway or CCAM) for all AFTN circuits in the network.

4.4 Information was provided on the breakdowns of the GPS receiver equipment in Curitiba (now resolved), La Paz and Ezeiza, however it was clarified that this does not influence in the operation, but in the monitoring (since it is important for the synchronization of events). These breakdowns will be solved by INEO.

4.5 Finally, it was expressed about the convenience of implementing working groups in different areas, technologies and depending on the experiences of the personnel of each State.