INTERNATIONAL CIVIL AVIATION ORGANIZATION

RLA/03/901

TWENTY FIRST MEETING OF THE COORDINATION COMMITTEE (RCC/21)

FINAL REPORT

(Lima, Peru, 14 to 16 May 2018)

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INDEX

HISTORY OF THE MEETING

ii-1. PLACE AND DURATION OF THE MEETING

The Twenty First Meeting of the Coordination Committee of Project RLA/03/901 - *REDDIG Management System and Satellite Segment Administration*, was carried out in the ICAO South American Regional Office, in Lima, Peru, from 14 to 16 May 2018.

ii-2. OPENING

Mr. Fabio Faizi Rahnmeay Rabbani, Regional Director of the ICAO South American Regional Office, welcomed the participants, pointing out the importance of the topics to be dealt with and wishing success in the deliberations. Thereafter, he inaugurated the meeting.

ii-3. WORKING LANGUAGES

The meeting working languages for the discussions and documentation were Spanish and English. Documentation was presented in both languages.

ii-4. PARTICIPANTS AND ORGANIZATION

The meeting counted with the assistance of 10 member States (Argentina, Brazil, Chile, Colombia, Guyana, Paraguay, Peru, Trinidad & Tobago, Uruguay and Venezuela), making a total of 19 participants, including ICAO officers. The list of participants is being presented in page iii-1.

Mrs. Veronica Chávez, Technical Assistance Officer acted as Secretary, assisted by Mr. Onofrio Smarrelli, ICAO CNS consultant and by Mr. Javier Vittor, REDDIG Administrator.

ii-5. LIST OF CONCLUSIONS

LISTA DE PARTICIPANTES / LIST OF PARTICIPANTS

ARGENTINA
1. Walter Alejandro Rupo

BRASIL / BRAZIL
2. Renata Rodrigues Frias

CHILE
3. Germán Olave
4. Christian Vergara

COLOMBIA
5. Robinson Quintero

GUYANA
6. Mortimer Salisbury

PARAGUAY
7. Víctor Morán
8. Ronald Benítez

PERÚ
9. Luis Silva Gárate
10. José Rubira Chauca
11. Ricardo Arteaga

TRINIDAD & TOBAGO
12. Rupnarine Baboolal

URUGUAY
13. Ricardo Clavijo
14. Miguel E. Vera

VENEZUELA, REP. BOLIVARIANA DE
15. Luis Escobar
16. Willy Rojas

OACI / ICAO
17. Verónica Chávez
18. Onofrio Smarrelli
19. Javier Vittor

Agenda Item 1: Approval of the agenda and of the meeting schedule

1.1 Under this Agenda Item, the Meeting reviewed and approved the agenda and meeting schedule included as **Appendixes A and B** to this part of the Report.

APPENDIX A

AGENDA

Agenda Item 1:	Approval of the agenda and of the meeting schedule
Agenda Item 2:	Review of the report of the Twentieth Meeting of the Coordination Committee
Agenda Item 3:	Report of the activities carried out to date since the last Coordination Committee meeting.
Agenda Item 4:	Work plan for 2018
Agenda Item 5:	Financial situation of the project and approval of the budget
Agenda Item 6:	Annual project evaluation
Agenda Item 7:	Other matters

EXPLANATORY NOTES TO THE PROVISIONAL AGENDA

Agenda Item 1: **Approval of the agenda and of the meeting schedule**

The Coordination Committee will consider and approve the provisional agenda and meeting schedule proposed by the Secretariat for its Twenty First Meeting.

Agenda Item 2: Review of the report of the Twentieth Meeting of the Coordination Committee

The Committee will review, for approval, the report of its Twentieth Meeting (RCC/20) held in Lima from 21 to 23 March 2017. Likewise, the Committee will analyse the status of implementation of conclusions formulated during said meeting, as well as of conclusions in force from previous meetings.

Agenda Item 3: Report of the activities carried out to date since the last Coordination Committee meeting

The Committee will analyse the activities carried out since its last meeting regarding:

a) Follow-up to REDDIG II performance;
b) REDDIG II training programme; and
c) New REDDIG II services and activities.

Agenda Item 4: **Work plan for 2018**

The Committee will analyse the work programme for 2018:

a) New REDDIG II activities and services;
b) New MEVAIII / REDDGI II activities and interconnection services; and,
c) Training programme for 2018

Agenda Item 5: **Financial situation of the project and approval of the budget**

The Committee will consider the status of the cost-sharing contributions to the project and a summary of the obligations assumed during 2017, as well as the project budget for 2018 for approval.

Agenda Item 6: **Annual project evaluation**

The Committee will take note of the project's situation at the end of the year, including the management and outputs indicators, as well as the monitoring and control of the project with regard to the approved work plan for 2017, shown in the corresponding forms, concluding with the review of the survey conducted among participant States concerning their annual project evaluation.

Agenda Item 7: **Other matters**

Under this agenda item, the Committee could analyse any other related issue deemed appropriate.

APPENDIX B

PROVISIONAL TIMETABLE

HOUR	**Monday** 14 May 2018	**HOUR**	**Tuesday** 15 May 2018	**HOUR**	**Wednesday** 16 May 2018
08:30 09:00	Registration of participants	09:00 10:30	Review of Agenda Item 4	10:00 10:30	Review of Report
09:00 09:15	Opening				
09:15 09:30	***Coffee break***	10:30 11:00	***Coffee break***	10:30 10:45	***Coffee break***
09:30 12:30	Review of Agenda Items 1 and 2	11:00 12:30	Review of Agenda Item 5	10:45 12:00	Approval of the Report
12:30 13:30	***Lunch break***	12:30 13:30	***Lunch break***	12:00	Closing Ceremony
13:30 15:00	Review of Agenda Item 3	13:30 15:00	Review of Agenda Items 6 and 7		

Agenda Item 2: Review of the report of the Seventeenth Meeting of the Coordination Committee

2.1 Under this agenda item, the Meeting discussed and approved the report of the Twentieth meeting of the REDDIG Coordination Committee, the (RCC/20) held in Lima, Peru, on 21-23 March 2017, with the participation of 11 member States (Argentina, Brazil, Chile, Colombia, France, Guyana, Paraguay, Peru, Trinidad & Tobago, Uruguay and Venezuela) and one company (AIREON), making a total of 27 participants, including ICAO officers.

2.2 The RCC/20 Meeting reviewed the report of the Nineteenth meeting of the REDDIG Coordination Committee (RCC/19), the report on the activities carried out since the RCC/19, the work plan for 2017, the financial situation of the project, the approval of the budget for year 2017, the annual project assessment since the RCC/19, and other matters.

2.3 During the RCC/20, the following conclusions were formulated:

RCC/20-1	*Preparation of model letter for the registration of REDDIG frequencies and other VSAT networks in REDDIG member States at the ITU MIFR*
RCC/20-2	*Implementation and updating of the REDDIG antivirus software*
RCC/20-3	*Analysis of REDDIG II security*
RCC/20-4	*Urgency in the selection of the new REDDIG administrator*
RCC/20-5	*Extension of Project RLA/03/901*

2.4 The Meeting examined the list of valid conclusions presented in WP/02 and in this respect, considered that Conclusions 8/8, 19/1, 19/3 and 20/1 as still valid, and Conclusions 20/2, 20/3, 20/4 and 20/5 as completed. The **Appendix** to this agenda item presents the status of conclusions as revised by the Meeting.

2.5 Upon analysing Conclusion 19/3 part a), in addition to Argentina, Chile, Guyana, Paraguay, Trinidad & Tobago, Uruguay and Venezuela, Colombia and Peru noted that they had also registered their REDDIG II equipment and frequencies before their national entities in charge of managing the spectrum. Regarding part b), it was reformulated as Conclusion 20/1.

2.6 In relation to Conclusion 20/1, the Secretariat will send by the end of May 2018 a letter to all the REDDIG II member states, indicating the actions considered at the CMR/15 Meeting of the UIT in relation to the protection of frequencies in C band for VSAT networks with aeronautical applications.

APPENDIX

CONCLUSIONS ADOPTED BY THE REDDIG COORDINATION MEETINGS THAT REMAIN VALID AND THEIR STATUS OF IMPLEMENTATION

No.	Title	Content	Status	Remarks
8/8	REDDIG Administration	That, until such time that the institutional aspects related to the management of multinational systems for the provision of air navigation services are more clearly defined, the States agree that, for the next two years, starting 15 October 2005, the REDDIG will continue to be managed through the ICAO technical cooperation mechanism, as an extension of Regional Project RLA/03/901.	Valid	Whereas the establishment of the South American Air Navigation and Safety Organization, multinational system with ability to manage the REDDIG continues undefined, RCC/15 meeting (Lima, Peru, 15-17 August 2012) approved the RLA/03/901 project document substantive revision, extending the management of REDDIG until 2018. During RCC/20 Meeting RLA/03/901 member States approved the extension of the REDDIG II management for a 5-year period until 2023.
19/1	Suriname cost-sharing contributions payment schedule	That, Suriname with the aim of complying with full payment of its 2012 to 2016 cost-sharing contributions, present a payment schedule in this regard, in order to avoid the application of the payment delay procedure indicated by the ICAO SAM Regional Office through letters SA5033 and SA5192 of 21 January and 7 March 2016, respectively.	Valid	Suriname presented a payment schedule and on mid-March 2017 made two payments of USD 80,000, pending USD 109,260 until 2016, without considering the contribution of 2017.

No.	Title	Content	Status	Remarks
19/3	Registration of VSAT stations for fixed-satellite service (FSS) for aeronautical use at MIFR (Master International Frequency Register)	In order to ensure adequate protection to the operating frequencies of REDDIG II as well as the frequencies of VSAT stations for aeronautical use at the national level, REDDIG member States: a) That still have not proceeded to registration of frequencies and REDDIG equipment as well as the frequencies of its VSAT stations for aeronautical use, in case that exists the respective national entities that manage the spectrum of radio frequency, do so as soon as possible and send the registration forms to the ICAO SAM Office b) Ensure that national entities that manage the radio frequency spectrum recorded operating frequencies of each REDDIG II station as well as frequencies of VSAT networks for local aeronautical use, in case they had it, to the UIT Master International Frequency Register (MIFR) and report the process to SAM Office.	Valid	a) Argentina, Chile, Colombia, Guyana, Paraguay, Peru, Trinidad & Tobago, Uruguay and Venezuela had registered their REDDIG II equipment and frequencies at their national entities that manage the spectrum. b) It was reformulated in the Conclusion 20/1
20/1	Preparation of model letter for the registration of the REDDIG frequencies and other VSAT networks in the member States of the REDDIG at the MIFR-ITU	That the REDDIG Administration prepares and send to the States members of project RLA/03/901 by end May 2017, a model letter to be submitted to the national entities that manage the frequency spectrum with the aim of that these entities may proceed to register at MIFR (International master frequency register) of the ITU (International Telecommunications Union) the frequencies used in REDDIG II as well as national networks VSAT used to transport voice and data services for aeronautical applications.	Valid	The Secretariat consulted with ICAO Headquarters, which in turn consulted with the ICAO Dakar Office on its experience with registering the AFISNET and CAFSAT networks, and we were informed that there was no specific model in this regard. Since there is no standard format, the Secretariat will send a letter by the end of May 2018 to all member States of REDDIG II, based on the results of the ITU WRC 15.

No.	Title	Content	Status	Remarks
20/2	Implementation and updating of the REDDIG antivirus software	That in order to maintain the security in the REDDIG II: a) The member States of the REDDIG II that have not yet proceed to the implementation of the antivirus software in the NMS servers of the REDDIG II, must complete the implementation by 14 April 2017. b) That the REDDIG II Administration, in order to always keep updated the antivirus software in the NMS servers of the REDDIG II, proceed with the acquisition of updating licences from the moment the REDDIG warranty period ends.	a) Finalised b) Finalised	The acquisition of the antivirus software was approved for purchase in 2018.
20/3	Analysis of the REDDIG II security	That the *ad hoc* group of the REDDIG II, in order to analyse the security comprised by Argentina, Brazil, Colombia, French Guyana, Paraguay, Peru and the REDDIG Administration, prepares an action plan for the implementation of the proposed actions stated in the **Appendix H** to this Agenda Item to mitigate the threats of risks identified in the REDDIG II y presents the initial progress in the first teleconference to be held on 29 April 2017.	Finalised	Action plan presented at the Sixth meeting on the technical-operational implementation of REDDIG II (Manaus, Brazil, 12 June 2017)
20/4	Urgent selection of the new REDDIG Administrator	That ICAO, in order to ensure the continued security of air navigation services through REDDIG II, expedite the process of selection of the new REDDIG II Administrator, to allow the new administrator to take office by early May 2017 and thus share duties with the current REDDIG II Administrator during a transition period until 30 June 2017 to ensure operational continuity.	Finalised	The process was completed and a new administrator was designated.
20/5	Extension of Project RLA/03/901	Revision S of Project RLA/03/901 is approved with budget extension until 31 December 2023, which is presented as **Appendix A**. That the ICAO South American Regional Office take relevant action for the approval of the revision of project RLA/03/901 by ICAO Headquarters, for its subsequent submission to REDDIG member States.	Finalised	Version S approved

Agenda Item 3: **Report of the activities carried out to date since the last meeting of the Coordination Committee**

3.1 Under this agenda item, the Meeting reviewed the following working paper:

- WP/03 - *Report of the activities carried out to date since the last meeting of the Coordination Committee* (presented by the Secretariat)

Report of the activities carried out to date since the last meeting of the Coordination Committee

3.2 The Meeting analysed the following activities agreed upon at the Twentieth Coordination Committee meeting (RCC/20):

a) REDDIG II training programme
b) REDDIG II operation and analysis of the implementation of new services

REDDIG II training programme

3.3 With regard to training activities, the Meeting took note of the delivery of the following courses:

a) Advance Course of the REDDIG Operations
b) Course on IP Networks applied to the REDDIG II
c) Course on Network Fundamentals (basic) for the staff of NCC Manaus

3.4 Information on the content of the courses is presented in **Appendices A, B** and **C**, respectively to this agenda item.

REDDIG II operation and analysis of the implementation of new services

REDDIG II Brasilia Node

3.5 The Meeting took note of the action taken to correct problems in its operation:

a) checking the status of the serial cables and checking the operation of the B chain;
b) problems in maintenance and administrative voice circuits
c) verification of coaxial cabling
d) causes of packet loss in the Skywan A modem
e) verification of the operation of the Gorgy timing
f) backup procedure of servers on external disks
g) general and integrated verification of the operation of the station and its components

3.6 The Meeting took note that the DC Block BLK-6-N + (mini circuits) had been installed on 10 January 2018, solving all problems. See details in **Appendix D**.

REDDIG II nodes

3.7 During the mission in Brasilia, issues related to the network in general were addressed. Tasks included:

a) Verification of the operation of the NMS of Venezuela and Ecuador
b) Analysis of instability in the operation of Venezuela
c) Support for NDSatCom
d) Verification of the operation of the La Paz node
e) Disadvantages in the Ezeiza station
f) Establish a procedure for calculating bandwidth consumption

News regarding the IBUC of Suriname and the modem in Bolivia

3.8 The Meeting took note that and 80-W IBUC had been sent to Paramaribo under logistics operation OR-17005, with document SAMRO-77.

3.9 Regarding the problem with the modem in La Paz (Bolivia), the failure that occurred on 15 June 2017 gave rise to logistics operation OR-17003, with document SAMRO-75.

3.10 Regarding the aforementioned cases, note should be taken of the prolonged period during which the equipment remains in the respective customs, and the importance of having focal points available to help avoid these situations. **Appendix E** contains the list of REDDIG II focal points.

Level 3 ground network

3.11 The Meeting took note of the work being carried out with Level 3. In general, work is being carried out in the following areas: definitive solution of node issues; Level 3 portal; service desk; contacts matrix; last miles; credit notes.

3.12 Emphasis was placed on the continuity of activities being carried out, namely:

a) Establish an on-going dialogue with Level 3 to solve issues, by working together.
b) Penalize Level 3 for breaches observed.
c) If applicable, require Level 3 to change the local provider or modify last-mile connections, ensuring high redundancy and the desired availability.
d) Keep the contacts matrix updated, follow up on issues that occur, and coordinate with the technicians of the local nodes as needed.

Final acceptance tests (FNAT) of the REDDIG

3.13 The Meeting took note that on 29-30 January 2018, the REDDIG II final acceptance tests (FNAT) had been carried out, and the FNAT certificate had been signed, taking note that all major failures in REDDIG II, such as random freezing of the satellite modem (Skywan ID 1070) in some REDDIG II nodes, and random freezing of the satellite modem in Manaus (Skywan ID 7000) had been resolved. This activity was carried out at CINDACTA IV facilities in Manaus, Brazil, where the Manaus node and NCC of REDDIG II are located.

3.14 The FNAT was carried out by: the head of the REDDIG II project, Mr. Onofrio Smarrelli (CNS Regional Officer of the ICAO SAM Office); the Administrator of REDDIG II, Mr. Javier Vittor; and INEO representatives. **Appendix F** contains the FNAT report and the certificate of acceptance of the FNAT.

Implementation of REDDIG II new services

3.15 The Meeting was informed that, since the RCC/20 meeting, the following AMHS circuits had been implemented and commissioned in REDDIG II:

Brasilia - Bogota (May 2017)
Brasilia - Georgetown (July 2017)
Bogota - Caracas (December 2017)
Brasilia - Caracas (March 2018)

3.16 Likewise, the Meeting took note that the following connections had been implemented in the network for radar data exchange between:

Ezeiza - Santiago
Ezeiza – Asunción

Sixth meeting on the technical-operational implementation of REDDIG II

3.17 The Meeting took note that the Sixth meeting on the technical-operational implementation of REDDIG II (RTO/6) had been held on 12 June 2017 at the premises of the Technical Training and Update Section (SIAT) of the Fourth Integrated Centre for Air Defence and Air Traffic Control - CINDACTA IV, Manaus, Brazil.

3.18 The Meeting was informed that 11 member States (Argentina, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Trinidad & Tobago and Venezuela) participated at the RTO/6 meeting, totalling 40 participants, including ICAO experts. The meeting addressed the following topics:

a) Performance of REDDIG
b) Review and update of procedures for the maintenance and operation of REDDIG
c) Analysis of security in REDDIG and its recommendations
d) Purchase of redundant equipment (router / firewall / switch) to standardize the connection and security in the REDDIG

3.19 Regarding the REDDIG security analysis, the Meeting endorsed the conclusion formulated by RTO/6 on the need to implement a redundant router/firewall/switch configuration in each REDDIG II node in order to isolate REDDIG II from IP user services in each node. In this regard, it was agreed that this activity should be carried out under Project RLA/03/901 to ensure installation within a same period of time and standardized. The REDDIG II Administration would conduct a technical/economic study that, once completed, would be circulated to all REDDIG II States for approval. It is expected that the information will be circulated to the States by the end of July 2018. In this regard, the Meeting formulated the following conclusion:

Conclusion RCC/21-1 Technical-Economic study for the installation of security equipment in REDDIG II Node

That, the REDDIG Administration, in order to protect REDDIG II from possible external threats and ensure concurrent installation of standard equipment:

a) conduct by the end of July 2018 a technical-economic study on the implementation of redundant equipment (router/firewall/switch) in each node of REDDIG II, to be conducted under Project RLA/03/901;
b) send the study to REDDIG II member States for feedback and possible approval by 30 September 2018.

APPENDIX A

ADVANCED COURSE OF OPERATION OF THE REDDIG
(Manaus, Brazil, 13 to 16 June 2017)

CONTENTS

APPENDIX B

COURSE ON IP NETWORKS APPLIED TO THE REDDIG II
(Manaus, Brazil, 13 to 17 November 2017)

CONTENTS

Day 1

1. **InternetNetworking**

   - OSI model and TCP / IP model
   - Basic functions of the physical layer, link, network and transport
   - Encapsulation, PDU overhead

2. **Operation of the Cisco IOS software**

   - Characteristics and functions
   - CLI User and Privileged modes
   - Basic commands on privileged mode
   - Help commands
   - Error messages (logs)
   - Types of router memories
   - Presentation on router hardware and switches used in REDDIG

3. **LAN**

   - Collision domain and broadcast
   - Differences between hubs and switches
   - Frame Ethernet
   - Mac Address and types of network communications (unidissemination / broadcast / multicast)
   - Frame routing in a switch
   - Full-Duplex and half-Duplex modes and speed (troubleshooting)
   - Hardware y software features of the Netgear switch

4. **VLAN**

   - Importance of the VLANs
   - Frame Ethernet 802.1q
   - Types of VLAN interfaces (trunk / Access)
   - Native VLAN in a port
   - STP
   - Configuration of VLANs in Netgear
   - REDDIG VLANs mapping

5. **VLANs (Packet Trace and Netgear) configuration laboratory**

Day 2

1. **IP addressing**

- IP header
- IP addressing types (compare with REDDIG addressing)
- Subnetting / Masks
- VLSM
- REDDIG IP addressing structure
- IP addressing laboratory / Subnet

2. **Transportation layer**

- TCP / UDP differences
- ¿Which REDDIG applications use TCP and UDP?

3. **Initial configuration of a router and a switch**

- Initial logical configuration of the Cisco router and Netgear switch
- Interface and administrative IP addressing
- Software licenses
- Types of router access
- CDP / LLDP
- ARP
- Brief example on how a package travels in a switch and router network

4. **VRRP**

- Operation
- Advantages
- REDDIG VRRP configuration
- Priority
- IPSLA Tracks

5. **IP routing**

- Router operation
- Features of a Cisco router (CEF)
- Path determination and routing table
- Administrative distance
- Route types (direct, static, dynamic and default) – show the REDDIG routing table as reference

Day 3

1. **Static routing**

- Advantages and disadvantages of static routings
- Manners for the configuration of static routes (next-hop / interface)
- Default routes
- Configuration of static routes in REDDIG (Level-3)
- Show IP route

2. **Dynamic routing**

- Areas
- Router types in OSPF (DR, BDR, ASBR, ABR)
- LSDB / SPF / Hello
- Vicinity and adjacency (see REDDIG router)
- Status of an interface with adjacency
- DR / BDR selection
- LSA / LSA types
- Troubleshooting commands
- SH IP OSPF information, REDDIG router data base
- SH IP OSPF neighbours status

3. **Inter-VLAN routing**

- VLAN routing objectives
- VLAN routing s in the REDDIG trunks

4. **Laboratories involving static, dynamic and inter-VLAN routing**

Day 4

1. **Access lists**

- Use of ACLs
- ACL types
- Construction of ACLs
- Wildcards
- ACLs used in REDDIG

2. **NAT**

- Use of NAT
- NAT types (static, PAT)
- Use of NAT in REDDIG

3. QoS

- Importance
- Basic parameters of a network (jitter, delay, loss of packages)
- DIFFserv
- Traffic classification
- Policers
- QoS application in interfaces
- Troubleshooting commands for QoS
- QoS configuration in REDDIG Cisco routers

4. Traffic tunnelling

- Operation
- BSTUN
- GRE
- Tunnel configuration in REDDIG

5. Laboratories involving ACL, NAT, QoS and tunnels)

Day 5

1. VOIP

- Analogue and digital interfaces
- Basic protocol concepts in SIP signalling
- Codec types
- VOIP configuration in Cisco
- Call-manager
- Dial-peers
- Translation rules
- VOIP configuration in REDDIG

2. WAN technologies

- Link layer protocols
- Point-to-point link configuration
- Configuration of WAN links in the SkyWAN modems
- Configuration of routing protocols in SkyWAN modems

3. MPLS

- Basic operation concepts of the service provider MPLS network
- REDDIG traffic routing through the Level-3 MPLS network

APPENDIX C

NCC REDDIG MANAUS

CURSO FUNDAMENTOS DE REDES
(BÁSICO)

PROGRAMA DE CAPACITACIÓN PARA PERSONAL NCC MANAUS
Y PROGRAMA DE ESTUDIO

1- INTRODUCCION

Teniendo en cuenta los continuos y rápidos avances de la tecnología en las Telecomunicaciones y redes, aplicados específicamente a la aviación civil, se hace necesario que el personal técnico, involucrado con aplicaciones de las mencionadas tecnologías, se familiarice con conceptos que les permita afianzar los conocimientos adquiridos producto de la experiencia y trabajos diarios en sistemas de telecomunicaciones.
El curso de capacitación tiene como fin renovar y complementar los conceptos fundamentales y avanzados en sistemas de transmisión empleados en el transporte de voz y datos aplicados a la aviación civil.
El esquema del curso propuesto se basa en los fundamentos de redes orientados a las aplicaciones aeronáuticas sobre IP del proyecto RLA/03/901 de la SAM de la OACI, en el curso teórico-práctico CCNA (Cisco Certified Networking Associate), Networking Fundamentals y de diferentes fuentes las cuales tratan de forma lógica los temas en telecomunicaciones. Tales fuentes han sido probadas por muchas universidades con buenos resultados, complementado con protocolos y datos empleados para aplicaciones aeronáuticas, dándole un enfoque particular.

2- OBJETIVO GENERAL

Conocer la terminología, conceptos generales y específicos de los estándares de transmisión de voz y datos en redes basadas en tecnología TCP/IP, que emplea la REDDIG para el transporte de la señalización de los distintos sistemas aeronáuticos, incluso lo concerniente al transporte de datos radar.

3- OBJETIVOS ESPECÍFICOS:

Que el cursante (técnico) conozca los fundamentos de los protocolos LAN y WAN aplicados en el transporte de voz y datos (interfaces asincrónicas de datos RS232, la interface serial síncrona V35, fxs/fxo, asterix, etc).
Que el cursante pueda adquirir los conocimientos que permitan la utilización de los estándares establecidos para solucionar problemas de compatibilidad entre distintos fabricantes y unificar criterios para la implementación de sistemas de telecomunicaciones.
Familiarizarse con los protocolos TCP, UDP y los dispositivos de networking.
Que el cursante tenga una introducción para iniciarse en el estudio y análisis en el transporte de datagramas en redes IP.
Que pueda conocer y estudiar mediante simulación el intercambio de paquetes entre unidades de enrutamiento IP.
Comprender la relación de dichas tecnologías con las aplicaciones aeronáuticas.
Que el cursante tomé conocimiento del funcionamiento del protocolo de control de enlace; HDLC, y aplicarlo a la transmisión de datos en formatos ASTERIX. Introducción a la configuración de enlaces asíncronos y síncronos.
Que el cursante pueda reconocer topologías y situaciones típicas de un escenario de networking.
Que el cursante pueda reconocer diferentes componentes a través de las diferentes actividades y prácticas de laboratorio de lo enunciado precedentemente.

4- REQUISITOS:
Personal técnico que preste servicios en el ámbito de competencia de las telecomunicaciones aeronáuticas del NCC Manaos.

ESTRUCTURA DE CURSO:
Para el logro de los objetivos propuestos, el curso se impartirá distribuido en capítulos centrales, incluyendo el desarrollo de contenidos teóricos y teórico-prácticos, existiendo correlatividad lógica entre los mismos.

RÉGIMEN DE DICTADO:
La capacitación se desarrollará en forma presencial, en módulos horarios de 90 minutos cada uno y con actividades como tareas a complementar para la siguiente clase.

DURACIÓN DEL CURSO:
El curso de Fundamento de Redes se desarrollará en el lapso de los 8 (Ocho) clases en días hábiles.

METODOLOGÍA:
El curso se desarrollará en forma presencial, y con tareas extracurriculares, mediante secciones de formación teórica en el aula, con participación activa del cursante por medio de análisis y solución de problemas en el área de estudio respectiva. Los conocimientos adquiridos serán aplicados en el laboratorio (o lugar adecuado para tal fin) donde el cursante simulará situaciones de desempeño y configurará parámetros en equipos y software, dando solución a los problemas propuestos.
La metodología incluye, además, lecturas de documentación técnica, exposiciones de los distintos temas y aprendizaje grupal, con discusión sobre las aplicaciones y casos de estudio propuestos.
Los cursantes tendrán a su disposición, en la web, todo el material necesario para poder cumplimentar el curso. Este sitio contendrá la información necesaria conforme al marco teórico expuesto por el profesor en el aula.
Eventualmente se utilizarán herramientas en el mismo entorno web para poner a disposición los prácticos que se programen.

EVALUACIÓN:
EXAMEN ESCRITO: Se tomará un examen escrito integrador de todos los contenidos.

AYUDAS DIDÁCTICAS:
El contenido se desarrollará con el apoyo documental específico requerido en el presente documento.
Las clases se dictarán en aula equipada con pizarrón, elementos de escritura, borrador, bancos/escritorios para los alumnos, escritorio para el profesor. PC, cañón y pantalla de proyección/ En laboratorio, equipado con equipos de networking, se desarrollarán las prácticas con un máximo de dos (2) alumnos por grupo.
La metodología empleada se apoyará en los siguientes recursos hardware y software que estén disponibles.

Nota: Todo el software requerido será suministrado por el instructor; únicamente se requieren permisos de administrador local en cada equipo para su instalación. La información, software y accesorios serán alojados en el servidor o donde designe el personal de informática que brinde el soporte, con acceso a los cursantes y para uso exclusivo.
El material requerido anteriormente, no es imprescindible para el curso; eventualmente será coordinado con el personal responsable de cada lugar del dictado del curso para evaluar las ayudas con las que se contará en cada caso.

CRONOGRAMA

CONTENIDO (UNIDADES/TEMAS)	TEORÍA	PRÁCTICA
Día 1		
1.1. Estándares	**20 min**	**30 min**
1.2. Organizaciones estándares.	**20 min**	
1.3. Modelos	**20 min**	
Día 2		
2.1. Capas del modelo	**50 min**	**30 min**
2.2. Interconexión de capas.	**10 min**	
Día 3		
3.1. TCP/IP	**10 min**	**30 min**
3.2. Protocolos de Capa Física.	**10 min**	
3.3. Redes de Área Local.	**20 min**	
3.4 Capa Física, protocolos WAN	**20 min**	
Día 4		
4.1. Protocolos Nivel 2.	**15 min**	**30 min**
4.2. Protocolos Capa de Red.	**15 min**	
4.3. Enrutamiento.	**30 min**	
Día 5		
5.1. Capa de Transporte	**10 min**	**30 min**
5.2. Protocolos de Capas Superiores	**10 min**	
5.3. Herramientas de Diagnóstico	**20 min**	
5.4. Prácticas y ejercicios	**45 min**	
Día 6		
6.1. Notaciones	**10 min**	**30 min**
6.2. Matemática binaria	**25 min**	
6.3. Direccionamiento IP	**25 min**	
Día 7		
7.1. Introducción a la telefonía	**10 min**	**30 min**
7.2. Conceptos	**10 min**	
7.3. Equipos de Networking	**15 min**	
7.4. Prácticas y ejercicios	**15min**	
7.5. Troubleshooting	**10 min**	
Día 8		
8.1. Evaluación	**1h30min**	

Nómina del personal del NCC que participo del curso.

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1S BET	ERALDO MENEZES DA SILVA	eraldomenezes@gmail.com	511455
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3S BET	DANIEL AUGUSTO RIBEIRO	daniel.augrib12@gmail.com	575415

APPENDIX D

REPLACEMENT OF THE DC BLOCK IN THE BRASILIA NODE

The DC Block needed to be replaced by four definitive DC-Blocks adapted to the frequency range of the REDDIG system. For which INEO sent to the SBBR site four DC Block BLK-6-N + (Mini-Circuits). These were finally installed on January 10, 2018, leaving the Brasilia station with all the problems resolved.

This task was scheduled and planned, on the aforementioned date, and the installation of the DC Blocks in the Brasilia node was proceeded in due time, in coordination with Eng. Clement, Ten. Rodolfo, Sg. Maia, and this Administration.

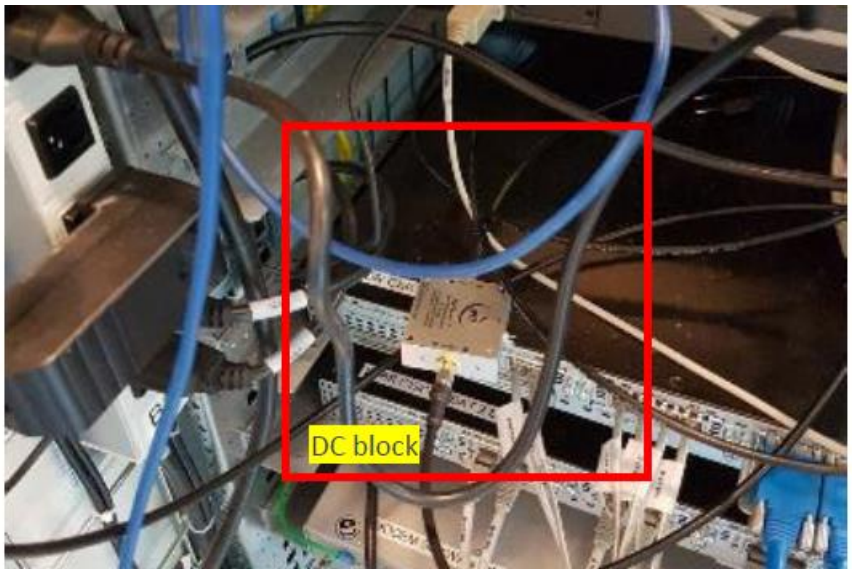
It should be noted that the services were not affected. Before starting the replacement, the IBUCs were disabled and started working for the terrestrial backup.

Once the task was finished, the status of the IBUCs was normalized and enabled, with which the station returns to normal operation and with the new DC Blocks.

Esta imagen muestra dos DC Blocks en Skywan A

Esta imagen muestra dos DC Blocks en Skywan B

Esta imagen muestra que el DC Block anterior fue retirado



DC Block que se había instalado provisoriamente (no existe actualmente)

APPENDIX E / APENDICE E

REDDIG II FOCAL POINTS / PUNTOS FOCALES REDDIG II

State / Estado	Name / Nombre	Cargo	E-Mail / Correo-e	Telephone / Teléfono	Address / Dirección
ARG	Moira Lidia Callegare	Jefe Departamento Proyectos – DNSA - ANAC	mcallegare@anac.gov.ar	(5411) 594-13097	Edificio ANAC Central Paseo Colón 1452, Ciudad Autónoma de Buenos Aires, CP 1063
	Sergio Alberto Vallone	Inspector de Navegación Aérea, Depto. Regional Noroeste de Inspecciones de la Dirección Nacional de Inspecciones de Navegación Aérea - ANAC	svallone@anac.gov.ar	(54351) 475-6414	Dirección Regional Noroeste Camino Pajas Blancas Km. 8.5, CP 5000, Córdoba Capital
	Javier Schenk	Gerente CNS - EANA	Jschenk@eana.com.ar	(54911) 28370135	EANA S.E. Av. Rivadavia 578, Piso 3 Buenos Aires, Argentina
BRA	Eduardo Alberto do Nascimento Fontes	Jefe de TIC - DECEA Avenida General Justo, 160 Rio de Janeiro, Brasil	eduardeanf@decea.gov.br	(5521) 21016620	Av. General Justo 160, Rio de Janeiro, Brasil
	Renata Rodrigues Frias	Asesora de Comunicaciones - DECEA	renatarrf@decea.gov.br	(5521) 21016869	Avenida General Justo, 160 Rio de Janeiro, Brasil
BOL	Hernando Lara	Jefe Unidad Nacional CNS AASANA	nanos_24@hotmail.com	(5912) 212-7959	Aeropuerto Internacional El Alto, Bloque Técnico AASANA
	Remigio Blanco	Responsable de Telecomunicaciones AASANA	rblanco@aasana.bo	(5912) 237-0340	Aeropuerto Internacional El Alto, Bloque Técnico AASANA
CHI	Christian Vergara Leyton	Supervisor de Mantenimiento Técnico - DGAC Centro de Control de Santiago	cvergara@dgac.cl	(562) 836-4005; (562) 836-4011; (562) 644-8345	Avenida San Pablo 8411, Comuna de Pudahuel, Santiago, Chile
	Pedro Pastrián Céspedes	Supervisor de Mantenimiento Técnico - DGAC Centro de Control de Santiago	ppastrian@dgac.cl	(562) 836-4005; (562) 836-4011; (562) 644-8345	Avenida San Pablo 8411, Comuna de Pudahuel, Santiago, Chile

State / Estado	Name / Nombre	Cargo	E-Mail / Correo-e	Telephone / Teléfono	Address / Dirección
COL	Andrés Colmenares Rincón	Director de Telecomunicaciones y Ayuda a la Navegación Aérea		(571) 296-2224; (57) 317-5170996	Aeropuerto Internacional El Dorado, Av. El Dorado N° 112-09 Edif. C.N.A. (Centro Nacional de Aeronavegación)
	Gabriel Enrique Guzmán Pachon	Jefe del Grukpo de Sistemas de Comunicaciones	gabriel.guzman@aerocivil.gov.co	(571) 296-2940; (57) 317-656 7202	Aeropuerto Internacional El Dorado, Av. El Dorado N° 112-09 Edif. C.N.A. (Centro Nacional de Aeronavegación)
ECU	Washington Wilfrido Quinde Muñoz	Coordinador Área de Sistemas de Telecomunicaciones Servicio Fijo Aeronáutico	washington.quinde@dgac.gob.ec	(593-4) 269-2829	Av. De las Américas, Edif. Servicio para la Navegación Aérea, Guayaquil
FRA	Michel Areno	Dirección de los servicios de navegación aérea (Francia) - Jefe del centro de control del aeropuerto de Cayena	michel.areno@aviation-civile.gouv.fr	594 594 359395	Aviation Civile, Aeroport de Cayenne Félix Eboué, 97351 Matoury, Guyane Francaise
GUY	Mortimer Salisbury	Supervisor - AN & T - GCAA	mbsalisbury2000@yahoo.com	(592) 261-2569	Control Tower complex, Cheddi Jagan International Airport, Timehri, East Bank Demerara, Guyana
	Sewchan Hemchan	Electrical Engineer - GCAA	sewchan_hemchan@yahoo.com	(592) 261-2569	Control Tower complex, Cheddi Jagan International Airport, Timehri, East Bank Demerara, Guyana
PAR	Víctor Morán Maldonado	Jefe Departamento de Comunicaciones - DINAC	moranchu@gmail.com	(595 21) 758 5208	Centro de Control Unificado, Gral. Artigas y Fernando de Mompox, Mariano Roque Alonso, Paraguay
	Aldo Pereira Alcaraz	Jefe Sección Radiocomunicaciones - DINAC	aldopereira26@gmail.com	(595-21) 645-708; (595-21) 645598	Centro de Control Unificado, Gral. Artigas y Fernando de Mompox, Mariano Roque Alonso, Paraguay
PER	Luis Silva Gárate	Jefe del Equipo encargado de la Operac. y Mantto. del Nodo REDDIG-Lima - CORPAC	lsilva@corpac.gob.pe	(511) 515-3015; (511) 414-1250	Aeropuerto Internacional Jorge Chávez, Callao, Perú
SUR	Mitchell Themen	Ministry of Transport, Communication and Tourism - CNS Technical Division - CAD	mickiano@live.com	(597) 325-123 597) 325-172 (597) 497-143	J. A. Pengel International Airport, Zanderij, district Para, Zorg en Hoop Airport, Paramaribo

State / Estado	Name / Nombre	Cargo	E-Mail / Correo-e	Telephone / Teléfono	Address / Dirección
TRI	Shiraz Gopaul	CNS Supervisor - CAA	sgopaul@caa.gov.tt	(1-868) 669-4806 (1-868) 669-4706,	Trinidad and Tobago Civil Aviation Authority Complex, Caroni North Bank Road, Piarco
	Veronica Ramdath	Manager Telecommunications and Electronics - CAA	vramdath@caa.gov.tt; vramdath@gmail.com		
URU	Miguel Vera	Técnico de la División Comunicaciones - DINACIA	miguelvera@adinet.com.uy	(5982) 6010932, Ext. 4520	Aeropuerto Internacional de Carrasco Av. Wilson Ferreira Aldunate 253 Paso Carrasco, Canelones
VEN	Vicente FioreFedullo	Jefe Región Maiquetía-INAC	v.fiore@inac.gob.ve	(58212) 355-2143; (58212) 355-1412	Edificio ATC, 2do piso, Depto. De Comunica., Maiquetía, Edo. Vargas, Venezuela
	Luis Escobar	Coordinador de los Sistemas de Comunicaciones CNS Región Maiquetía-INAC	l.escobar@inac.gob.ve	(58212) 355-2143; (58212) 355-1412	Edificio ATC, 2do piso, Depto. De Comunica., Maiquetía, Edo. Vargas, Venezuela

Manaus Brazil
30 January 2018

FNAT ATTACHMENT COMMENTARIES

The Provisional Site Acceptance Tests, (Document PSAT – NAT - NT 2022-2141167C rev H) were made from 31 January to 5 February 2015. Once the tests were concluded, the focal points of the REDDIG II States members proceeded to sign the PSAT certificate with comments in each of the nodes.

The results of the PSAT tests in each of the nodes were registered by the focal points in the PSAT document (H version). In the web page www1.lima.icao.int/reddig are published the PSAT documents completed by the focal points.

According to the article 13.1 of the REDDIG II Contract No. 2250120 established between the International Civil Aviation Organization and the consortium consisting of INEO Engineering and Systems and LEVEL 3 PERÚ S.A, for the Provision of a New Regional Aeronautical Telecommunication Network (REDDIG II) and associated equipment and services, the rectification of Network deficiencies evidenced at PSAT would had to be completed in the period of forty (40) ORD days after the PSAT

The majorities of the pending issues identified in the REDDIG II during the PSAT were solved during the first semester of 2015 with the exception of following major failures:

Random freezing at some of the satellite modems (SkywanID 1070) REDDIG II nodes

Random freezing at the Manaus modem A (Skywan ID 7000)

Random freezing at some of the satellite modems (SkywanID1070) REDDIG II nodes

With respect to this failure, INEO reported at the end of 2016 that it was due to a synchronization problem between the RXRF part and the Skyway modems, and to fix the problem, requires replacing all existing LBNs (which presently generate internally their own 10MHz reference frequency) by new LNBs (receiving an external 10MHz reference frequency coming from the Skyway).

The replacement of the LNBs started on the month of February 2016 and was completed at the beginning of April 2017. The replacement was made during the following schedule date:

Manaus	11th February 2016
Recife	17th February 2016
Lima	15th April 2016
Cayenne	6thJune 2016
Ezeiza	17th June 2016
Guayaquil	8th July 2016
Brasilia	9thJanuary 2017
Curitiba	11th January 2017
Piarco	6th February 2017
Paramaribo	9th February 2017
Georgetown	13th February 2017
Maiquetia	16th February 2017
Bogota	19th February 2017

T.S.
CC

La Paz	29th March 2017
Santiago	5th April 2017
Asuncion	30th March 2017
Montevideo	9th April 2017

Random freezing at the Manaus modem A (Skywan ID 7000)

The Skywan MODEM of Manaus is the most important equipment of the satellite REDDIG II subnetwork because it controls all the rest of the MODEMs of REDDIGII network. There is only one master in Manaus and one backup master in Ezeiza, in both sites, identified as Skywan "A".

Even though INEO took the necessary actions to install externally referenced LNBs and 10 MHz redundancy kits (February 2016) the problem persisted in Manaus.

On May 19 2017 INEO with ND SATCOM (Skywan modem manufacturer) 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 continued. This default occurred every eight (8) to ten (10) days. This condition forced to restart the said equipment to normalize its operation.

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.

ND Satcom developed a specific debug software, which was implemented in the REDDIG II in October 2017. This later showed evidence of an overload of TCP sockets opened, root of the issue (the quantity of TCP socket is limited and got to overflow, resulting in freezing the device). Following this evidence was discovered a wrong configuration between the NMS What´s Up Gold and the Skywan Modem A, and proceeded to be fixed.

The last occurrence of freezing in the Manaus Skywan MODEM A was the 19th November 2017 and since now no additional freezing occurred.

FNAT PROCEDURE

Considering that the major REDDIG II pending issues were solved as described above, the FNAT procedure has been be made the from 29 January to 30 January 2018 in Manaus Brazil in the installation of CINDACTA IV where is hosted the REDDIG II node and the main Network Control Center (NCC).

During the FNAT it was reviewed the functioning of the NCC , the configuration of the satellite MODEM Skywan A 7000 and the NMS (Network Management System). Additionally it was reviewed the status of functioning of all the nodes of REDDIG II.

It was verified that the action made by INEO solved the REDDIG major problem that originated the delay of the FNAT and proceeded to sign the FNAT certificate the 30 January 2018.

The FNAT process and certificate signature were made by the following representatives of INEO and ICAO:

For INEO :
Thierry Su
Clement Chevallier

For ICAO :
Onofrio Smarrelli
Cristian Javier Vittor

The FNAT was made only at the REDDIG II satellite sub network, due that the FNAT for the ground REDDIG II network was made in January 2016 and Amendment 4 for the REDDIG II Contract No. 2250120 was signed.

During the FNAT were considered the following action to be completed in the following time period by INEO in conjunction with REDDIG II Administration :

a) Pending to reload the OSPF in the Manaus SKYWAY modems.
b) Review of the cabling for IBUC monitoring in Manaus due to loss of packets
c) Review the monitoring configuration of the IBUC and RX in the NETGEAR in Manaus

The technical representative of INEO Mr. Clement Chevallier will proceed to solve all the above pending issues in Manaus for the 2 February 2018.

The SKYWAN Modem in La Paz node presents problem in the main and standby equipment. In order to solve the problem Mr. Clement Chevallier an INEO Engineer will go to La Paz from 12 to 16 February 2018 with Mr. Cristian Javier Vittor the REDDIG II Administrator

Additional the following pending issues will be studied during this period and solved no later than the 28th February 2018:

CRC errors in the network generated from Bogota REDDIG II node
Updating Manaus diagram installation

Onofrio Smarrelli

ICAO Lima Regional CNS Officer
REDDIG II Manager Project

Cristian Javier Vittor

REDDIG II Administrator

Thierry SU

Project Manager
INEO ENERGY & SYSTEMS

Clement Chevallier

Technical Manager
INEO ENERGY & SYSTEMS

FINAL NETWORK ACCEPTANCE TEST CERTIFICATE

Reference: International Civil Aviation Organization (ICAO)
Contract: 22501200
REDDIG II Network
RLA/03/901 – REDDIG II Project Group

We hereby acknowledge that the REDDIG II network and associated equipment (all sites) have been verified in accordance with mutually agreed upon test procedures and found to be compliant with the provisions of ICAO Contract 22501200.

On behalf of INEO Engineering and Systems / Level 3*

THIERRY SU
Project Manager Authorized Representative

30.01.2018
Signature and Date

CLEMENT CHEVALLIER
Technical Manager Authorized Representative

30/01/2018
Signature and Date

On behalf of the REDDIG II Project Group

ONOFRIO SMARRELLI
Project Manager Authorized Representative

30 Janvy 2018
Signature and Date

CHRISTIAN JAVIER VITTOR
REDDIG II Administrator Authorized Representative

30-01-2018
Signature and Date

Note : FNAT commentaries are attached to this certificate.

* A separate FNAT certificate was signed with LEVEL 3 according to Amendment IV of the Contract.

Agenda Item 4: **Work plan for year 2018**

4.1 Under this agenda item, the following working paper was presented:

- WP/04 – *Activities foreseen for 2018* (Presented by the Secretariat).

4.2 The Meeting reviewed the following activities scheduled for 2018:

a) REDDIG II training and meeting programme; and
b) REDDIG II operation and analysis of the implementation of new services.

REDDIG II TRAINING AND MEETING PROGRAMME

4.3 The Meeting approved the following training courses and meetings for 2018:

- Course on the operation, maintenance and programming at the factory of SKYWAN 7000/1070 satellite modems for 3 persons in charge of NCC management, two from the Manaus NCC and one from the Ezeiza NCC. The course is scheduled for 17-21 September 2018. Project RLA/03/901 will cover the cost of the course, as well as the air tickets and DSA for the participants.

- Course on the operation, maintenance and programming of the SKYWAN 7000/1070 satellite modems for staff responsible for maintenance of REDDIG II nodes. The course is tentatively scheduled for 17-20 October 2018 at a node in Brazil to be defined (other than Manaus). The course will be delivered by the staff that followed the satellite modem course at the factory.

- Seventh meeting on the technical-operational implementation of REDDIG II (RTO/07) at a node in Brazil to be defined (other than Manaus) on 15-16 October. Project RLA/03/901 will cover 2 fellowships per REDDIG II node, the DSA and air tickets for the REDDIG II administrator, and simultaneous interpretation services.

REDDIG II OPERATION AND ANALYSIS OF THE IMPLEMENTATION OF NEW SERVICES

4.4. The Meeting discussed the conduction of the following activities for 2018:

- Acquisition of REDDIG II spare parts and updating of settings
- Replacement procedure for failed node equipment
- Programming of preventive maintenance
- Visits to REDDIG II nodes
- Transfer of the Bogota REDDIG II node
- Installation of a new REDDIG II node in Ezeiza
- Implementation of new REDDIG II services
- Implementation of new MEVA III-REDDIG II services and contractual considerations.

Acquisition of REDDIG II spare parts and updating of settings

4.5 The Meeting took note of the spare parts currently available and of the need to purchase more, based on failures occurred and the expiration of the warranty period for most equipment.

4.6 In this regard, in order to resolve failures in the nodes while the damaged equipment is sent to the factory for repair, the Meeting reviewed the list of additional spare parts contained in Appendix C to WP/04. The Meeting approved the acquisition of the additional spare parts listed, together with two GORGY TIMING units. In the same way, the Meeting considered that it was necessary to renew the antivirus of the NMS.

Replacement procedure for failed node equipment

4.7 The Meeting agreed that, upon expiration of the warranty for most of REDDIG II equipment, the procedure for replacing and sending faulty equipment to the factory for repair would be as follows: the REDDIG administration, from the ICAO SAM Office in Lima, will send the spare equipment or piece of equipment to the node that had the failure. The State of the node will send the damaged equipment or piece of equipment to the ICAO SAM Office, which, in turn, will send it to the factory for repair. Once repaired, the equipment will return to the ICAO SAM Office, where it will be placed in storage. Coordination will be through the REDDIG Administration, REDDIG focal points, and the representatives of equipment manufacturers. In this regard, the Meeting stressed the importance that States keep the list of REDDIG II focal points duly updated.

Programming of preventive maintenance

4.8 The Meeting deemed it important to continue with the preventive maintenance programme for all REDDIG II equipment at the NCCs and in all the nodes of REDDIG II, which started in April. The preventive maintenance programme is shown in **Appendix A**.

Visit to REDDIG II nodes

4.9 As part of REDDIG II maintenance and training activities, the Meeting agreed that the REDDIG Administrator visit one or two nodes per year for a full assessment of the node and offer a general refresher course for the staff responsible for node maintenance. The Meeting agreed that the REDDIG Administrator would visit the Maiquetía node in 2018. The visit would last one week and was scheduled for mid-July.

Transfer of the Bogota REDDIG II node

4.10 The Meeting took note of the new offer by INEO to relocate the Bogota node, as shown in **Appendix B** to this agenda item. The proposal was currently being reviewed and was being negotiated by the ICAO Technical Cooperation Bureau, the REDDIG Administration, Colombia, and INEO. The transfer of the Bogota node would be carried out through contract REDDIG II 22501200 and the cost would be borne by Colombia.

4.11 In this regard, a teleconference was scheduled for 18 May 2018 with the participation of representatives of the Administration of Colombia, the REDDIG Administration, the ICAO Technical Cooperation Bureau in Montreal, and INEO.

Installation of a new REDDIG II node in Ezeiza

4.12 The Meeting took note that the review of INEO's proposal for the installation of a new REDDIG II node in Ezeiza by EANA (Argentina), the ICAO Technical Cooperation Bureau, the REDDIG Administration, and INEO had been completed in mid-April 2018. In this regard, ICAO had negotiated with INEO the proposal dated 1/7/2017, to accommodate it to EANA's budget. The result was proposal B dated 16/02/2018, where the most significant change was the reduction in the number of SKYWAN 7000 units from two to one, reusing one of the modems of the existing Ezeiza node.

4.13 The Meeting took note that the proposal had been approved by EANA in mid-April 2018, as shown in **Appendix C**. This activity was included in contract REDDIG II 22501200 and the cost would be borne by Argentina.

4.14 Based on the proposal of the representative of Argentina, and with the assurance that the facilities of the new Ezeiza ACC would not be completed by this year, Argentina was invited to participate in the teleconference of 18 May in order to present this case, taking into account the validity of the offer submitted by INEO.

Implementation of new REDDIG II services

4.15 The Meeting took note that new AMHS circuits are scheduled for implementation, as shown in **Appendix D**. Furthermore, a hotline circuit was foreseen between Santiago and Lima upon request by Chile, with the approval of Peru. Tasks for the implementation of this service would be coordinated between the parties with the REDDIG Administrator.

4.16 Likewise, the operational implementation of radar data exchange was foreseen between Argentina-Chile, Argentina-Paraguay and Ecuador-Peru. Finally, the data link service from Chile to the central processor of SITA in Rio de Janeiro would be implemented using the circuit configuration approved by the REDDIG group.

Implementation of new MEVA III REDDIG II services and contractual considerations

4.17 Within the context of the MEVA III - REDDIG II interconnection, AMHS between Bogota-Panama, Lima-Atlanta and Brasilia-Atlanta was scheduled for implementation in 2018.

4.18 The Meeting took note that, in view of the increased number of new services in MEVA III, such as the implementation of several AMHS circuits and the exchange of surveillance data, the MEVA III group needed to increase its satellite bandwidth. In this regard, it felt that the costs of the increased bandwidth should be equally divided among all States where a MEVAIII node was installed, including the Bogota and Maiquetía nodes, where MEVAIII interconnected with REDDIG II.

4.19 The Meeting took note that each additional increment of 100khz in the satellite bandwidth of the MEVA III provider will charge an amount of 500 dollars per month. In this sense, as estimated by the MEVA III group, this cost should be divided among the 14 member States, including Bogota and Maiquetía, each State paying 35.70 dollars. Maiquetía and Bogota were considered as a single node, so both would pay only 35.70 dollars. **Appendix E** contains the proposal of the additional circuit in the contract with the MEVA III members.

4.20 The Meeting took note that the contractual terms between REDDIG and the MEVA III provider were specified in another contract. Therefore, if REDDIG member States agreed to share the cost of the increased bandwidth, the contract would be modified accordingly. In case the cost-sharing arrangement proposed by the MEVA III members were not accepted, the States involved would pay 500 dollars per month, which was the cost of implementing a circuit that required a bandwidth of 100kHz.

4.21 In this regard, the States that had services in the MEVA III-REDDIG II interconnection agreed to modify the contract between ICAO, on behalf of REDDIG member States, and the MEVA III provider, to include the shared cost for each 100-kHz increment in satellite bandwidth, since that would favour the migration of the following AFTN circuits to AMHS: Bogota-Panama, Brasilia-Atlanta, Lima-Atlanta, and Caracas-Atlanta. The representative of Venezuela requested for his State, that the Regional Office send an official letter so that the Administration could analyse the proposal for its approval. In this regard, once the response was received from Venezuela, the REDDIG Administration would revise the contract between ICAO and the MEVA III provider.

Diagramación tareas REDDIG para 2018

20-feb-2018

http://icao.int

Administración REDDIG - CNS - ICAO SAM

Encargado del proyecto	
Fechas de inicio y fin del proyecto	02-abr-2018 - 01-dic-2018
Progreso	0%
Tarea	76
Recursos	0

Tareas programadas para ser desarrolladas durante el año 2018 en NCCs y estaciones de la REDDIG.

Tarea

Nombre	Fecha de inicio	Fecha de fin
NCC	2/04/18	30/11/18
Routers	2/04/18	1/06/18
Backup configuraciones // Backup configurations	2/04/18	20/04/18
Verificar configuraciones // Verify configurations	23/04/18	11/05/18
Verificar diagramas y cableado // Verify diagrams and cabling	14/05/18	1/06/18
Verificar identificaciones // Verify identifications	14/05/18	1/06/18
Switches	4/06/18	22/06/18
Backup configuraciones // Backup configurations	4/06/18	8/06/18
Verificar configuraciones // Verify configurations	11/06/18	15/06/18
Verificar diagramas y cableado // Verify diagrams and cabling	18/06/18	22/06/18
Verificar identificaciones // Verify identifications	18/06/18	22/06/18
AMHS -AFTN - AIDC Check	25/06/18	29/06/18
ATS - ADMIN - MANT Check	2/07/18	6/07/18
Verificar WUG // Verify WUG	9/07/18	13/07/18
Externos (ADS-C, otros) // External (ADS-C, others)	16/07/18	20/07/18
Capacitación // Training	2/04/18	30/11/18
VERIFICACIÓN EQUIPOS INDOOR // Indoor equipment verification	23/07/18	3/08/18
Registro fotográfico // Photographic record	23/07/18	3/08/18
Cotejo de diagramas // Compare diagrams	23/07/18	3/08/18
Backup	31/07/18	3/08/18
Servers Local y Global	6/08/18	10/08/18
GPS	13/08/18	17/08/18
MODEM SKWAN A	20/08/18	24/08/18
MODEM SKYWAN B	27/08/18	31/08/18
LINE-UP-MANAGER	3/09/18	7/09/18
ANTENA	10/09/18	2/11/18
Registro fotográfico // Photographic record	10/09/18	14/09/18
Cotejo de diagramas // Compare Diagrams	17/09/18	21/09/18
Backup	17/09/18	21/09/18
LNB A	24/09/18	28/09/18
LNB B	1/10/18	5/10/18
RX 1+1	8/10/18	12/10/18
IBUC A	15/10/18	19/10/18
IBUC B	22/10/18	26/10/18
TX 1+1	29/10/18	2/11/18
VERIFICAR NROS DE SERIE DE EQUIPOS Y ESTADO DE INVENTARIO // Verify serial numbers of equipment and inventory status	2/04/18	31/05/18
LEVEL 3	5/11/18	9/11/18
Identificar equipos // Equipment identification	5/11/18	9/11/18
Verificar cableado // Verify cabling	5/11/18	9/11/18
Nodos // Nodes	2/04/18	2/11/18
Routers	2/04/18	27/04/18
Verificar Configuraciones físicas y lógicas // Verify physical and logical configurations	2/04/18	6/04/18
Verificar Diagramas y cableado // Verify diagrams an cabling	2/04/18	13/04/18
Verificar Identificaciones // Verify identifications	16/04/18	27/04/18
SWITCHES	30/04/18	25/05/18
Verificar Configuraciones físicas y lógicas // Verify physical and logical configurations	30/04/18	4/05/18
Verificar Diagramas y Cableado // Verify diagram and cabling	2/05/18	18/05/18
Verificar Identificaciones // Verify identifications	21/05/18	25/05/18
ATS -ADMIN - MANT	28/05/18	1/06/18
AMHS - AFTN - AIDC Check	4/06/18	8/06/18
Verificar WUG // Verify WUG	11/06/18	15/06/18
Externos // External	18/06/18	22/06/18
VERIFICACIÓN EQUIPOS INDOOR // Indoor equipment verification	2/04/18	27/04/18
Registro Fotográfico // Photographic record	2/04/18	6/04/18
Cotejo de diagramas // Compare diagrams	2/04/18	13/04/18
BackUp	16/04/18	27/04/18
Server NMS Local	25/06/18	29/06/18
GPS	2/07/18	6/07/18
MODEM A	9/07/18	13/07/18
MODEM B	16/04/18	20/04/18
LINE-UP-MANAGER	23/07/18	27/07/18
ANTENA	10/09/18	19/10/18
Registro Fotográfico // Photographic record	10/09/18	14/09/18

Tarea

Nombre	Fecha de inicio	Fecha de fin
Limpieza de antena // Antenna cleaning	17/09/18	21/09/18
Cotejo de Diagramas // Compare diagrams	10/09/18	21/09/18
Backup	24/09/18	28/09/18
LNB A	1/10/18	3/10/18
LNB B	3/10/18	5/10/18
RX 1+1	8/10/18	10/10/18
IBUC A	10/10/18	12/10/18
IBUC B	15/10/18	17/10/18
TX 1+1	17/10/18	19/10/18
VERIFICACIÓN NROS DE SERIE DEEQUIPOS Y ESTADO DE INVENTARIO // Verify serial numbers of equipment and inventory status	22/10/18	2/11/18
LEVEL 3	30/07/18	10/08/18
Identificar equipos // Equipment identification	30/07/18	3/08/18
Verificar cableado // Verify cabling	6/08/18	10/08/18

Diagrama de Gantt

Nombre	Fecha de inicio	Fecha de fin
NCC	2/04/18	30/11/18
Routers	2/04/18	1/06/18
Backup configuraciones // Backup configurations	2/04/18	20/04/18
Verificar configuraciones // Verify configurations	23/04/18	11/05/18
Verificar diagramas y cableado // Verify diagrams and cabling	14/05/18	1/06/18
Verificar identificaciones // Verify identifications	14/05/18	1/06/18
Switches	4/06/18	22/06/18
Backup configuraciones // Backup configurations	4/06/18	8/06/18
Verificar configuraciones // Verify configurations	11/06/18	15/06/18
Verificar diagramas y cableado // Verify diagrams and cabling	18/06/18	22/06/18
Verificar identificaciones // Verify identifications	18/06/18	22/06/18
AMHS -AFTN - AIDC Check	25/06/18	29/06/18
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Externos (ADS-C, otros) // External (ADS-C, others)	16/07/18	20/07/18
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Identificar equipos // Equipment identification	5/11/18	9/11/18
Verificar cableado // Verify cabling	5/11/18	9/11/18
Nodos // Nodes	2/04/18	2/11/18
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Verificar Configuraciones físicas y lógicas // Verify physical and logical configurations	2/04/18	6/04/18
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SWITCHES	30/04/18	25/05/18
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Identificar equipos // Equipment identification	30/07/18	3/08/18
Verificar cableado // Verify cabling	6/08/18	10/08/18

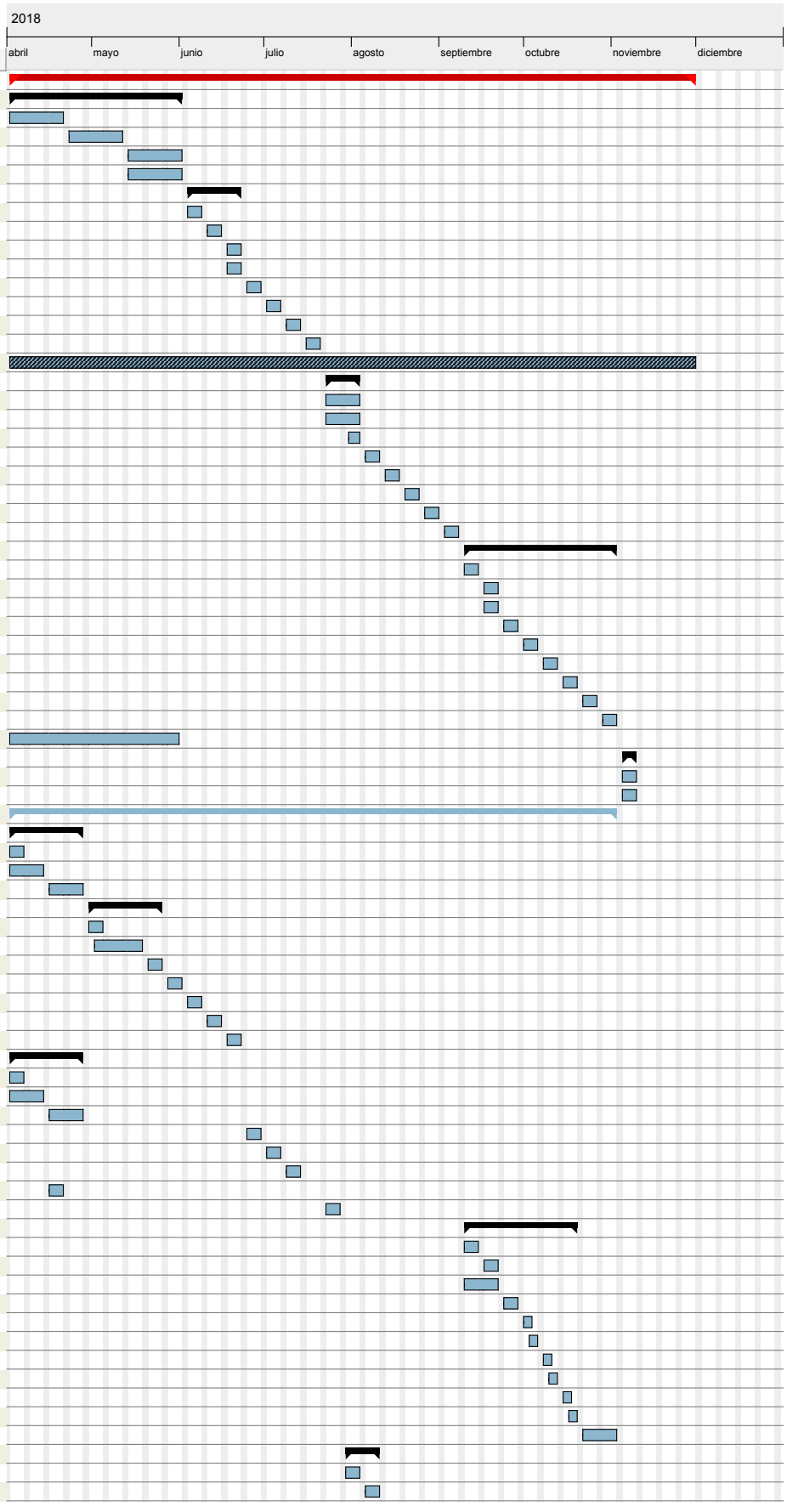
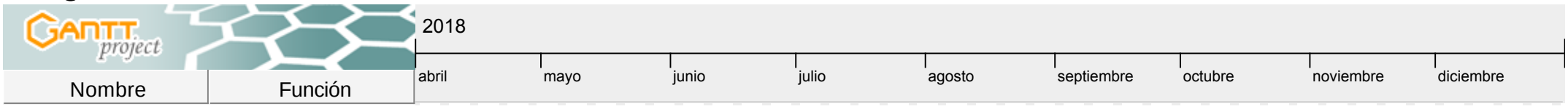


Diagrama de recursos



	CUSTOMER : ICAO	DOC N° OC-2022-30021833
	INEO Proposal for Equipment & Services for the relocation of the REDDIG-II VSAT system at **Bogota**	Rev. : C / Page 1 / 20

APPENDIX B / APENDICE B

CUSTOMER: **ICAO**

DESIGNATION : **BOGOTA Node**
INEO Proposal for REDDIG-II system relocation

Rev	Date	Update status	Writer Name	Approved	
C	06/04/2018	3rd issue: Proposal update	Thierry SU	Grégory IAUCH	
B	30/03/2016	2nd issue: Cost review *(To be read with Addendum-1)*	Thierry SU	Augustin BAREAU	
A	04/02/2016	1st issue: Initial Proposal	Thierry SU	Augustin BAREAU	

TABLE OF CONTENTS

1. PURPOSE

This proposal consists of services and equipment to be provided by INEO to relocate SKED VAST REDDIG-II node at the new CCAC building. The text in dark blue in this document shows the major updates from the previous version.

This offer is based on information provided in the following documents:

- ✓ ICAO's specifications # 4202-2015 (13/10/2016): Traslado Nodo REDDIG/MEVA de Bogotá
- ✓ Exchanges between ICAO and INEO in 2016 (hereafter are the most significant ones):
  - Request for Quotation - Contract 22501200 REDDIG Network (Email dated 18/01/2016)
  - Proposal for REDDIG-II VSAT system relocation at Bogota_A (Email dated 08/02/2016)
  - Proposal for REDDIG-II VSAT system relocation at Bogota_B (Email dated 30/03/2016) (*)
- ✓ Site survey done by INEO in February 2017
- ✓ ICAO's request for an updated quotation taking into account the end-user information:
  - Cuostas proyectos OACI RLA/03/901 (REDDIG II) y RLA/06/901 (CNS/ATM), Traslado Nodo REDDIG (Email dated 11/01/2018) (**)

(*) The Rev B of the offer was sent to ICAO with a revised price list to be read necessarily with the Addundum-1, which explains price changes.

(**) The present offer (Rev C) consists of an update of INEO's offer Rev B, which takes into account the request of Colombia Aerocivil to install the new VSAT antenna on the roof-terrace of the CGAC building, instead of on the ground.

2. CONDITIONS OF THE PROPOSAL

The technical solution that INEO is proposing takes into account the hypothesis listed hereafter. This list summarizes the technical requirements to be accepted by the customer prior starting the transfer of the equipment to the new location. These requirements are described in the section "TECHNICAL SOLUTION".

- o No change (or very minor change) regarding all electrical interfaces to be connected to the services to be transported (AFTN, AMHS, ATS/DS, Telephone…) → See section 3.3.1
- o UPS and adapted breakers are available in the main Low Voltage Board → See section 3.3.3
- o All services (one physical cable per service) are available at the nearest of the new location of the cabinet, with no need of new cables, nor adapting interfaces, nor major configuration change in CISCO Routers. → See section 3.4.7
- o MEVA III services should support an interruption of service during a few days, except AFTN services if these ones are rerouted through Maiquetía (as MEVA III cannot be rerouted by the REDDID-II Ground Back Bone) → See section 3.4.10
- o Two short interruptions of service will occur during final operations to migration the system.

3. TECHNICAL SOLUTION

3.1 PRESENTATION OF THE SOLUTION

INEO proposes the best solution to both limit costs and insure the transition with the fewest possible interruption of services.

The request is that the operation should be transparent for REDDIG-II operational users. Nevertheless, an interruption of a few minutes may be mandatory (see § 3.4 below).
Regarding MEVA services, an interruption of services will be mandatory during the transition (about 2 weeks), as the REDDIG-II antenna is the only link with MEVA nodes, and because MEVA does not have a dedicated router. Nevertheless, services like AFTN could be re-routed through Maiquetía. Colombia Aerocivil is in charge of this re-routing (see § 3.4.10).

Our offer is constructed over a solution designed to limit extra-costs, by proposing to **re-use all indoor and outdoor equipment**, except the antenna (see details later).

However, in order to limit the risks during the transfer operation, INEO proposes to supply optional equipment in case of facing hardware issues during its relocation. In the financial proposal, the items proposed are part of the section “Optional equipment for risk limitation”. As this equipment is not mandatory, the Grand Total of our proposal does not include the cost of this optional equipment.

3.2 OUTDOOR PART

3.2.1 Antenna

In the technical specification requirements (Traslado Nodo REDDIG/MEVA de Bogotá) Colombia Aerocivil proposed to re-use an existing ANDREW antenna.
In the previous revisions of this proposal, INEO already explained why this antenna does not fit to REDDIG requirements. Therefore, INEO did not quote for any relocation for this antenna.

Existing ANDREW Antenna (suggested by Colombia Aerocivil)

The other option proposed by Colombia Aerocivil is to relocate the existing REDDIG antenna. This antenna is a NWIEE CT37 type which has been installed about 14 years ago (picture below). In the previous revisions of this proposal, INEO already explained why INEO does not advise to re-use this antenna. Therefore, INEO did not quote for the relocation of this antenna.

Existing REDDIG-II NWIEE CT37 Antenna (14 years old)

Old antennas will not be re-used. INEO will supply a new one, which is the same as the ones installed for other VSAT nodes (see picture below).

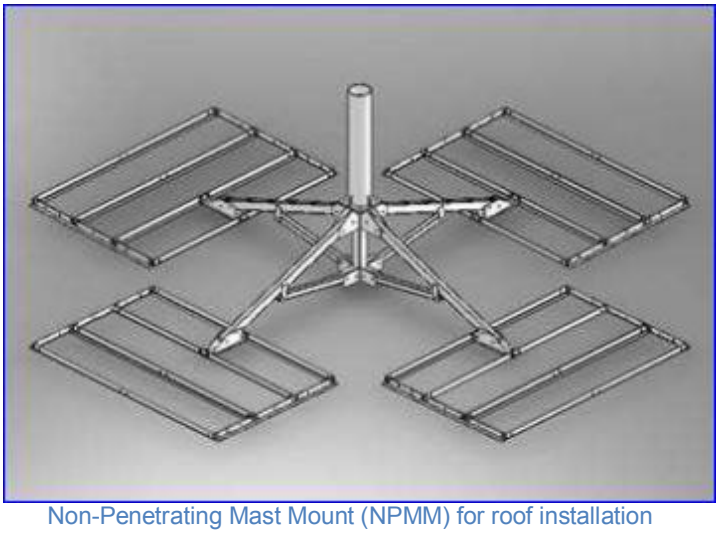
This satellite antenna is a **PRODELIN 1385** type - 3.8m diameter. It is type **approved by Intelsat as F1 antenna**, meaning that it can enter the Intelsat constellation without having to go through a long testing process.

This antenna adopts an offset precision-formed reflector, mounted on an Az over El pedestal, providing necessary stiffness and pointing accuracy required in C band operation. It is provided with an Rx/Tx Co-Pol (2 ports) feed with corrugated horn and OMT.

New REDDIG-II PRODELIN 1385 Antenna proposed by INEO

According to the instructions given by the end-user (email dated 11/01/2018), the new antenna will not be installed on a concrete slab in a plain terrain, but on the roof-terrace of the new CGAC building, at the location determined with Colombia Aerocivil during the site survey done by INEO on February 2017. This antenna installation requires a specific **N**on-**P**enetrating **M**ast **M**ount (NPMM), as shown in the pictures below.

Example of PRODELIN 1385 antenna



Non-Penetrating Mast Mount (NPMM) for roof installation

The local maximum wind speed given by the customer is 67 km/h (42 mph). The ballast to be installed on the antenna pedestal has been determined for a maximum wind speed of **80 mph**. The table hereunder, already submitted to Colombia Aerocivil (email dated 03/03/2017), gives the ballast weight, according to the antenna Manufaturer's datasheet.

Data for Bogota site	**Urban area, Max wind speed 80 mph**	**US**	**ISO**
Coefficient of friction (cu)	With rubber membrane under ant. pads	cu = 0,64	
CGAC building	Max Building Height	20 ft	6 m
Max wind speed (42 mph Colombia Aerocil)	Calculation done for 80 mph to get margin	80 mph	129 km/h
Weight of 1385 Antenna + NPMM	Without ballast	1907 lbs	865 kg
Weight of concrete ballast	To be put on the antenna pad support	584 lbs	265 kg
Total weight on roof	Antenna + NPMM + Ballast	**2491 lbs**	**1130 kg**
Static roof load	According to chart with above conditions	26 lbs/ft²	127 kg/m²

3.2.2 RF equipment

As explained in section 3.4, the same RF equipment will be used, by moving them from the old antenna to the new one.

New supports will be supplied by INEO, to be able to fix the TX1+1 (IBUC from Terrasat), RX1+1 (redundancy switch, from Terrasat) and LNB (from Norsat), on the new antenna, in the same way as for Asunción and Brasilia.

INEO will supply new coaxial cable to limit electromagnetic losses and degradation of the signals. New electrical cables will be also supplied.

As explained in section 3.1, in order to limit the risks during the transfer operations, INEO proposes to supply optional equipment in case of failure of one the operational ones. After the installation is completed, the unused equipment could become new spare parts. Although this equipment is not mandatory, in section § 6.2, INEO proposes:

- One IBUC (from Terrasat)
- One Tx1+1 platform (from Terrasat)
- One RX1+1 platform (from Terrasat)
- Two LNB (from Norsat)

3.3 INDOOR PART

3.3.1 Cabinet and equipment

The same cabinet and equipment will be re-used in order to limit the costs of material and engineering (configuration of equipment).

Regarding the technical information provided by Colombia Aerocivil (email dated 18th January 2016), and the site survey of February 2017, INEO has noted the following:

- The location of the cabinet in the new technical room is already determined.

- Data and Services will be transported through Fiber Optic system and Microwave link, between the current building (CAN) and the new building (CGAG, where should be installed the REDDIG-II System). INEO is considering that this equipment will be operational before the migration of the System.

- All equipment is new and operational in the CGAC building (VCS, Radar, Telephone connected to the existing AMHS system).
  According to the clarifications given by Colombia Aerocivil (email dated 18/01/2016), there are a new VCS, a new Radar System, and a new Telephone System. Therefore, during the migration process, we may encounter some unforeseen interconnection troubleshooting due to this new equipment, when all the interfaces will be connected directly to the REEDIG-II cabinet installed at its new location. This may cause some delay in the migration. INEO understands that all the links and services from each equipment are presently deported from the new CGAG building to the old CAN building, and are temporarily connected to the REDDIG-II cabinet, until this cabinet is moved to the new CGAC building.

- All services are operational the CAN building to the CGAG building.
  However, INEO considers that there is a risk of a temporary malfunction due to some unforeseen connection issues once the cabinet will be relocated, which may cause some delay in the migration.

- During the site survey, INEO could not check all the electrical and operational services which were operating. Therefore, INEO is expecting no change regarding the type of interfaces to be connected from and to the new equipment installed in the new CGAG building.

INEO will not supply new types of hardware interfaces. However, regarding the above information, all equipment is new (VCS, Telephone…). Therefore, INEO wants to point out the fact that we may face some issues when connecting the new equipment in the new CGAG building, as all the existing interfaces may not require exactly the same configurations as the ones used in the CAN building. This may also cause some delay in the migration.

As explained in section 3.1, in order to limit the risks during the transfer operations, INEO proposes to supply the following optional equipment in case of failure of one the operational ones. After the installation is completed, the unused equipment could become new spare parts. Although this equipment is not mandatory, in section § 6.2, INEO proposes:

- One satellite Skywan modem (from NDSatcom)

IMPORTANT NOTICE:
INEO is considering that the same services, the same type of local equipment, the same interfaces and the same configuration will be available on the new site!

If only one service is different (e.g.: new equipment provider, new connection type, etc...), INEO has not foreseen to provide adapting equipment, cards, nor engineering.

3.3.2 Ethernet Link Extension *(no more necessary)*

According to the site survey report, the distance between the antenna (installed on the roof-terrace of the CGAC building) and the cabinet (installed in the new technical room of the CGAC building) will not exceed 60m, including cable tray path. Therefore, the Ethernet connectivity between the cabinet and the outdoor RF equipment will only require Ethernet cables. No more Ethernet link extender is necessary, contrary to what was proposed in INEO's previous offer.

3.3.3 Electrical switch box

An electrical switch box, including the necessary breakers and lightning arrestors will be supplied by INEO. This switch box will supply separate energy for indoor and outdoor equipment, as outdoor cables must have lightning arrestors.
That implies that the existing installation is capable to host the whole REDDIG-II System consumption (indoor and outdoor equipment).

3.4 TRANSITION PROCEDURE

3.4.1 Presentation

In term of services, the required interfaces consist of five serial connections (AFTN), two E1/T1 connections (ATS, MNT), and two IP connections, to be connected to the REDDIG-II system, through one unique Cisco router.

Important notice: INEO strongly recommends having at disposal, on the site, some spare equipment, in order to be able to replace immediately a device which would not restart after having switched off and moved from the old site to the new one. In case no spare would be available, INEO recommends purchasing the optional hardware equipment listed in Section 6.2.

INEO proposes to withdraw one router from the cabinet, and connect directly all services to this unit, using transition connections, while the relocation of all the others equipment is done.

The following procedure will start from the moment the new antenna (installed on the roof of CGAC building) and all the electrical wirings are ready in the new site.

3.4.2 Step 1: Withdrawing of transition equipment

All operational services will be working through Chain A of the REDDIG-II cabinet. Therefore, the IP Netgear switch, the IP Cisco router, and the LEVEL 3 equipment can be switched off and removed from the cabinet. Refer to § 3.6 regarding LEVEL 3 interaction.

During this period of time, all services are still working on the REDDIG-II chain A.

3.4.3 Step 2: Reconnection of removed equipment

All services can be reconnected to the removed equipment, installed on a temporary table nearby the cabinet, in the old technical room. This equipment should be powered with precaution by the local UPS, which should exist in the technical room. Electrical reconnections must be done firstly. Then, Level 3 equipment can be connected to its own network for connectivity testing, and a temporarily connection could be done with REDDIG-II cabinet to test it.

Please, note that the previous two steps of the procedure are critical and imply a short service interruption.

3.4.4 Step 3: Preparation of transitional service connections

In order to limit as much as possible the service interrupting time, all connection transition will be prepared in advance between the cabinet and the transitional equipment.

3.4.5 Step 4: Switch off satellite link **(Critical)**

This step is critical because both satellite Skywan modems of the station will be switched off. The IP packets should then be re-routed automatically to the transitional equipment. At the same time, services will be disconnected from the REDDIG-II cabinet and directly re-connected to the transitional equipment.

Expected services interrupting time: less than five (5) minutes.

At this moment, operational services will be routed by the REDDIG-II Chain B (outside the cabinet), and through the terrestrial Level 3 network.
From that moment, all the necessary works to be done on the antenna and the cabinet, will be possible, without any time constraint.

3.4.6 Step 5: Relocation of equipment

All necessary precautions can be taken to move the RF equipment from the old antenna to the new one, and to carry the cabinet including its equipment, to the new technical room.

3.4.7 Step 6: Test of the new station

Operational services will be still working in the old site, while the new ones will be tested. Line-Up of the antenna, power up of the equipment and preparation of all the new services will be done at the new site, supposing all the service cables are at disposal at the new location of the REDDIG-II cabinet.

IMPORTANT REMINDER: As mentioned before, INEO is considering that the same services and the same type of equipment are operational in the new site. Colombia Aerocivil is responsible for providing exact and same services at the new location of the REDDIG-II cabinet.

3.4.8 Step 7: Starting up of the new station **(Critical)**

At this step, the new antenna and the operational services are ready to operate from the new site. From the moment both satellite Skywan modems are switched on, all operational traffic will automatically be re-routed from the new site.
At the same time, the disconnection of the services in the old site will occur, and the connection of the same services will start in the new site. The services will start operating from the new site.

Expected services interrupting time: less than ten (10) minutes.

IMPORTANT NOTICE: There is a consequent risk in this step because operational services will be tested only once the new connections are operational in the new CGAG building (see § 3.3.1).

In case of a major issue at this step, the services could be reconnected to the LEVEL 3 equipment, and operate again from the old site.

3.4.9 Step 8: Installation of the transition equipment in the new site

As the operational services will be now operating from the new site, transitional equipment in the old site could be disconnected and moved to the new station. Chain B and Level 3 equipment will be re-installed at their initial location in the cabinet, and reconnected without any trouble for operational services.

3.4.10 MEVA III network

No information has been provided regarding the relocation of MEVA III equipment. INEO is still waiting for clarifications regarding the following questions, and therefore, cannot foresee, nor manage MEVA III migration.

- What is MEVA's modulation? (REDDIG modulation is: 2 PSAK)
- What is the needed bandwidth for MEVA? This information is required to determine the global transmitting power. The IBUC power of Bogota node is limited to 80W.
- Does this transmit power matches REDDIG + MEVA total requirements?

IMPORTANT REMINDER: As mentioned before, an interruption of services is mandatory for MEVA III. If possible, INEO recommends to re-route the traffic through Maiquetía's REDDIG-II station.
That should be done by the local technical staff prior the migration.

3.5 SITE SURVEY

INEO's proposal includes a site-survey which was done ahead of time by INEO, in January 2017. This site survey allowed us to determine the exact location of the antenna on the roof with no hindering obstacle for its alignment towards to the satellite, the length of all coaxial and electrical cables to be provided, the presence of local power supply, and many details which may impact the system installation duration.

3.6 MPLS TERRESTRIAL LINK (LEVEL 3)

Since January 2016, ICAO stated a contract separation between INEO and LEVEL 3, regarding REDDIG-II Project. As INEO is no longer responsible of LEVEL 3's, INEO has withdrawn this intervention from its proposal. Therefore, the present proposal does not include LEVEL 3 services for the relocation of REGGIG-II node.

Prior installing/migrating Bogota REDDIG-II node to the new site, LEVEL 3 should imperatively confirm that the related services to be achieved prior the migration are done. ICAO is in charge of contacting LEVEL 3 in order to get the MPLS services ready prior the relocation operations. INEO will not start any on-site installation without getting this confirmation from ICAO/LEVEL 3.

Once INEO is awarded the contract, INEO will let ICAO know about the foreseen schedule, so that ICAO can inform LEVEL 3 accordingly. Ideally, LEVEL 3's intervention should occur at the same time as INEO's installation starting date.

Once the project is getting into force, INEO will inform about the foreseen milestones and migration requirements.

The technical works to be done regarding the LEVEL 3' Multi-Protocol Label Switching services (MPLS) will consist of:

1) Withdraw LEVEL 3 equipment from the cabinet.

2) Reconnect it near the cabinet in the old technical room, in cooperation with INEO to make the transitional services connection with INEO equipment.

3) Provide the terrestrial backup of the services while passing through the transitional connection (in case of failure or others issues).

LEVEL 3 will be responsible for moving/installing its own equipment in the new site.

LEVEL 3 will be responsible of commissioning its network in the new technical room.

LEVEL 3 should propose a detailed migration procedure in coordination with INEO.

INEO will coordinate the works with LEVEL 3, as soon as the migration protocol starts.

4. FINANCIAL PROPOSAL

INEO's financial proposal consists of three price lists including Equipment & Services for the relocation of the REDDIG-II VSAT system at Bogota:

- Section 6.1 Detailed price list for the Supply of a new PRODELIN antenna
- Section 6.2 Detailed price list for the Relocation of the existing NWIEE antenna
- Section 6.3 Detailed price list for Optional equipment for risk limitation
- Section 6.5 Detailed price for Optional Daily extra cost for one INEO Engineer

The prices include:
Project management, Factory studies, Logistic organization, Shipment of the goods from the manufacturer premises up to Bogota site.

The prices do not include:

- Cost for system redesign or reconfiguration
- Allowance, nor travelling costs for ICAO or End-user representatives
- Services to be provided by LEVEL 3 for the Ground Back Bone disconnection and reconnection from and to the network (MPLS services) → See section 3.6
- Workforce to disassemble or remove equipment and cables from the old site (old antenna, electrical and coaxial cables…)
- Unforeseen hardware implications due to major information missing, regarding new equipment provided by the customer, and/or new services not already operational in the existing system

Conditions of the proposal

The prices are based on the technical hypothesis summarized in Section 2 of this document, and indications got after the site survey.

INEO's quote is for the relocation of the whole REDDIG-II system, including the supply of a new PRODELIN 1385 antenna, and the items related to the works and equipment to be provided by INEO.

In section 6.3, INEO has also quoted for some optional active equipment, which could be purchased to limit the risk of a long delay of delivery if spares must be sent from ICAO-Lima, in case of a major hardware failure. This option is suggested, but not mandatory.

As a new option, our quote also includes the daily extra cost for one INEO Engineer, in case of necessary on-site investigations, for reasons beyond INEO's control.

5. PAYMENT TERMS

Prices are in US Dollars

Payment terms and conditions suggested by INEO ES
40% as a down payment as activation of the amendment
30% upon Shipment of the Equipment
10 % PSAT/NAT
10% FSAT

Validity of the offer: 1 month

6. DETAILED PRICE LIST

Detailed Price List for
Equipment & Services for the relocation of the REDDIG-II VSAT system at Bogota

(See following sections)

6.1 BOGOTA NODE PRICE LIST WITH THE SUPPLY OF A NEW PRODELIN ANTENNA

Item	Designation *(with new PRODELIN antenna)*	Q	Unit	Unit Price US$	Total Price US$
1	**VSAT Antenna**				**55,970.00**
1.1	**Antenna**, including:	1	set	31,122.00	**31,122.00**
1.2	Supply of a New VSAT 3,80m Antenna + **Non Penetrating Mast Mount**				
1.3	Set of adaptation accessories for VSAT Antenna				
1.4	**Civil works**, including:	1	set	24,848.00	**24,848.00**
1.5	Construction of concrete blocks for antenna ballast (roof-terrace mount)				
1.6	Earthing of the system to the building grounding				
1.7	Crane renting including driver				
2	**Indoor Equipment**				**11,530.00**
2.1	**Indoor Equipment**, including:	1	set	11,530.00	**11,530.00**
2.2	Set of accessories (for interconnection and wirings)				
2.3	Electrical switch box for power supply distribution (with lightning arrestors)				

Item	Designation *(with new PRODELIN antenna)*	Q	Unit	Unit Price US$	Total Price US$
3	**Installation services - Measuring and Test equipment**				**84,752.00**
3.1	**Installation Services**, including:	1	set	54,563.00	**54,563.00**
3.2	Unwiring, dismounting, rewiring of the indoor equipment				
3.3	Travel cost and DSA for INEO Engineer to configure and test new equipment				
3.4	Set of tools for installation and miscellaneous mechanical accessories				
3.5	Test and commissioning in new building Equipment + Antenna on the roof-terrace				
3.6	**Cabinet and existing equipment displacement,** including:	1	set	10,655.00	**10,655.00**
3.7	Packing of cabinet and racks withdrawn, in order to transport safely the equipment to the new site				
3.8	Rent of a truck to transport the equipment, under the management of INEO representative				
3.9	**Installation of new Prodelin antenna**, including:	1	set	11,584.00	**11,584.00**
3.10	Installation of new antenna and outdoor equipment on the roof-terrace				
3.11	**Cables & Power supply interconnections accessories**, including:	1	set	7,950.00	**7,950.00**
3.12	Set of coaxial connectors				
3.13	Coaxial cable				
3.14	Power supply cable & Cat 5 cable				
3.15	Grounding accessories				

Item	Designation *(with new PRODELIN antenna)*	Q	Unit	Unit Price US$	Total Price US$
4	**Documentation**				**6,351.00**
4.1	**Paper print documentation (3 sets English + 3 sets Spanish)**, including:	1	set	6,351.00	**6,351.00**
4.2	Preparation				
4.3	Office studies				
4.4	Installation drawings				
4.5	As Built Drawings				
5	**Equipment for Ethernet extension (Cabinet/Antenna > 70m)**			*No more applicable*	
5.1	**Supply of equipment for Ethernet link extension**, including:				
5.2	Ethernet extension modem (one at each side)				
5.3	Interconnection accessories				
6	**Site survey at Bogota**				**11,880.00**
6.1	**Site survey**, including:	1	set	11,800.00	**11,880.00**
6.2	Travel cost				
6.3	DSA for INEO staff				
6.4	Factory management				

Item	Designation *(with new PRODELIN antenna)*	Q	Unit	Unit Price US$	Total Price US$
7	**Site Acceptance Test (SAT)**				**5,610.00**
7.1	**Site acceptance test**, including:	1	set	5,610.00	**5,610.00**
7.2	PSAT preparation				
7.3	On-site SAT with end user representative				
	Notice: No allowance, no air ticket for customer representative				
8	**Shipment DAP Incoterm 2010 & Insurance**				**28,070.00**
8.1	Air Shipment of the goods (from the manufacturer premises up to Bogota), including:	1	set	28,070.00	**28,070.00**
8.2	Transport DAP (Incoterm 2010) of equipment from France, with Insurance				
8.3	Transport DAP (Incoterm 2010) of Antenna + **NPMM** from USA, with insurance				

Total US$	**204,163.00**

Payment terms and conditions suggested by INEO ES: Refer to Section 5

6.2 OPTIONAL HARDWARE EQUIPMENT AND SERVICES

Hardware equipment for risk limitation

Item	Designation *(with PRODELIN or NWIEE antenna)*	Q	Unit	Unit Price US$	Total Price US$
10	**Optional equipment for risk limitation**				
10.9	**Satellite modem**, including:	1	set	21,917.00	**21,917.00**
10.10	IDU 1070 19" NS + PS AC (*)				
10.11	License Key Mesh Topology				
10.12	**Outdoor Equipment**, including:				
10.13	**RF Transmitter & Receiver**				
10.14	IBUC **80W** (*)	1	set	19,782.00	**19,782.00**
10.15	Tx 1+1 switching system (*)	1	set	9,221.00	**9,221.00**
10.16	Rx 1+1 switching system (*)	1	set	10,087.00	**10,087.00**
10.17	LNB & Filter (*)	1	set	1,916	**1,916.00**
10.18	**Shipment of the goods**	1	set	14,541.00	**14,541.00**

(*) Costs of hardware items above include INEO 2-year warranty.

Total US$	**77,464.00**

Daily extra cost for one INEO Engineer

20	Optional services	Q	Unit	Unit Price US$	Total Price US$
20.1	Daily extra cost for one INEO Engineer, in case of necessary on-site investigations, for reasons beyond INEO's control.		1 day	1 412,00	**1 412,00**

Payment terms and conditions suggested by INEO ES: Refer to Section 5

6.3 RELOCATION OF THE EXISTING NWIEE ANTENNA *(NO MORE APPLICABLE)*

No more applicable according to information provided by ICAO
(See Section 1 - Email dated 11/01/2018)

6.4 LEVEL 3 EQUIPMENT RELOCATION *(NO MORE IN CHARGE OF INEO)*

No more applicable since January 2016
(Contract separation between INEO and LEVEL 3)

	CUSTOMER : ICAO	DOC N° OC-2022-30021833	
	INEO Proposal for Equipment & Services for the relocation of the REDDIG-II VSAT system at Bogota	Rev. : C	Page 20 / 20

7. TENTATIVE SCHEDULE

		juin-18		juil.-18		août-18		sept.-18		oct.-18		nov.-18		déc.-18		janv.-19		févr.-19		mars-19		avr.-19		mai-19		juin-19	
	Month Number	Mth 01		Mth 02		Mth 03		Mth 04		Mth 05		Mth 06		Mth 07		Mth 08		Mth 08		Mth 08		Mth 09		Mth 10		Mth 11	
item	Half-month resolution	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	Bogota Node services																										
1	Amendement for Bogota (contract signature)	T0																									
2	Bogota new node Factory studies and preparation																										
3	Bogota new equipment ready for shipment								♦																		
4	Shipment of Equipment from France and USA/antenna																										
5	Colombia Customs clearance											---	---	---	---	---	---	---									
6	Concrete block construction for Antenna ballast on roof																										
7	Bogota new node installation																										
8	Availability of all services at Bogota new ACC																						♦				
9	Bogota new node commisionning																										
10	Bogota new node PSAT																							♦			
11	Bogota new node Operational observation period																										
12	Bogota new node FNAT																									♦	

APPENDIX C / APENDICE C

CUSTOMER: **ICAO**

DESIGNATION : **INEO Proposal for EZEIZA REDDIG-II System**
VSAT node relocation with new equipment

B	16/02/2018	Hardware quantity update Migration procedure update	T. SU / C. CHEVALLIER	G. IAUCH	
A	01/07/2017	1st issue: Initial Proposal	T. SU / D. CAMUS	G. IAUCH	
Rev	Date	Update status	Writer Name	Approved	

TABLE OF CONTENTS

1. PURPOSE

This proposal consists of services and equipment to be provided by INEO ES to relocate SAEZ VSAT REDDIG-II node at the new ACC building, using new equipment.
This offer is based on information provided in the following documents:

- ✓ Request for quotation by EANA (08/11/2016):
  Email "Request for quotation for a new node in Argentina"
- ✓ Clarifications requested by INEO (18/11/2016):
  NT 2022 30038561 Ind A - Clarifications for new nodes in Argentina ind A
- ✓ Answers provided by EANA (29/11/2016):
  NT 2022 30038561 Ind A - Clarifications for new nodes in Argentina EANA revised
- ✓ Hardware quantity modification, as per agreed between ICAO and INEO-ES:
  Email dated 2018/01/15, "REDDIG - Teleconference of 7th December 2017 about Ezeiza new node"
- ✓ Tentative Schedule (section 7)

2. CONDITIONS OF THE PROPOSAL

The technical solution that INEO is proposing takes into account the hypothesis listed hereafter. This list summarizes the technical requirements to be accepted by the customer prior starting the installation of the node at its new location. The requirements must match the technical points of section “TECHNICAL SOLUTION”, as well as the following ones:

- No change (excepting pinouts) regarding all electrical interfaces to be connected to the services to be transported (AFTN, AMHS, ATS/DS, Telephone…)
  → See section 3.3.1.2
- All services (one physical cable per service + uninterruptible power supply) are available at the new cabinet location, with no need of new cables, nor adapting interfaces, nor configuration change in CISCO Routers.
- No penalty can be applied to INEO if the customs clearance of the shipments is delayed beyond the estimated time (3.5 months as per the schedule in Section 7).

Our quote **does not include**:

- Extra costs for system redesign or reconfiguration.
- Extra costs for air flight tickets and DSA (Daily Subsistence Allowance) for ICAO representatives, nor end-user representatives, during FAT, PSAT / FNAT
- Extra costs for INEO Engineer for reasons beyond INEO's control, such as:
  - Additional delay if the on-site installation must be postponed
    (e.g.: Unavailability of the new ACC and/or its technical rooms)
  - Additional delay after one-week of on-site commissioning
    (e.g.: Necessity of investigations or other site missions due to service unavailability attributed to EANA or any of its subcontractors)
- Decommissioning of the old SAEZ site
- Services for moving the existing equipment of REDDIG-II system, from the old ACC (once decommissioned) to Cordoba
  → *These services will be part of another proposal, to be provided for Cordoba node.*

3. TECHNICAL SOLUTION

3.1 PRESENTATION OF THE SOLUTION

INEO proposes the best solution to both limit costs and insure the transition with the fewest possible interruption of services. As the old ACC must remain operational during the installation of the new ACC, our proposal includes all necessary equipment to build a new station, taking into account exactly the same configuration as the previous installation. The price list of section 6 details all indoor and outdoor equipment to be provided.

The transfer operation should be as transparent as possible for the operational users. However, an outage of a few minutes will be mandatory (see § 3.4.5), and some service perturbation are likely.

3.2 OUTDOOR PART

3.2.1 Antenna

INEO proposes to supply a new PRODELIN 3.8m antenna, which is equivalent to the old NWIEE antenna. This new antenna is the same as the ones already installed for new REDDIG-II nodes (e.g. Asuncion and Brasilia). The picture below shows this antenna.

This satellite antenna is a **PRODELIN 1385** type - 3.8m diameter. It is type **approved by Intelsat as F1 antenna**, meaning that it can enter the Intelsat constellation without having to go through a long testing process. This antenna adopts an offset precision-formed reflector, mounted on an AZ over EL pedestal, providing necessary stiffness and pointing accuracy required in C band operation. It is provided with an Rx/Tx (2 ports) feed with corrugated horn and OMT. A new concrete slab is necessary for this antenna.

REDDIG-II PRODELIN 1385 Antenna

3.2.2 RF equipment

New RF equipment will be supplied, as well as necessary mechanical supports, to fix onto the new antenna the TX1+1 (Terrasat redundancy switch for RF transmission), the RX1+1 (Terrasat redundancy switch for RF reception), the LNBs (Norsat). The RF equipment will be made of:

- Two IBUCs (Terrasat)
- One Tx1+1 platform (Terrasat)
- One RX1+1 platform (Terrasat)
- Two LNBs (Norsat)

To interconnect indoor and outdoor equipment, INEO will supply electrical and coaxial cables adapted to the length and the environment of the foreseen installation.

Additionally, to make possible the management of the outdoor RF equipment, the new distance between the indoor racks and the antenna implies the provision of an Ethernet repeater box (Ethernet link extension), as already done for some Brazilian nodes (e.g. Manaus, Recife, Curitiba).

3.3 INDOOR PART

3.3.1 Cabinet and equipment

Two new cabinets, with the same equipment as the ones existing at old ACC of Ezeiza, will be provided by INEO, with exception of the servers and modem.

3.3.1.1 Servers

Ezeiza current node has two servers:

- A backup global administration server (What'sUpGold central)
- A server for local administration of the station (What'sUpGold distributed).

From those two servers only the local administration server will be supplied, and configured for the new equipment.

The backup global administration server will be transferred from old Ezeiza site to new Ezeiza site. This has no impact on the operational status of the services. This server, on the same way as the global administration server at Manaus, will be remotely tuned to consider the new local administration server.

Regarding the hardware, the local server will be equivalent but will consist of ore more recent device.

3.3.1.1.1 Satellite modems

Ezeiza has two IDU 7000 modems. For the new node, only one modem will be supplied. This configuration is sufficient to assure:

- Correct line-up of the new Ezeiza station (satellite line-up, SSPA calibration)
- Smooth transition of the services from the old site to the new one

3.3.1.2 Note regarding interfaces

Regarding the technical information that INEO has understood from EANA's clarifications, we have noted the following:

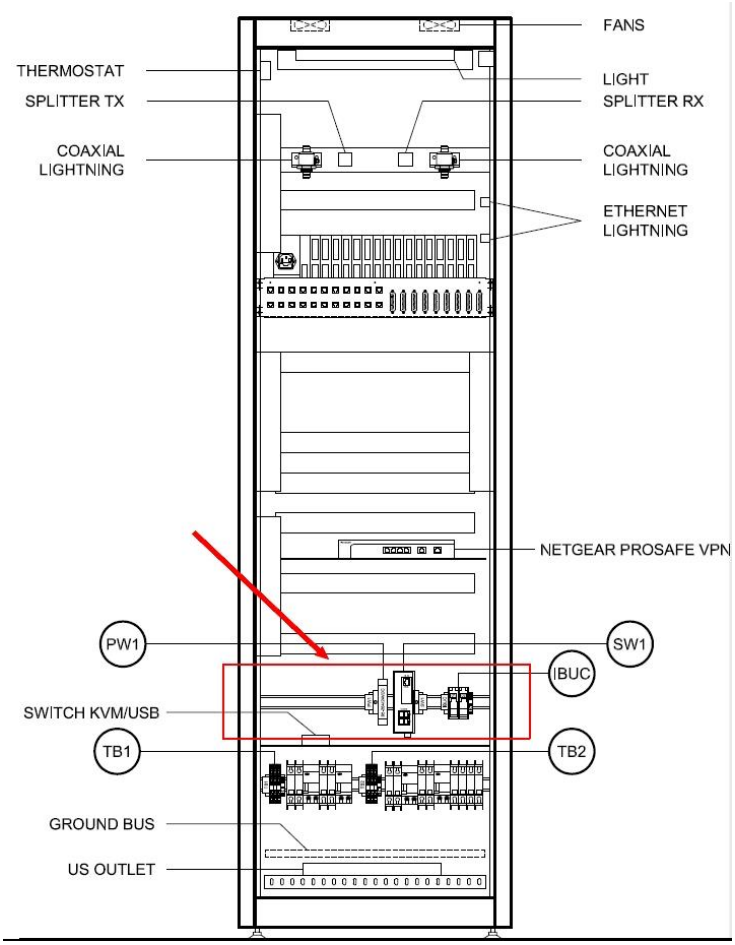
- Data and Services will be available at the new ACC, ready to be connected, prior the arrival of INEO's technician. INEO is considering that this equipment will be operational before the migration of REDDIG-II system.

- All equipment will be new and operational in the new ACC. INEO understands that this equipment may be different from the one existing in the old ACC, but EANA is committed to use the same type of services to be transported (ATS/DS, AFTN, PABX, VCS, Radar, Telephone connected to the existing AMHS system), with the same numbering plan.

- There will be no change regarding the REDDIG-II type of physical/electrical interfaces to connect to the new systems installed by the customer in the new ACC. Therefore, INEO will not supply any new types of hardware interfaces. However, regarding the fact that the equipment is new (VCS, Telephone…), INEO wants to point out that there is a risk of a temporary malfunction due to some unforeseen connection issues. This may cause some delay in the migration.
  Would different interfaces be identified during site survey, INEO will issue a study to verify feasibility, and modify the configuration and hardware as per the conclusion of the study, at extra costs.

3.3.2 New Ethernet Link Extension

As the distance between the cabinet and the antenna is longer than in the previous installation, the Ethernet connectivity between the cabinet and the RF equipment requires that a new equipment is installed between the racks and the antenna. This signal repeater, based on a XSLAN-140 modem or equivalent, has already been installed in Brazilian sites and matches the requested connectivity. New cabinet drawings will be provided to describe the installation of this new equipment.



New Ethernet Link equipment (in red rectangle) - Recife cabinet example

The equipment highlighted in red above is the indoor part of the link. The outdoor part consists of a box hosting the same equipment, that will be fixed onto the antenna pedestal.

3.3.3 Electrical switch box

A new electrical switchbox, including the necessary breakers and lightning arrestors will be supplied by INEO. The purpose of this electrical box is to distribute energy for both indoor and outdoor equipment. It implies that its installation should be possible inside the new technical room.

This box will be connected itself to the main low voltage switchboard of the technical room (UPS, 230Vac), inside which, a single-phase breaker should be available and reserved to REDDIG-II system. UPS supply for the technical room is not INEO's responsibility.

3.4 TRANSITION PROCEDURE

3.4.1 Presentation

In term of services, the required interfaces consist of eleven serial connections (2x RADAR, 3x METEO, 6x AFTN), twelve E&M connections, two FXS connections (ATS, MNT), and two IP connections, to be connected to REDDIG-II system.

The following procedure will start from the moment the new antenna and all the electrical wirings are ready in the new site.

LEVEL 3 availability at both sites is a recommended requirement for transition safety. LEVEL 3 shall be aware and reachable at any time during the transition for appropriate configuration modifications (i.e. OSPF, port configuration…).

LEVEL 3 procurement, availability and coordination is not INEO's responsibility.
In no case INEO will be held responsible of LEVEL 3's unavailability.
In case of LEVEL 3 unavailability, transition can be delayed. Should this happen, this delay will be charged at extra costs.

LEVEL 3's line creation and configuration prior migration is strongly recommended. A temporary installation can be achieved, and after INEO's cabinet installation, LEVEL 3 can proceed with the final installation of its devices and tests.

Before the migration period, the antenna line-up (using test frequencies) is to be done.

3.4.2 Migration

3.4.2.1 Step 1: Link test checking's

Interface tests (phone calls, ping, interfaces checking…) and LEVEL 3 link tests will be performed (verification of the presence of LEVEL 3's router in its own network, checking of OSPF distribution…).

3.4.2.2 Step 2: Satellite line-up with Intelsat

At the new node, a line-up of the new antenna is required to trim the antenna pointing with the new Skywan satellite modem.

SSPA and modem power calibration will be achieved with Intelsat. At this step, modem is not transmitting at its nominal frequency but with a test frequency given by Intelsat.

Once this is achieved, the new modem (slave) will be disconnected from the LAN interface (to avoid sending wrong OSPF information regarding its area and connected networks) and will receive its operational frequencies.

At this point, the modem should enter the network, but not transmit any service.

3.4.2.3 Step 3: Old SAEZ node isolation and satellite link switch off (Critical)

The old node will be isolated: Satellite link and Ground Backbone link will be disconnected, but will still remain under power, ready to re-operate back in case of major issue during the migration of all the services on the new node.

This step is critical because both satellite Skywan modems of the old station will be switched off. The IP packets coming from the other stations will thus be re-routed automatically to the new equipment of the new site:

- Through the new modem, now connected to its LAN interface
- Or through LEVEL 3 in case of contingency

At the same time, services will be disconnected from REDDIG-II old cabinet and directly re-connected to the new cabinet.

3.4.2.4 Step 4: Test services at the new station

All operational services will be tested from the new site, through the satellite network and/or the ground backbone (GBB).
In case of major issue, a go back to Step 3 will remain possible, to re-operate the services from the old station.

IMPORTANT REMINDER: As mentioned before, INEO is considering that the same services and the same type of equipment will be present in the new site. EANA is responsible for providing exact and same services at the new location of the REDDIG-II cabinet.

3.4.2.5 Step 5: Final tests and network adjustment

The second modem (master modem) shall be transferred from the old site to the new one. Its attenuators shall be adjusted.

Once this is achieved, network final adjustments can be achieved:

- NMS checking
- Global NMS and SkyNMS modifications (a general satellite network reboot for configuration cleaning is likely)
- Power levels

All the services and redundancy shall be tested (part of PSAT approbation), in order to enable old site decommissioning (decommissioning is not INEO's responsibility). Minor observations cannot be held responsible of blocking decommissioning.

At the end of Step 5, the old site should be powered off, to avoid any interference or error.

3.5 SITE SURVEY

INEO proposal includes a site-survey which must be done to complete information, such as the determination of the exact location of the antenna, the possible alignment of the antenna, the length of the trenches to be dug from the antenna to the new technical building, the number of vaults to be constructed, and the length of all electrical cables to be provided, the local power supply availability, and many details which may be necessary before proceeding to the installation of the new system.

3.6 MPLS TERRESTRIAL LINK (LEVEL 3)

Before INEO's installation is complete, the customer will inform LEVEL 3, so that LEVEL 3 can schedule its own intervention, which should ideally occur during the presence of INEO on site, to facilitate the installation of LEVEL 3 equipment in the cabinet.

The technical works to be done regarding LEVEL 3 Multi-Protocol Label Switching services (MPLS) will consist of:

1) Positioning/installing the new GBB router and modem to be provided by LEVEL 3, in the cabinet, in coordination with INEO.

2) Commissioning of LEVEL 3 equipment.

   LEVEL 3 will be responsible of the LMT (Last Mile Test) and the LAN test.

   LEVEL 3 will be responsible of testing the MPLS operability from the new site.

   LEVEL 3 will be responsible of commissioning its network in the new technical room.

   LEVEL 3 should propose a detailed migration procedure in coordination with INEO.

3) Waiting for the green light to be given by the customer, to proceed with the effective migration. INEO will work in coordination with LEVEL 3, as soon as the migration protocol starts.

4) At the end of the migration, an observation period of a few weeks is foreseen, before the FNAT signature.

Important Notice: *The works to be done by LEVEL 3 is not part of INEO's quotation.*

4. FINANCIAL PROPOSAL

INEO's financial proposal consists of a price list which details Equipment & Services to be provided by INEO to relocate the REDDIG-II VSAT telecommunication services from SAEZ old ACC building to SAEZ new ACC one.

During the installation of the new ACC, the old site must still remain operational. Therefore, INEO is requested to provide for the new site a complete set of equipment and antenna that will be installed and commissioned prior migrating the old site to the new one.

Our financial proposal does not include services to move REDDIG-II system from the old ACC (once decommissioned) to Cordoba. These services will be part of another proposal.

The prices include:
Project management, Factory studies, Logistic organization, Shipment of the goods from the manufacturer premises up to Ezeiza site.

The prices do not include:

- Allowance, nor travelling costs for ICAO or End-user representatives
- Services to be provided by LEVEL 3 for the ground backbone (GBB) backup routing (MPLS services)
- Unforeseen hardware implications due to major missing information, regarding the new equipment to be provided by the customer, and/or new services which may not be operational in the new site
- Workforce to disassemble or remove equipment and cables from the old site (old antenna, electrical and coaxial cables…)
- Project costs for the foreseen new REDDIG-II node of Cordoba

Conditions of the proposal
The prices are based on the technical hypothesis summarized in Section 2 of this document, and restrictions which may be listed after the site survey.

5. PAYMENT TERMS

Prices are in US Dollars

Payment terms and conditions suggested by INEO ES
40% as a down payment as activation of the amendment
30% upon Shipment of the Equipment
10 % PSAT/NAT
10% FNAT

Validity of the offer: 1 month

6. DETAILED PRICE LIST

Detailed Price List for

Equipment & Services for the relocation of the REDDIG-II VSAT

telecommunication services at Ezeiza

(See following sections)

DETAILED PRICE LIST

Equipment & Services for the relocation of the REDDIG-II VSAT telecommunication services at Ezeiza

Items	Designation	Q	Unit	Unit Price US$	Total Price US$
1	**Ezeiza - VSAT Antenna for the new ACC site**				**68 980,00**
1.1	**Antenna, including:**	1	set	26 972,00	**26 972,00**
1.2	Supply of a new 3,80m Antenna				
1.3	Set of adaptation accessories for VSAT Antenna				
-					
1.4	**Civil works, including:**	1	set	42 008,00	**42 008,00**
1.5	Construction of the slab with H30 concrete and additives			*included*	
1.6	Grounding system of the slab			*included*	
1.7	Trench and manholes from antenna to the technical room (considered distance: max. 40 m)			*included*	
-					
2	**Ezeiza - New Indoor & Outdoor equipment for new ACC site**				**230 508,00**
2.1	**Routing equipment**	1	set	2 475,00	2 475,00
2.1.1	NETGEAR SW F/E Stackable Managed Sw	2	set	*included*	
2.1.2	NETGEAR ProSafe VPN Dual WAN Gigabit	1	set	*included*	
-					

Items	Designation	Q	Unit	Unit Price US$	Total Price US$
2.1.3	**RSS-16 : RSS 16 Slot 4U Chassis, including:**	2	set	6 975,00	**13 950,00**
2.1.3.1	K16-RPC-WRI, 100-240 VAC, Mini : PWR MODULE, 1 Slot Redundant	2	set	*included*	
2.1.3.2	IPC-16-R : Network Control Card - 16	2	set	*included*	
2.1.3.3	AB-2RJ8-R : Dual 8 Wire Mod. Jack A/B Card	2	set	*included*	
2.1.3.4	AB-D25-R : D25 A/B Card	2	set	*included*	
2.1.3.5	AB-2RJ8-R : Dual 8 Wire Mod. Jack A/B Card	2	set	*included*	
2.1.3.6	AB-D25-R : D25 A/B Card	2	set	*included*	
2.1.3.7	FP-AB-RSS : Blank Panel for unused slots	2	set	*included*	
-					
2.1.4	**Cisco 2901 UC Bundle, PVDM3-16, UC License PAK, including:**	6	set	4 206,00	**25 236,00**
2.1.4.1	DATA license per Cisco (for serial card)	2	set	*included*	
2.1.4.3	4-Port Async/Sync Serial HWIC	2	set	*included*	
2.1.4.4	RS-232 Cable, DCE Female to Smart Serial, 10 Feet	2	set	*included*	
2.1.4.6	CAB-HD4-232FC - 4-port EIA-232 DCE	2	set	*included*	
2.1.4.7	HWIC - 8A/S-232 - 8 port Async/Sync Serial HWIC, EIA-232	2	set	*included*	
2.1.4.8	VIC3-2E/M - Two port Voice Interface Card - E & M	2	set	*included*	
2.1.4.9	VIC3-2FXS/DID - Two port Voice Interface Card - FXS and DID	2	set	*included*	
-					

Items	Designation	Q	Unit	Unit Price US$	Total Price US$
2.1.5	**Cisco 2901 UC Bundle, PVDM3-16, UC License PAK, including:**	2	set	4 653,00	**9 306,00**
2.1.5.1	DATA license per Cisco (for serial card)	2	set	*included*	
2.1.5.2	4-Port Async/Sync Serial HWIC	2	set	*included*	
2.1.5.3	RS-232 Cable, DCE Female to Smart Serial, 10 Feet	2	set	*included*	
2.1.5.4	VIC3-2E/M - Two port Voice Interface Card - E & M	2	set	*included*	
2.1.5.5	VIC3-2FXS/DID - Two port Voice Interface Card - FXS and DID	2	set	*included*	
-					
2.2	**Satellite modem**				
2.2.1	**IDU 7000 19" NS + PS AC, including:**	1	set	50 364,00	**50 364,00**
2.2.1.1	*Special discount on the second IDU 7000 Master*			*Not applicable*	
2.2.2	Set of Licenses Key Mesh Topology			*included*	
-					

Items	Designation	Q	Unit	Unit Price US$	Total Price US$
2.3	**Network Management System**	1	set	25 871,00	**25 871,00**
2.3.1	HP ProLiant DL160 Gen9 Base - Server, or equivalent including:	1	set	*included*	
2.3.1.1	Windows Server 2012 R2 Std License 2 processors Open Business	1	set	*included*	
2.3.1.2	Card PCI-Express 1X 4 ports series RS232 Std and Low Profile	1	set	*included*	
2.3.1.3	HP Hard Disk 500Go 3.5 hot plug 7200 rpm	2	set	*included*	
2.3.1.4	NPORT MOXA Card & cable	1	set	*included*	
2.3.2	SAMSUNG monitor LCD 27´´ Samsung SyncMaster S27C450B or equivalent	1	set	*included*	
2.3.3	HP LaserJet Pro 400 M401dn /33ppm	1	set	*included*	
2.3.4	Eaton Ellipse ECO 1200 FR USB	1	set	*included*	
2.3.5	WhatsUp Gold Distributed Remote 25 Devices	1	set	*included*	
2.3.6	Implementation, configuration, Update of NMS	1	set	*included*	
2.3.8	KVM	2	set	*included*	
-					
2.4	**Indoor equipment, including:**	1	set	50 569,00	**50 569,00**
2.4.1	Set of tools for installation and miscellaneous mechanical accessories	1	set	*included*	
2.4.2	Electrical switch box for power supply distribution (with lightning arrestors)	1	set	*included*	
2.4.3	GPS Clock Server RT CP 09	1	set	*included*	
2.4.4	IP telephone set for teleconference in the REDDIG II network	5	set	*included*	
2.4.5	Cabinets (rack)	2	rack	*included*	

Items	Designation	Q	Unit	Unit Price US$	Total Price US$
2.5	**RF Transmitter & Receiver**				
2.5.1	IBUC 40W	2	set	14 230,00	**28 460,00**
2.5.2	Tx 1+1 switching system	1	set	7 675,00	**7 675,00**
2.5.3	Rx 1+1 switching system	1	set	7 284,00	**7 284,00**
2.5.4	LNB (including 10MHz ext reference kit & Filter)	2	set	4 659,00	**9 318,00**
2.5.5	Handheld Terminal			*Not applicable*	
-					
3	**Ezeiza - Installation services for new ACC site**				**73 593,00**
3.1	**Installation Services, including:**	1	set	55 866,00	**55 866,00**
3.1.1	Installation of the indoor equipment			*included*	
3.1.2	Travel cost and DSA for INEO Engineer to configure and test new equipment			*included*	
3.1.3	Test and commissioning of new equipment in new building			*included*	
3.1.4	Set of tools for installation and miscellaneous mechanical accessories			*included*	
-					
3.9	**Installation of new Prodelin antenna, including:**	1	set	11 352,00	**11 352,00**
3.9.1	Installation of new antenna and outdoor equipment			*included*	
-					

Items	Designation	Q	Unit	Unit Price US$	Total Price US$
3.10	**Cables & Switch box, including:**	1	set	6 375,00	**6 375,00**
3.10.1	Set of coaxial connector			*included*	
3.10.2	Coaxial cable & coaxial connectors - Low loss cable			*included*	
3.10.3	Power supply cable			*included*	
3.10.4	Cat 5E oudoor Cable			*included*	
3.10.5	Set of indoor cables and connectors			*included*	
3.10.6	RS-232 Cable, DCE Female to Smart Serial, 10 Feet			*included*	
-					
3.12	**Ground Back Bone (GBB)**				**-**
3.12.1	Technical assistance for ground backbone (including preventive maintenance)			*Not in charge of INEO*	
-					
4	**Ezeiza - Documentation**				**9 947,00**
4.1	**Paper print documentation (3 sets English + 3 sets Spanish), including:**	1	set	9 947,00	**9 947,00**
4.1.1	Preparation			*included*	
4.1.2	Office studies			*included*	
4.1.3	Installation Drawings			*included*	
4.1.4	As Built Drawings			*included*	
-					

Items	Designation	Q	Unit	Unit Price US$	Total Price US$
5	**Ezeiza - Ethernet extension (racks/antenna > 60m)**				**11 222,00**
5.1	**Supply of equipment for Ethernet link extension, including:**	1	set	11 222,00	**11 222,00**
5.1.1	Ethernet extension modem from cabinet to antenna (one at each side)			*included*	
5.1.2	Interconnection accessories			*included*	
-					
6	**Ezeiza - Site survey**				**16 384,00**
6.1	**Site survey, including:**	1	set	16 170,00	**16 384,00**
6.1.1	Travel cost and DSA (for INEO staff - 1 person)			*included*	
6.1.2	6 working days at Ezeiza (for INEO staff - 1 person)			*included*	
6.1.3	Factory management & associated costs			*included*	
-					
7	**Ezeiza - Site Acceptance Test (SAT)**				**6 162,00**
7.1	**Site acceptance test, including:**	1	set	6 162,00	**6 162,00**
7.1.1	PSAT preparation (documentation)			*included*	
7.1.2	On-site SAT with end user representative			*included*	
-	*Notice: No allowance, no air ticket for customer representative*				
-					

Items	Designation	Q	Unit	Unit Price US$	Total Price US$
8	**Ezeiza - Shipment DAP Incoterm 2010 & Insurance**				**34 612,00**
8.1	**Shipment of the goods (from the manufacturer premises up to Ezeiza), including:**	1	set	34 612,00	**34 612,00**
8.1.1	Transport DAP (Incoterm 2010) of equipment from Ineo premises with Insurance			*included*	
8.1.2	Transport DAP (Incoterm 2010) of the new antenna from USA, with insurance			*included*	
8.1.3	On-site packing and Transportation of existing equipment (excluding antenna)				
-					
9	**Ezeiza - 2 year warranty for new equipment**				**11 642,00**
9.1	**2 year warranty for active equipment**	1	set	11 642,00	**11 642,00**
-					

Total US$	463 050,00

Items	Designation	Q	Unit	Unit Price US$	Total Price US$
Option	Daily extra cost for one INEO Engineer, in case of necessary on-site investigations, for reasons beyond INEO's control.		1 day	1 412,00	**1 412,00**

Payment terms and conditions suggested by INEO ES: Refer to Section 5

7. TENTATIVE SCHEDULE

	Month Number	Mth 01		Mth 02		Mth 03		Mth 04		Mth 05		Mth 06		Mth 07		Mth 08		Mth 08		Mth 08		Mth 09		Mth 10		Mth 11	
item	Half-month resolution	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	Ezeiza Node services																										
1	Amendement for Ezeiza (contract signature)	T0																									
2	Ezeiza New node Factory integration																										
3	Ezeiza New node FAT								♦																		
4	Ezeiza New node Shipment																										
5	Argentine Customs clearance											---	---	---	---	---	---	---									
6	Antenna slab construction at Ezeiza new ACC																										
7	Ezeiza new node installation																										
8	Availability of Services at Ezeiza new ACC																						♦				
9	Ezeiza new node commisionning																										
10	Ezeiza new node PSAT																							♦			
11	Ezeiza new node Operational observation period																										
12	Ezeiza new node FNAT																									♦	

APPENDIX D

CURRENT STATE OF IMPLEMENTATION OF AMHS INTERCONNECTION IN THE SAM REGION

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
Argentina	Bolivia	Dec 2018	Pending initial coordination
	Brazil	Apr 2018	Final operational tests for AMHS interconnection between Brasilia and Ezeiza were successfully completed on 18 May 2016. Operational implementation 05/04/2018.
	Chile	Nov 2017	Positive operational tests carried out on mid December 2016. Pending decision from authorities of Argentina and Chile for operational implementation.
	Paraguay	Mar 2012	Implemented and operational
	Peru	Mar 2018	Positive operational tests carried out at the end of 2016. Pending decision from authorities of Argentina and Peru for operational implementation.
	South Africa	Jun 2019	Coordination began on December 2016. Interconnection implementation will be made through CAFSAT. Modernization of CAFSAT node Ezeiza is foreseen by mid-2018.
	Uruguay	Apr 2018	Connectivity in Protocol P1 level between MTA Ezeiza – Montevideo. Operational test foreseen March 2018.
	Venezuela	Apr 2018	Implemented and operational (out of service- failure in AMHS Venezuela) since Dec 2016. Operational since 20 September 2017. Tests foreseen for March 2018.
	SITA (Atlanta)	Apr 2018	Positive connectivity tests carried out. Operation foreseen December 2017.
Bolivia	Argentina	Dec 2018	Pending initial coordination
	Brazil	Sep 2018	Pending initial coordination
	Peru	Jun 2018	IP connectivity between La Paz and Lima MTAs achieved. Failure occurred in MTA La Paz, AASANA will consult Thales.
Brazil	Argentina	Apr 2018	Final operational tests for AMHS interconnection between Brasilia and Ezeiza were successfully completed on 18 May 2016. Operational implementation 05/04/2018.
	Bolivia	Sep 2018	Pending initial coordination
	Colombia	May 2017	Operational May 2017.

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
	Spain	Dec 2017	Operations scheduled December 2017. AMHS circuit implemented through CAFSAT. To date in pre-operational phase. For beginning operations, Brasilia AMHS connection is expected - SITA(April 2018)
	United States	Jun 2018	Coordination began between Brazil and United States. Circuit implementation will be made through MEVAIII/REDDIGII.
	Guyana	Sep 2017	Operations in Protocol P1 level begun on 16 December 2016 at 17:00 UTC. On mid-February 2017 returned to AFTN configuration. AMHS tests resume on May 2017. Connection resume on July 2017.
	French Guiana	Dec 2018	Operation of an AMHS (CONSOFT) system is schedule by January 2018. AMHS interconnection scheduled October 2018.
	Paraguay	June 2018	Positive P1 connectivity tests were carried out. Pending operational tests by March 2018.
	Peru	Dec 2015	Implemented and operational 14 December 2015
	Senegal	Dec 2018	Coordination began between Brazil and Senegal (Dec 2016). Interconnection will be made through AFISNET satellite network which Brazilian node was installed in Recife.
	Sita (Atlanta)	Apr 2018	Successful operational and IP interoperability tests carried out in August 2017. Operation foreseen by April 2018
	Suriname	Jun 2018	Entered into operation on 15 Dec 2016 at 17:00 UTC. On mid-February 2017 returned to AFTN configuration. Pending updating of AMHS system by Suriname.
	Uruguay	Apr 2018	IP connectivity completed. (First week October 2016). IP Protocol tests successfully concluded the week of 28 Nov 2016 (30 Nov and 1 Dec). Positive operational tests made in August 2017 and commissioning in April 2018.
	Venezuela	Mar 2018	Positive connectivity in Protocol P1 level between Brasilia and Caracas (Oct 2016). Operational since 20 September 2017. Positive operational tests foreseen February 2018.

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
Chile	Argentina	Mar 2018	Positive operational tests carried out in mid-December 2016. Pending decision from authorities of Argentina and Chile for operational implementation.
	Peru	Dec 2016	Began operations on mid-December 2016.
Colombia	Brazil	May 2017	Operational May 2017.
	Ecuador	June 2018	Successful IP connectivity tests. Pending resume of operational tests.
	Panama	Mar 2018	Circuital interconnection has been configured through MEVA III/REDDIG II (Mid-February 2017). Positive operational tests August 2017. Operational implementation will be carried out once Colombia and Panama contract the AMHS circuit with MEVA III communication provider in MEVAIII/REDDIGII interconnection.
	Peru	Sep 2010	Implemented and operational
	Venezuela	Dec 2017	Operational since 20 September 2017 with new AMHS System. Tests foreseen November 2017.
Ecuador	Colombia	June 2018	IP connectivity tests successfully made. Pending resume of operational tests.
	Peru	Jul 2012	Implemented and operational
	Venezuela	Jun 2018	Operational since 20 September 2017 with new AMHS System. Operational tests with Venezuela carried out in November 2017. Problems in MTA Quito occurred in AMHS messages.
French Guiana (France)	Brazil	Dec 2018	French Guiana has scheduled for January 2018 the commissioning of an AMHS (CONSOFT) system. AMHS interconnection foreseen to begin October 2018.
	Venezuela	Dec 2018	French Guiana has scheduled for January 2018 the commissioning of an AMHS (CONSOFT) system. AMHS interconnection foreseen to begin on October 2018.
Guyana	Brazil	Jul 2017	Began operations on 15 Dec 2017 at 17:00 UTC. At mid-February 2017 returned to AFTN configuration. AMHS tests resumed on May 2017. Operational connection resumed on July 2017.
	Suriname	Jun 2011	Implemented and operational
	Trinidad & Tobago	Dec 2018	Pending coordination

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
	Venezuela	June 2018	Operational since 20 September 2017 with new AMHS System. Tests foreseen May 2018.
Panama	Colombia	Mar 2018	Circuital interconnection has been configured through MEVA III/REDDIG II (mid-February 2017). Positive operational tests made on August 2017. Operational implementation will take place once Colombia and Panama contract AMHS circuit to the MEVA III communications provider in MEVAIII/REDDIGII interconnection.
	United States	Jun 2018	By mid-February 2018 positive operational test were conducted between MTA Panama and MTA Atlanta
Paraguay	Argentina	Mar 2012	Implemented and operational
	Brazil	Jun 2018	IP interconnectivity tests began mid July 2016. Pending of operational tests on March 2018.
Peru	Argentina	March 2018	Positive operational tests carried out at the end of 2016. Pending decision from authorities of Argentina and Chile for operational implementation.
	Bolivia	Jun 2018	Successful IP connectivity between La Paz MTA and Lima MTA. Failure occurred in MTA La Paz, AASANA will consult Thales.
	Brazil	Dec 2015	Implemented 14 December 2015
	Chile	Dec 2016	Entered into operations the second half of Dec 2016.
	Colombia	Sep 2010	Implemented
	Ecuador	Jul 2012	Implemented
	United States	Dec 2018	Initial coordination has begun for the AMHS connection through the MEVAIII/REDDIGII interconnection.
	Venezuela	Dec 2017	Operational since 20 September 2017 with new AMHS System. Tests foreseen October 2017. Operational since December 2017
Suriname	Brazil	Jun 2018	Began operations on 15 Dec 2016 at 17:00 UTC. At mid-February 2017 returned to AFTN configuration. Pending Suriname AMHS system updating.
	Guyana	Jun 2011/Dec 2018	Implemented and operational until last quarter 2017. AMHS problems in Suriname identified. Pending updating.

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
	Venezuela	Mar 2018	New AMHS system operative in Venezuela since 20 September 2017. Tests and operation shall begin once Suriname updates its AMHS.
Uruguay	Argentina	April 2018	Positive P1 connectivity between Ezeiza and Montevideo achieved. Operational tests foreseen March 2017.
	Brazil	April 2018	IP connectivity tests completed (first week October 2016) Protocol P1 successfully concluded the week of 28 November 2016 (30 November and 1 December). Positive operational test made on August 2017. Operations foreseen April 2018.
Venezuela	Argentina	Abril 2018	Implemented and operational (out of service- failure in AMHS Venezuela) New AMHS system started operations in Venezuela on 20 September 2017. Tests with Venezuela foreseen March 2018.
	Brazil	Mar 2018	IP Connectivity achieved between Brasilia and Caracas (Oct 2016) New AMHS system started operations in Venezuela on 20 September 2017. Positive tests carried out in February 2018).
	Colombia	Dec 2017	New AMHS system started operations in Venezuela on 20 September 2017. Positive tests carried out in November 2017. Began operation in December 2017.
	Spain	Dec 2018	Pending initial coordination. Interconnection will be made through a communication circuit rented to a local provider. Implementation in progress.
	United States	Dec 2018	Pending initial coordination. AMHS circuit will be implemented through MEVAIII/REDDIGII interconnection.
	Ecuador	Jun 2018	New AMHS system started operations in Venezuela on 20 September 2017. Operational tests with Venezuela carried out in November 2017. Problems with MTA Quito identified in AMHS messages priorities.
	Guyana	Jun 2018	New AMHS system started operations in Venezuela on 20 September 2017. Tests with Venezuela foreseen May 2018.

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
	French Guiana	Dec 2018	French Guiana has scheduled for January 2018 the commissioning of an AMHS (CONSOFT) system. AMHS interconnection scheduled since October 2018.
	Peru	Dec 2017	New AMHS system started operations in Venezuela on 20 September 2017. Tests foreseen November 2017.
	Suriname	Jun 2018	New AMHS system started operations in Venezuela on 20 September 2017. Pending operational tests to be made when Suriname updates its AHMS system.
	Trinidad & Tobago	Dec 2018	New AMHS system started operations in Venezuela on 20 September 2017. Initial coordination done.

Green highlighted: AMHS interconnection operative
Light green: almost operational

APPENDIX E / APENDICE E

	Upgrade Stage	Upgrade Start	Type of Service	Date of Implementation	Station A	Station B	Nominal Bandwidth	DAMA Factor	Weighted Bandwidth towards Satellite	Coding & FEC	Symbol Rate	TDMA Overhead	Occupied Bandwidth Summary per Stage	Additional Satellite Bandwidth	Occupied Bandwidth Summary	Additional Costs
	1	Dec-16	VSD	Q4/2016	San Juan	Curacao	25.20 kbps	1	25.20 kbps	QPSK 6/7	14.70 kHz					
	1	Dec-16	VSD	Q4/2016	Miami	Cuba	25.20 kbps	1	25.20 kbps	QPSK 6/7	14.70 kHz					
	1	Dec-16	AMHS transfer	Q4/2016	Atlanta	Dom.-Rep.	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz	15.00%	**141.04 kHz**	100 kHz		USD 500
	1	Dec-16	AMHS transfer	Q1/2017	Atlanta	COCESNA	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz					
	1	Dec-16	AMHS transfer	Q1/2017	Atlanta	Aruba	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz					
	1	Dec-16	AMHS transfer	Q2/2017	Atlanta	Cuba	89.60 kbps	0.3	26.88 kbps	QPSK 6/7	15.68 kHz					
	2	Sep-17	AMHS transfer	Q3/2017	Atlanta	Panama	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz					
	2	Sep-17	AMHS transfer	Q4/2016	Atlanta	Curacao	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz					
	2								0.00 kbps	QPSK 6/7	0.00 kHz	15.00%	**52.55 kHz**	100 kHz		USD 500
	2								0.00 kbps	QPSK 6/7	0.00 kHz					
	2								0.00 kbps	QPSK 6/7	0.00 kHz				**378 kHz**	
REDDIG	3	?	AMHS transfer	?	Atlanta	Caracas	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz					
REDDIG	3	?	AMHS transfer	?	Atlanta	Bogota (Lima)	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz	15.00%	**105.10 kHz**	100 kHz		USD 500
REDDIG	3	?	AMHS transfer	?	Atlanta	Bogota (Manaus)	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz					
	3	?	AMHS transfer	?	Atlanta	Jamaica	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz					
	4	?	AMHS transfer	?	Atlanta	Nassau	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz					
	4	?	AMHS transfer	?	Atlanta	Haiti	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz	15.00%	**78.83 kHz**	100 kHz		USD 500
	4	?	AMHS transfer	?	Atlanta	Cayman	108.80 kbps	0.3	32.64 kbps	QPSK 6/7	19.04 kHz					
	4	?		?					0.00 kbps	QPSK 6/7	0.00 kHz					

Agenda Item 5: Financial situation of the project and approval of the budget

5.1 Under this agenda item, the Meeting took note of the expenses incurred by Project RLA/03/901 and the situation of cost-sharing contributions in 2017.

Summary of expenditures incurred by Project RLA/03/901 between 2003 and 2017

5.2 Table # 1 shows the expenditures incurred by Project RLA/03/901. The Project spent **USD 829,290** in 2017, and a total of **USD 13,349,517** from 2003 to 2017.

5.3 Table # 2 contains a bar chart with the distribution of project expenditures by year, as well as a pie chart showing the percentage of implementation of each budget component.

Status of cost sharing contributions

5.4 The Meeting took note of the status of cost-sharing contributions, as shown in Table # 3. To date, total contributions amounted to **USD 15,719,214**. Subtracting costs of **USD 13,349,517**, there was a positive balance of **USD 2,369,697**, still pending the collection of the cost corresponding to the completion of REDDIG II installation.

5.5 With regard to pending contributions, Agenda Item 2 dealt with the status of contributions by Suriname. Likewise, it was noted that Chile had made an advance payment of USD 10,095, corresponding to 2018; and Colombia and Guyana had made the deposit corresponding to their outstanding fee for 2018. **Appendix A** contains the aforementioned Tables 1, 2 and 3.

5.6 Regarding Conclusion RCC 20/5 – Extension of Project RLA/03/901, the Meeting took note that the ICAO General Secretariat had approved revision "S" of Regional Project RLA/03/901 in October 2017, which was circulated to member States on 21 November 2017 through letters SA5752 and S5753 for the corresponding action by the States.

5.7 The Meeting then took note that the project budget in revision "T" needed review. Accordingly, it formulated the following conclusion:

Conclusion RCC/21-2 Approval of the budget for Project RLA/03/901 Rev T

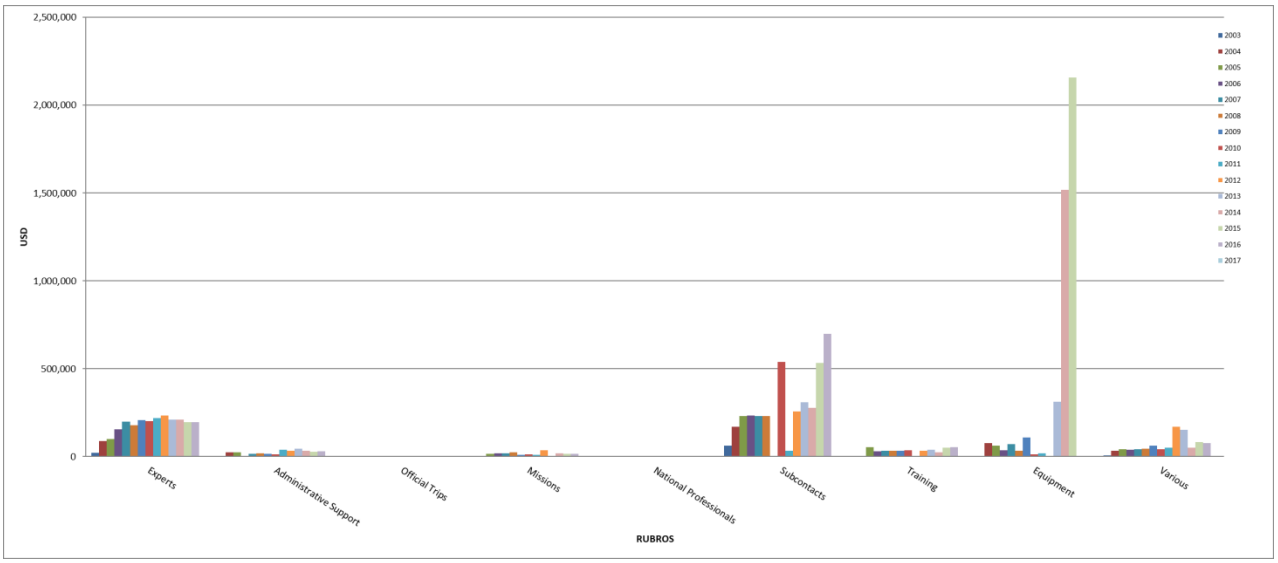
That the Secretariat send the proposed budget in Revision T to the Twenty-First meeting of the Coordination Committee of Project RLA/03/901 before 17 May for assessment and comments before 24 May. If there were no comments, revision T of the budget for Project RLA/03/901 would be considered as approved. Otherwise, the Secretariat would call for a teleconference to discuss the comments made and submit the budget for approval.

APPENDIX A

Table # 1 - Detailed breakdown of expenditures up to 31 December 2017

	CONCEPTO	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
BL 11	**Expertos**																
	Administrador REDDIG	22,359	93,953	101,296	156,503	197,784	177,449	207,289	201,030	209,250	232,544	212,112	211,011	197,473	194,720	180,813	**2,595,586**
	Consultores		(6,303)				1,499			9,200	0	0	0				**4,396**
BL 13	**Apoyo Administrativo**																**0**
13-01	Secretaria bilingüe	354	12,185	12,551		15,968	11,471	16,497	14,066	19,086	19,443	17,183	17,571	15,864	19,991	22,778	**192,230**
13-02	Técnico REDDIG		12,000	12,108	711												**24,819**
13-04	Secretaria bilingüe (liquidación)						7,516										**7,516**
13-05	Asistente administrativo y financiero									10,670	12,831	15,508	9,254	11,366	11,046	12,697	**83,372**
13-06	Auxiliar de Tecnología de la información									8,931	107	11,425	7,798				**28,261**
BL 15	**Viajes Oficiales**		321	925	499						0	0	0				**1,745**
BL 16	**Misiones**	3,504	4,110	16,732	18,642	18,357	25,718	10,615	14,110	10,250	36,747	5,075	20,306	15,372	15,115	21,120	**235,773**
BL 17	**Profesionales Nacionales**							2,080		961			0	1,769			**4,810**
BL 20	**Subcontratos**																**20**
21-01	Pan Am sat (P.O. 40670)																**0**
21-01	P.O. 30473(1 Oct 2003 a 31 Dic 2003)	62,727															**62,727**
21-01	P.O. 40670 (1 Ene 2005 a 31 Dic 2008)		168,849	231,264	231,264	231,264	231,264										**1,093,905**
21-01	Alquiler 2009-2011								462,528								**462,528**
21-01	Alquiler 2012-2014										233,826	231,264	231,264				**696,354**
21-01	Alquiler 2015-2018													462,528	231,264		**693,792**
21-02	Network Access									32,831	24,650	77,518	45,039	69,486	61,797	61,797	**373,118**
21-07	MEVA/REDDIG No Recurrente								75,071				0				**75,071**
21-08	Servicio Terrestre														404,564	407,135	**811,699**
21-98	Seguro de responsabilidad profesional		845	1,156	3,469		1,156	1,156	2,161		0	0	0	2,583	2,738	2,512	**17,776**
BL 39	**Instrucción**		**3,014**	**53,862**	**30,553**	**34,044**	**32,852**	**34,413**	**35,842**	**5,130**	**33,591**	**38,422**	**23,731**	**50,770**	**54,872**	**51,717**	**431,095**
45-01	**Repuestos**		**-12,752**	**59,541**	**36,311**	**71,637**	**33,997**	**108,509**	**12,507**	**2,896**	**635**	**2,307**	**5,057**				**320,645**
45-02	**Equipo de Oficina**	**82**	**0**	**2,083**	**-30**	**0**	**0**	**0**	**0**	**3,402**	**757**	**4,421**	**0**	**1,710**			**12,425**
45-03	Operación / Mantenimiento Equipos Of		1,716						0	2,009		0					**3,725**
45-03	PO 50522 VIASAT Reparación Modem SYGC			1,603													**1,603**
45-03	CB LIMA			179													**179**
45-04	Transferencia del NCC de SPIM a SBMN																**0**
45-04	P.O. 040694 VIASAT		8,250														**8,250**
45-04	P.O. 040687 MEMOTEC		4,250														**4,250**
45-05	Extensión del contrato SEEE (P.O. 40489)		50,000														**50,000**
45-06	Red de respaldo SEEE (P.O. 04090)		24,820														**24,820**
45-09	Equipo para interconexión MEVA-REDDIG									9,439							**9,439**
45-10	Adquisición REDDIG II											285,455	1,518,534	2,156,081			**3,960,070**
45-98	Seguro de responsabilidad profesional		444	284	246		130	1,109	0		0	0	0				**2,213**
50	**VARIOS**																**0**
53-01	Gastos varios	643	4,726	4,475	1,150	8,688	4,632	3,703	9,157	13,351	11,518	29,889	10,698	13,592	11,471	13,248	**140,941**
53-02	Cargos PNUD		118	505	337			3,318				0					**4,278**
55.01	Costos administrativos	6,439	28,795	35,817	37,372	34,601	39,503	55,621	33,357	36,539	157,229	140,757	41,566	68,460	64,082	55,473	**835,611**
	TOTAL	**96,108**	**399,341**	**534,381**	**517,027**	**612,343**	**567,187**	**444,309**	**859,829**	**373,945**	**763,878**	**1,071,336**	**2,141,829**	**3,067,054**	**1,071,660**	**829,290**	**13,349,517**

Table # 2
Distribution of project expenditures per year



Percentage of implementation by each budget component

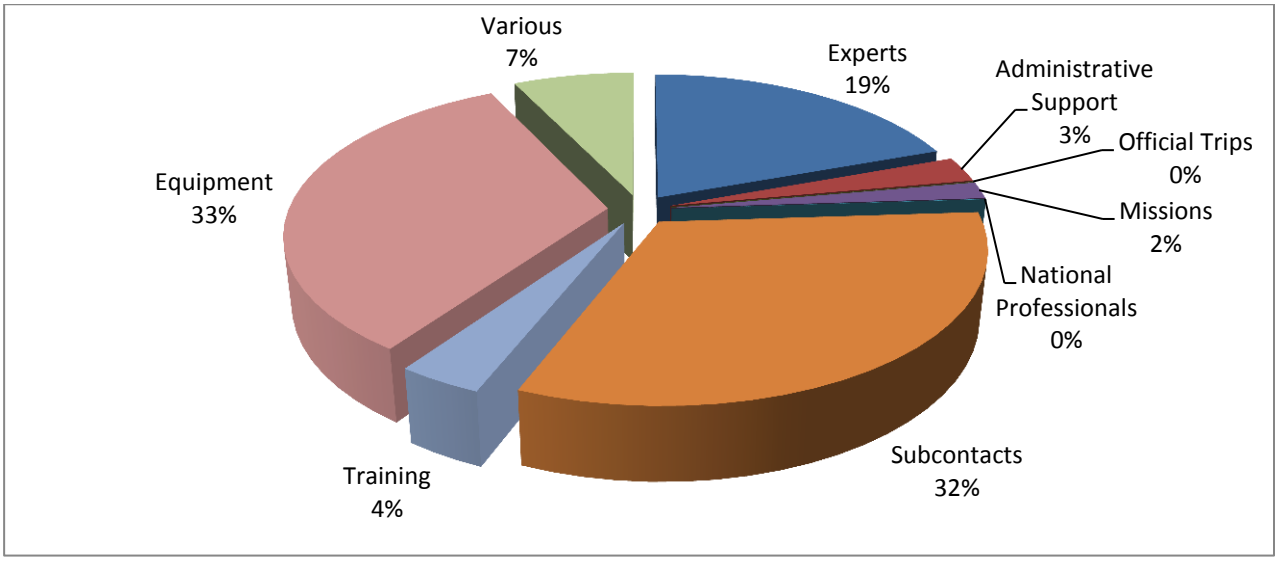


Table # 3 - Status of cost-sharing contributions to Project RLA/03/901

	2003-2014		1 Julio 2015		1 Julio 2016		1 Julio 2017		Totales (hasta 2017)		
	Cuota	Pagado	Cuota	Pagado	Cuota	Pagado	Cuota	Pagado	Cuotas	Pagado	Pendiente
Argentina	1,123,872	**1,050,659**	49,025	**0**	41,052	**73,193**	61,453	**90,077**	1,275,402	**1,213,929**	61,473
Bolivia	785,384	**773,591**	52,959	**52,959**	45,776	**45,776**	39,874	**39,874**	923,993	**912,200**	11,793
Brasil	2,668,716	**2,668,716**	150,145	**150,672**	128,044	**128,044**	168,503	**167,976**	3,115,408	**3,115,408**	0
Chile	763,294	**764,304**	51,603	**50,593**	44,496	**52,496**	34,401	**36,496**	893,794	**903,889**	-10,095
Colombia	896,565	**896,565**	60,388	**60,388**	46,842	**46,842**	46,425	**46,842**	1,050,220	**1,050,637**	-417
Ecuador	748,882	**748,832**	58,880	**58,880**	51,992	**0**	41,861	**93,853**	901,615	**901,565**	50
Francia	731,418	**668,322**	51,677	**114,683**	44,716	**44,776**	33,725	**33,725**	861,536	**861,506**	30
Guyana	669,741	**671,073**	60,077	**66,041**	53,755	**58,555**	39,512	**12,457**	823,085	**808,126**	14,959
Paraguay	849,854	**789,087**	47,266	**0**	42,589	**107,978**	42,589	**78,925**	982,298	**975,990**	6,308
Peru	1,000,811	**924,337**	58,961	**58,961**	50,614	**127,088**	59,719	**59,719**	1,170,105	**1,170,105**	0
Suriname	689,262	**529,577**	58,183	**0**	51,392	**80,000**	37,957	**80,000**	836,794	**689,577**	147,217
Uruguay	813,817	**813,371**	57,836	**58,240**	51,911	**51,869**	42,684	**42,649**	966,248	**966,130**	118
Venezuela	1,034,001	**1,033,961**	56,119	**56,119**	43,626	**43,626**	56,530	**43,626**	1,190,276	**1,177,332**	12,944
Trinidad y Tabago	635,306	**635,291**	52,454	**52,454**	45,584	**45,584**	29,289	**29,289**	762,633	**762,618**	15
COCESNA	122,772	**122,686**	49,124	**0**	19,193	**49,124**	19,193	**38,393**	210,282	**210,203**	79
Sub-Totales	**13,533,695**	**13,090,372**	**914,697**	**779,991**	**761,582**	**954,951**	**753,715**	**893,901**	**15,963,689**	**15,719,214**	**244,475**
Intereses	77,470	**77,470**	6,537	**6,537**	7,954	**7,954**	15,377	**15,377**	107,338	**107,338**	
Otros aportes	-86	**-86**	107	**107**	-186	**-186**	463,811	**463,811**	463,646	**463,646**	
Sub-Totales	**77,384**	**77,384**	**6,644**	**6,644**	**7,768**	**7,768**	**479,188**	**479,188**	**570,984**	**570,984**	
Totales	**13,611,079**	**13,167,756**	**921,341**	**786,635**	**769,350**	**962,719**	**1,232,903**	**1,373,089**	**16,534,673**	**16,290,198**	**244,475**

NOTE: Some differences between the amount deposited by the States and that shown by ICAO are due to transaction costs or exchange rates.
Chile made an advance payment of contribution of 2018 for USD 10,095

APPENDIX

3. SURVEY ON MANAGEMENT AND OUTCOME INDICATORS

Section I: Evaluation of current project
Section II: Assessment of compliance with objectives
Section III: Evaluation of implementation and delivery of services by ICAO
Section IV: Lessons learned

5.0	Exceptional results beyond project requirements
4.5	Exceeds requirements
4.0	Project objectives were achieved in all cases
3.5	Most of the project's objectives were achieved
3.0	Some quality results were achieved and implemented
2.5	Some quality results were achieved but are not implementable
2.0	Some results of low impact and quality were achieved
1.5	Below the expected results
1.0	Well below the expected results

Total	4.6

3. SURVEY ON MANAGEMENT AND OUTCOME INDICATORS
I. EVALUATION OF CURRENT PROJECT

1.-Project objectives **Do you think the project's objectives are set correctly according to the development priorities of your State in relation to the National Air Navigation Plan to serve the reality of civil aviation?**		**Evaluation**
ARG		4.5
BRA		5
CHI	Yes, project objectives are in accordance to the PNNA.	4.5
FRA		
GUY		4.5
PAR	Project objectives are aligned with the priorities of our State regarding the national air navigation plan.	4.5
PER	Yes	4.5
SUR		
T&T	Yes	4.5
URU	Project objectives contemplate the priorities of our State regarding the national air navigation plan.	4.5
VEN		4.5
	AVERAGE	**4.5**

2.- Support at regional and global level **Do you think that the project responds and supports your administration in its commitments *vis-a-vis* the regional and global air navigation plans?**		**Evaluation**
ARG		4.5
BRA		5
CHI	Yes, the project responds and supports the commitments of our administration *vis-a-vis* the air navigation plans, both regional and global.	5
FRA		
GUY		4.5
PAR	The project strongly supports the commitments of our State *vis-a-vis* the regional and global air navigation plans.	4.5
PER	Yes	4.5
SUR		
T&T	Yes	4.5
URU	We consider that it responds and supports the commitments of our administration *vis-a-vis* the regional and global air	4.5
VEN		5
	AVERAGE	**4.7**

3.-Comments of the State(s) **Do you have any comments on project management?**		**Evaluation**
ARG		4.5
BRA		5
CHI	Project management is satisfactory and consistent with the proposed objectives.	4.5
FRA		
GUY		4.5
PAR	Project management is fully committed with the objectives of the Project and promotes participation.	4.5
PER	It is appropriate.	5
SUR		
T&T	It is positive.	4
URU	Project management meets project objectives to the full satisfaction of our administration.	5
VEN	Excellent	4.5
	AVERAGE	**4.6**

4.-Strategy and vision Do you consider that the project meets your institution's strategy and long-term vision?		Evaluation
ARG		4.5
BRA		5
CHI	Yes, considering that the mission of our institution is to provide an intelligent public service of excellence and environmently responsibility that contributes to the safe, sustainable and effective development of aviation in the country.	4.5
FRA		
GUY		4.5
PAR	Fully responds to the requirements of our State.	4.5
PER	Yes	4.5
SUR		
T&T	Yes	4.5
URU	The project responds to the strategy and long-term vision of our administration.	4
VEN	Yes, it responds to the strategy of INAC	5
	AVERAGE	**4.6**

5.-Project quality What is your opinion about the content of this project for the achievement of its objectives?		Evaluation
ARG		4.5
BRA		5
CHI	It is appropriate and covers what is required to achieve the objectives.	5
FRA		
GUY		4.5
PAR	The content of the Project is totally in accordance with the objectives.	4.5
PER		4.5
SUR		
T&T	It is good but the security needs to be improved.	4
URU	The quality of the project is as expected for the objective.	4.5
VEN		5
	AVERAGE	**4.6**

6- Project resources Do you consider that the financial, physical and human resources considered for the attainment of the objectives set forth in the project document are adequate		Evaluation
ARG		4.5
BRA		5
CHI	Yes, they are adequate.	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	All the technical personnel in each REDDIG node must be trained.	4
SUR		
T&T		
URU	The financial, physical and human resources used for the project are sufficient and adequate.	4.5
VEN		5
	AVERAGE	**4.6**

7.-Project participants Do you consider that all the parties that should be involved in the project are involved? If not, who should be		Evaluation
ARG		4
BRA		5
CHI	Yes	5
FRA		
GUY		4.5
PAR	Yes	4.5
PER		5
SUR		
T&T	Yes. We should continue working together to achieve the objective.	4.5
URU	All the parties involved are necessary and they participate actively.	4.5
VEN	Ok	5
	AVERAGE	**4.7**

8.-Project effectiveness Is the project cost-effective compared to similar programmes or projects?		Evaluation
ARG		4
BRA		5
CHI	Yes	4.5
FRA		
GUY		4
PAR	Yes	4
PER	Yes	4.5
SUR		
T&T	Yes	4.5
URU	This project is being implemented properly and effectively, just like previous projects.	4.5
VEN	Yes	5
	AVERAGE	**4.4**

9.-Modification of project objectives What modifications to the objectives and scope of the project would you propose?	
ARG	Implementation timelines should be shorter in view of technological evolution and constant change.
BRA	
CHI	None.
FRA	
GUY	
PAR	No. None.
PER	
SUR	
T&T	
URU	The objectives and scope of the project contemplate future requirements.
VEN	

10.-Other information	
Please provide any other information that may support or better clarify your perception of the scope of the current project.	
ARG	Start discussing how would network administration be implemented from the States, more training for the personnel in charge of the nodes, supervision and control, and contact with the market in order to assess newstate-of-the-art technologies.
BRA	
CHI	None.
FRA	
GUY	
PAR	
PER	
SUR	
T&T	
URU	The scope of the project is in line with its administration, which has been excellent.
VEN	

3. SURVEY ON MANAGEMENT AND OUTCOME INDICATORS
II. ASSESSMENT OF ATTAINMENT OF OBJECTIVES

1.-Project objectives		Evaluation
In terms of project management by ICAO, do you think that project objectives are being met?		
ARG		4.5
BRA		5
CHI	Yes. And it is being done with much professionalism and excellent management.	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	Yes	4.5
SUR		
T&T	Yes	4.5
URU	We believe ICAO is meeting the objectives of the project, overcoming all the obstacles that arise.	4.5
VEN	Yes	4.5
	AVERAGE	**4.6**

2.- Project schedule		Evaluation
Do you consider that project objectives are being met or have been met on a timely basis in accordance with your		
ARG		4.5
BRA		5
CHI	Yes	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	The implementation of AMHS services and administrative communications has taken too long.	4
SUR		
T&T	Yes	4.5
URU	Objectives are being met and delays have been caused by the company that supplied and installed the equipment.	4.5
VEN	Yes	5
	AVERAGE	**4.6**

3.-Use of resources		Evaluation
Do you consider that resources are being, or have been, used efficiently to meet the objectives?		
ARG		4.5
BRA		5
CHI	Yes	4.5
FRA		
GUY		4.5
PAR	Yes	4
PER	Yes	4.5
SUR		
T&T	Yes	4.5
URU	Resources are being properly managed.	5
VEN	Yes	5
	AVERAGE	**4.6**

4.- Project cost		Evaluation
Do you consider that in meeting the objectives are being used, or have been used, resources efficiently?		
ARG	Maybe bandwidth cost could improve, since it is a regional project that will last several years, the satellite ISP	4
BRA		5
CHI	Yes, they had been adequate.	4.5
FRA		
GUY		4.5
PAR	Yes	4
PER		4.5
SUR		
T&T	Yes	4
URU	Costs assigned to the objectives are adequate.	4.5
VEN	Yes	5
	AVERAGE	**4.4**

5.-Major achievements		Evaluation
What are the main achievements of the project in relation to the expected results?		
ARG		4.5
BRA		5
CHI	The implementation of REDDIG II, specially the high availability of the network and enabling of new services.	4.5
FRA		
GUY		4.5
PAR	The availability, the qualified technical group and user satisfaction.	4.5
PER		4.5
SUR		
T&T	The high availability of services on the network.	4.5
URU	The expected results have been achieved, overcoming contingencies.	4.5
VEN	Compliance with modernisation, objectives and goals as scheduled.	5
	AVERAGE	**4.6**

6.-Major problems and their resolution What are the main problems affecting the achievement of expected results and how should they be resolved?		Evaluation
ARG	Management of logistics by both parties, State and administrator.	4
BRA		4
CHI	Timing differences of administrative processes in each country.	4
FRA		
GUY		4.5
PAR	The delays that occurred at some point in time in customs management by the different States.	4
PER		4.5
SUR		
T&T		
URU	The technical problems with the equipment and their operation are being resolved through ongoing collaboration by	4.5
VEN	a) Level 3 in SVMI and b) Spare part replacement (time issues)	4.5
	AVERAGE	**4.3**

7.- Other comments Please include other comments related to the attainment of project objectives.	
ARG	Times could improve, and work should already have started for the design of a new network.
BRA	
CHI	The objectives have been reached with profesionalism and dedication.
FRA	
GUY	
PAR	None.
PER	
SUR	
T&T	
URU	The objective is being met thanks to the excellent management by the Administrator and the individuals and technical areas
VEN	

8.- Risks What new events could affect the achievement of project outcomes? What do you recommend to respond to these events?	
ARG	We are concerned with the engineering error of the provider regarding lnb, and that there might be other hidden integration
BRA	Vulnerabilities in terms of the security of the networks connecting to the REDDIG and personnel renewal.
CHI	Vulnerabilities in terms of the security of the networks connecting to the REDDIG and personnel renewal.
FRA	

GUY	
PAR	Regarding the REDDIG II ground network, consider and maintain a working group to study network security aspects.
PER	
SUR	
T&T	Proper network security with redundancy needs to be established before considering VPN connectivity. This to prevent
URU	The retirement of ICAO communication experts will surely affect project results. We recommend that well-trained and suited
VEN	

9.-Other information	
Please provide any other information that may support or further clarify your assessment regarding attainment of project objectives.	
ARG	Create a technical work team to study new satellite developments that could be applied to air navigation.
BRA	
CHI	
FRA	
GUY	
PAR	None.
PER	
SUR	
T&T	
URU	Our assessment of project compliance is based on the excellent communication among the parties involves and their dedication.
VEN	

3. SURVEY ON MANAGEMENT AND OUTCOME INDICATORS
III. EVALUATION OF PROJECT IMPLEMENTATION AND PROVISION OF SERVICES BY ICAO

1.-Decision making **Do you think that the decision-making process within the project is appropriate?**		**Evaluation**
ARG		4.5
BRA		5
CHI	Yes, it is appropriate.	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	Yes, it is appropriate.	5
SUR		
T&T	Yes	
URU	Decisions made have been appropriate, especially in face of contingencies and emergencies.	4.5
VEN		5
	AVERAGE	**4.7**

2.-Product quality **Do you think that the quality of the products obtained is appropriate?**		**Evaluation**
ARG		4.5
BRA		5
CHI	Yes, it is appropriate.	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	Yes	4.5
SUR		
T&T	Yes	4.5
URU	Yes, the quality of the product has been the result of long hours of study and analysis.	4.5
VEN		5
	AVERAGE	**4.6**

3.-Orientation **Do you think that the orientation towards project outcomes is being complied with?**		**Evaluation**
ARG		4.5
BRA		5
CHI	Yes, there is compliance.	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	Yes	4.5
SUR		
T&T	Yes	4.5
URU	Yes, we believe we are oriented towards obtaining excellent results.	4.5
VEN		5
	AVERAGE	**4.6**

4.-Organization and prioritization Do you think the organization and prioritization within the project is appropriate?		Evaluation
ARG		4.5
BRA		5
CHI	Yes, it is appropriate.	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	Yes, it is appropriate.	5
SUR		
T&T	Yes	4.5
URU	We believe that the agenda and prioritization are adequate and sound.	4.5
VEN		5
	AVERAGE	**4.7**

5.-Change management Do you think that change management and the degree of flexibility in managing the project are appropriate?		Evaluation
ARG		4
BRA		5
CHI	Yes, they are appropriate.	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	Yes	4.5
SUR		
T&T	Yes, they are appropriate.	4.5
URU	Change management and flexibility are very good and appropriate.	4.5
VEN		5
	AVERAGE	**4.6**

6.-Service to the State Do you think that the service provided to your State is appropriate?		Evaluation
ARG		4.5
BRA		5
CHI	Yes, it is appropriate.	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	Yes	5
SUR		
T&T	Yes	4.5
URU	Yes, it is appropriate and equal for all States.	4.5
VEN		5
	AVERAGE	**4.7**

7.-Communication Do you think that the level of communication within and outside the project is adequate?		Evaluación
ARG		4.5
BRA		5
CHI	Yes, it is appropriate.	4.5
FRA		
GUY		4.5
PAR	Yes	5
PER	Yes, it is appropriate.	5
SUR		
T&T	Yes	4.5
URU	Communication has been one of its strengths and reasons for its success so far.	5
VEN		4.5
	AVERAGE	**4.7**

8.-Conflicts Do you believe that conflict management is adequate?		Evaluation
ARG		4.5
BRA		4.5
CHI	Yes, it is appropriate.	4.5
FRA		
GUY		4.5
PAR	Yes	5
PER		5
SUR		
T&T	Yes. There appears to be none.	4.5
URU	Conflicts are properly resolved according to their importance and priority.	4.5
VEN		5
	AVERAGE	**4.7**

9.-Use of resources Do you think that project resources are being used efficiently to produce the expected results?		Evaluation
ARG		4
BRA		5
CHI	Yes, they are used efficiently.	4.5
FRA		
GUY		4.5
PAR	Yes	5
PER	Yes	4.5
SUR		
T&T	Yes	4.5
URU	Yes, they are used efficiently.	4.5
VEN		5
	AVERAGE	**4.6**

10.-Relevance of mechanisms Do you think that project management mechanisms are relevant?		Evaluation
ARG		4.5
BRA		4.5
CHI	Yes, they are relevant.	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	Yes	5
SUR		
T&T	Yes, definitely.	4.5
URU	Yes, they are relevant and adequate.	4.5
VEN		5
	AVERAGE	**4.6**

11.-Opportunity of work plans On the basis of its work plan, how would you rate the degree of opportunity of the project as regards the achievement of outputs, outcomes, and delivery of inputs?		Evaluation
ARG		4
BRA		5
CHI	Very good.	4.5
FRA		
GUY		4.5
PAR		4.5
PER		4.5
SUR		
T&T	Good.	4
URU	The degree of opportunity has been appropriate, with good management of resources and time to obtain a good result.	4.5
VEN		5
	AVERAGE	**4.5**

12.-Orientation Do you consider that the activities and products developed through the project are in line with the directives of ICAO, the regional offices and air navigation plans?		Evaluation
ARG		5
BRA		5
CHI	Yes, they are.	4.5
FRA		
GUY		4.5
PAR	Yes	4.5
PER	Yes, they are in line.	4.5
SUR		
T&T	Yes	4.5
URU	Activities and outputs are aligned with air navigation plans, regional offices and ICAO directives.	4.5
VEN		5
	AVERAGE	**4.7**

13.-Other information Please provide any other information that may support or further clarify your assessment on products and services provided through the project.		
ARG	The role of ICAO is fundamental to provide recommendations and generate projects, reason why work should continue along the same lines and seek	
BRA		
CHI		
FRA		
GUY		
PAR	None.	
PER		
SUR		
T&T		
URU	Management of products and services by REDDIG has been appropriate.	
VEN		

3. SURVEY ON MANAGEMENT AND OUTCOME INDICATORS
IV. LESSONS LEARNED

1.-Positive lessons learned from the project.	
Provide a brief description of the positive lessons learned from project implementation.	
ARG	Development of team spirit and collaboration among member States. Understanding and listening to the directives of the administration for standardising node processes and configurations. Synergy in knowledge and resources to resolve problems. Acceptance of errors and correction of deviations from the work plan. Optimisation in the use of resources.
BRA	
CHI	Team work, with active participation by State and Regional Office staff.
FRA	
GUY	
PAR	The good communication through the use of teleconferences for the management of situations and coordinations to solve problems.
PER	
SUR	
T&T	Very good teamwork and coordination.
URU	Good communication obtain through meetings, courses, teleconferences, where we share the reality of each node, where we all cooperate, resulting in quick
VEN	

2.-Opportunities for improvement.	
Provide a brief description of the improvement opportunities identified during project implementation.	
ARG	Minimise initial failures. Define aspects covered by the warranty. Manage focal points in each State.
BRA	
CHI	
FRA	
GUY	
PAR	The constant training to have a prepared and efficient technical staff to solve problems.
PER	
SUR	
T&T	Training of tecnical personnel for maintaining the network.
URU	Opportunities for improvement start from close communication and support between the technical areas and the project administrator.
VEN	

3.- Strategy to implement the improvement opportunities identified.	
Provide a brief description of the strategy that you would propose to implement the improvement opportunities identified.	
ARG	Participate in system design, in the integration of system parts, and start-up as part of on-the-job training. Redefine the coverage of the warranty and the
BRA	
CHI	
FRA	
GUY	
PAR	Continue with the strategy being applied, since it was sharpened through experience gained during the Project.
PER	
SUR	
T&T	Persons to be trained must have on-the-job experience with the equipment.
URU	In order to improve, we must maintain and strengthen links among participants, and support REDDIG II management and administration.
VEN	

Agenda Item 7: **Other matters**

Nil.