



**Cuestión 2 del
Orden del Día:**

Antecedentes y trabajo realizado para implementar un nuevo enlace de comunicación entre el ACC de Ezeiza y el ACC de Johannesburgo

IMPLANTACIÓN DE UN NODO REDDIG II (MPLS) EN JOHANNESBURGO

(Preparado por la Secretaria)

RESUMEN
Esta nota informativa presenta los antecedentes y el trabajo realizado para la mejoría de las comunicaciones entre los Centros de Control de Área de Argentina y Sudáfrica, en apoyo a la prestación de los servicios de navegación aérea por los ACC Ezeiza y ACC Johannesburgo.
Referencias:
<ul style="list-style-type: none">• Informe Final de la Reunión del Comité de Gestión de la Red CAFSAT – CNMC/8 (Durban, 04 al 05 de junio de 2018)• Informe Final de la Reunión del Comité de Coordinación del Proyecto RLA/03/901 – REDDIG-RCC/26 (Virtual, 02 al 05 de marzo de 2021)

1. Antecedentes

1.1 Con el objetivo de proporcionar los medios de comunicaciones entre los Centros de Control de Área (ACCs) de Argentina y Sudáfrica, con regiones de información de vuelos (FIRs) adyacentes, fue implantada en Ezeiza (Argentina) una estación de la Red Satelítica de África Central (CAFSAT).

1.2 La estación CAFSAT de Ezeiza proporcionaba un enlace punto-a-punto con la estación CAFSAT de Johannesburgo, permitiendo el establecimiento dos circuitos orales y uno circuito AFTN. La Figura 1 ilustra las comunicaciones establecidas entre los dos nodos CAFSAT de Argentina y Sudáfrica.

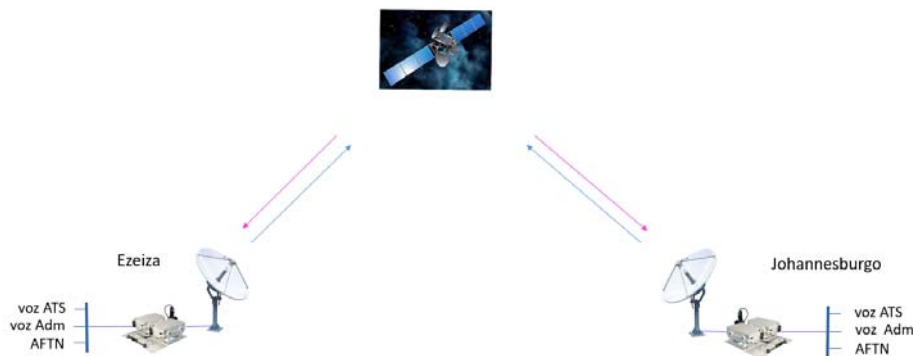


Figura 1 – Nodos CAFSAT de Ezeiza y Johannesburgo

1.3 Durante la Reunión CNMC/8 (Durban, 04 al 05 de junio de 2018), fueron formuladas la Conclusión CNMC/8-7: Lineamientos para la implementación de la fase II de las estaciones CAFSAT y la Decisión CNMC/8-08: Plan de Acción Actualizado para la Fase II de Reingeniería de la Red CAFSAT, para la modernización de las estaciones de la red CAFSAT.

1.4 La modernización de las estaciones CAFSAT proporcionarían la posibilidad de atender a los requerimientos de comunicaciones de los nuevos sistemas CNS/ATM (AMHS, ADS, etc.) que requieren mayor ancho de banda.

1.5 Luego de un análisis técnico y de costo/beneficio, el Proveedor de Servicios de Navegación Aérea de Argentina (EANA), concluyó que la modernización de la estación CAFSAT y la contratación de más ancho banda del proveedor satelital, no representaba la mejor opción para proporcionar los medios de comunicación entre los ACCs de Ezeiza y Johannesburgo.

1.6 Para reemplazar los enlaces vía CAFSAT, EANA ha considerado la implantación de un nodo MPLS de la Red Digital de la Región SAM (REDDIG II), proporcionando un medio de comunicación de alto desempeño y con significativas ventajas técnicas y económicas.

1.7 En este sentido, durante la Reunión REDDIG RCC/26 (Teleconferencias, del 02 al 05 de marzo de 2021), fue formulada la Conclusión RCC/26-1:

CONCLUSIÓN RCC/26-1	IMPLANTACIÓN DE NODOS DE LA RED TERRESTRE (MPLS) DE LA REDDIG II EN ESTADOS DE OTRAS REGIONES
<p>Que la Secretaria Tome las providencias necesarias para la contratación e instalación de nodos de la red terrestre (MPLS) de la REDDIG II en Estados de otras regiones, conforme descrito abajo:</p> <p>a) Un nodo en Madrid (España) por interés de Argentina, Brasil y Venezuela, para implantación, inicialmente, de comunicaciones AMHS con el Centro COM de Madrid. El costo será compartido por los tres Estados interesados; y</p> <p>b) Un nodo en Johannesburgo (Sudáfrica) por interés de Argentina para establecimiento de comunicaciones de voz y datos con el ANSP de la FIR Johannesburgo. El costo será cargado en la cuota anual de Argentina.</p>	<p>Impacto esperado:</p> <p><input type="checkbox"/> Político / Global</p> <p><input checked="" type="checkbox"/> Inter-regional</p> <p><input checked="" type="checkbox"/> Económico</p> <p><input type="checkbox"/> Ambiental</p> <p><input checked="" type="checkbox"/> Técnico/Operacional</p>
<p>Por qué: Para proporcionar mejores comunicaciones interregionales con Estados de África y Europa, que tienen requerimientos de comunicaciones planificadas con Estados participantes del Proyecto Regional RLA/03/901.</p>	
<p>Cuándo: De inmediato</p>	<p>Estatus: Aprobado en la Reunión RCC/26</p>
<p>Quién: <input checked="" type="checkbox"/> Estados Interesados <input checked="" type="checkbox"/> Secretaría OACI SAM <input type="checkbox"/> <input checked="" type="checkbox"/> Otros: ENAIRE y ATNS</p>	

2. Propuesta de Implantación de un Nodo REDDIG II (MPLS) en Johannesburgo

2.1 Por medio de la Carta SA5176 de 19 de abril de 2021, la Oficina Regional Sudamericana de la OACI informó a la Autoridad de Aviación Civil de Sudáfrica la intención de Argentina de discontinuar la estación CAFSAT de Ezeiza, reemplazando los enlaces sateliticos por un enlace de la red terrestre (MPLS) de la REDDIG II, a través de la instalación de un nodo REDDIG II en Johannesburgo, sin costo para la administración de Sudáfrica. El **Apéndice A** de esta nota informativa presenta la carta SA5176.

2.2 En respuesta, el Departamento de Transporte de la República de Sudáfrica designó representantes del Proveedor de Servicios de Navegación Aérea de Sudáfrica (ATNS) para tratar los detalles de la implantación del nodo REDDIG II en Johannesburgo y la actualización de la Carta de Procedimientos Operativos entre los ACCs de Ezeiza y Johannesburgo. El **Apéndice B** a esta nota informativa presenta la carta encaminada por la Autoridad de Aviación Civil de Sudáfrica.

2.3 En el marco del Proyecto Regional de Cooperación Técnica RLA/03/901, la OACI representando los Estados participantes del Proyecto contrata el proveimiento de los enlaces de comunicación para la REDDIG II. Con el fin de implantar el nodo de Johannesburgo, la OACI ha contratado la instalación y servicios para un enlace con las siguientes características:

- 5 Mbps de ancho de banda,
- Disponibilidad mensual de 99.7 %;
- Parámetro RTT entre dos estaciones, para un paquete de 64 bytes, menor que 150 ms en 95% de las medidas realizadas en un periodo de 10 segundos; y
- BER inferior a 10^{-7} , 95 % del tiempo.

2.4 La Figura 2 ilustra el concepto de implantación del nodo REDDIG II en Johannesburgo.

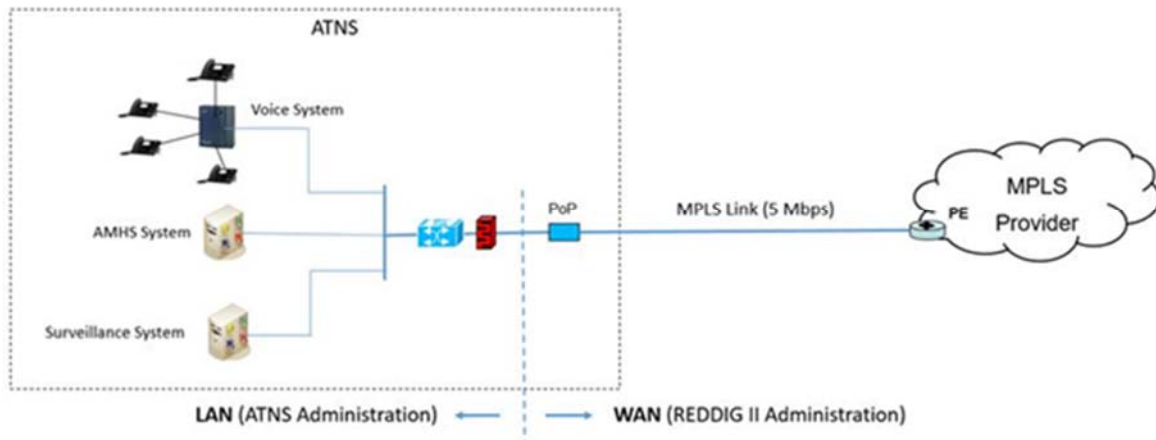


Figura 2 – Concepto de implantación del nodo REDDIG II en Johannesburgo

2.5 Con el fin de formalizar la implantación del nodo REDDIG II en Johannesburgo, representantes de ATNS y EANA, con el apoyo de las Oficinas Regionales de ESAF y SAM, elaboraron y firmaron una Carta de Acuerdo Técnico, que se encuentra en el **Apéndice C** a esta nota informativa.

3. Conclusión

3.1 La implantación del nodo REDDIG II en Johannesburgo además de mejorar las comunicaciones con Argentina, permite a Sudáfrica conectarse, a través del mismo enlace, con

cualquier nodo de la red que se tenga alguno requerimiento de comunicación. La Figura 3 presenta la topología de la REDDIG II, incluyendo los nuevos nodos planeados.

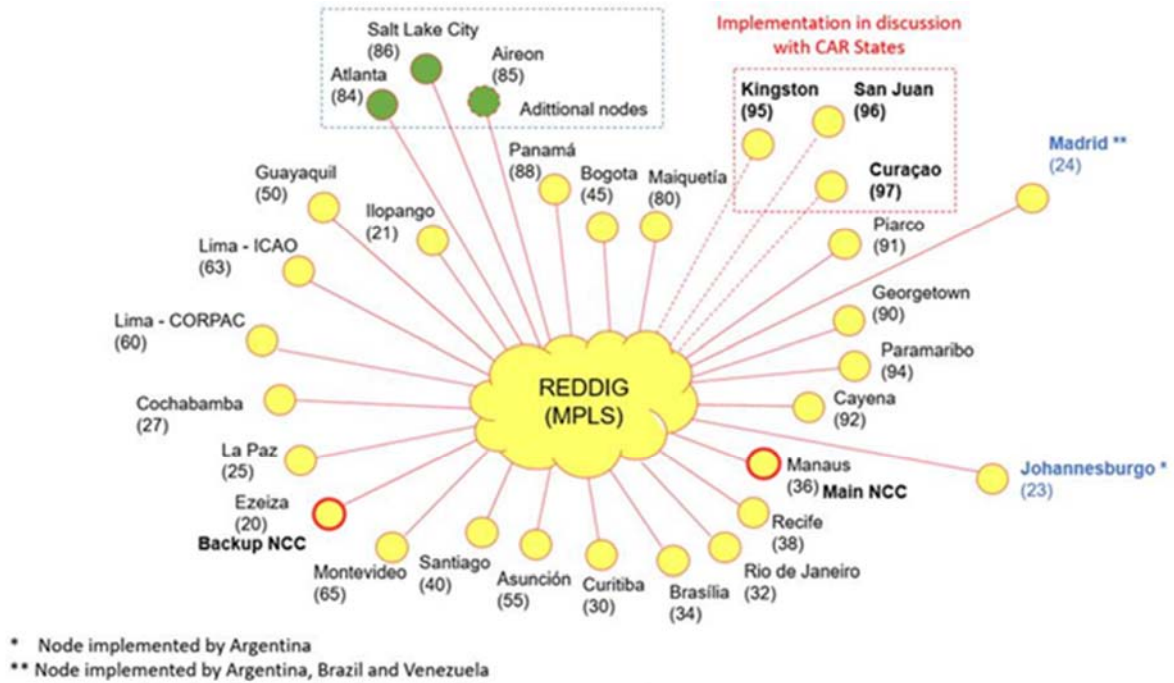


Figura 3 – Topología de la REDDIG II

3.2 Por el mismo enlace, el ACC de Johannesburgo podrá comunicarse con el ACC Atlántico (Brasil), el ACC Montevideo (Uruguay), con los cuales tiene adyacencia de FIRs, como también con cualquier otro nodo participante de la red.

3.3 Para el establecimiento de nuevas comunicaciones entre los nodos REDDIG II, solo es necesario coordinar, a través de la Oficina Sudamericana de la OACI, con el Administrador de la red en lo Centro de Control de la Red (NCC) en Manaus, que providenciará las configuraciones necesarias.

3.4 Seguramente, la iniciativa de implantación de un nodo REDDIG II en Johannesburgo, atenderá los futuros requerimientos de comunicaciones aeronáuticas, incluyendo el concepto SWIM, proporcionando una significativa mejora en el proveimiento de los servicios de navegación aérea y, consecuente, un aumento de la seguridad operacional.



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Ref.: LN3/20.2.13 – SA5176

Lima, 19 April 2021

Ms. Poppy Khoza
Director
SACAA

Subject: **RLA/03/901 - REDDIG Management System and Satellite Segment Administration**
Implementation of REDDIG II Ground Network (MPLS) Node in Johannesburg, South Africa

Dear Madam:

I wish to refer to the REDDIG II South American Regional Project to inform you that Argentina's air navigation service provider (EANA), through the attached letter, has expressed their intention to discontinue the VSAT station of the CAFSAT network in Ezeiza, replacing communication links with an MPLS link from the REDDIG II Network (SAM Region Digital Network).

In this regard, during the Twenty-sixth Meeting of the Coordination Committee of the RLA/03/901 Regional Project, Conclusion RCC/26-1 was adopted, for the implementation of a REDDIG II node in Johannesburg, if the proposal is accepted by the South African administration.

CONCLUSION RCC/26-1	IMPLEMENTATION OF REDDIG II GROUND NETWORK (MPLS) NODES IN STATES OF OTHER REGIONS
<p>The Secretariat</p> <p>Take the necessary information for the procurement and installation of REDDIG II ground network (MPLS) nodes in states in other regions, as described below:</p> <p>a) A node in Madrid (Spain) in the interest of Argentina, Brazil and Venezuela, to implement, initially, AMHS communications with the COM Center of Madrid. The cost will be shared by the three States concerned; and</p> <p>b) A node in Johannesburg, South Africa, in Argentina's interest for the establishment of voice and data communications with the FIR Johannesburg ANSP. The cost will be charged in Argentina's annual fee.</p>	<p>Expected impact:</p> <p><input type="checkbox"/> Political / Global</p> <p><input checked="" type="checkbox"/> Interregional</p> <p><input checked="" type="checkbox"/> Economic</p> <p><input type="checkbox"/> Environmental</p> <p><input checked="" type="checkbox"/> Technical/Operational</p>
<p>Why: To provide better interregional communications with African and European States, which have planned communications requirements with Participating States of the RLA/03/901 Regional Project.</p>	
<p>When: Inmediatly</p>	<p>Status: Approved in the RCC/26 Meeting</p>
<p>Who: <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO SAM Secretariat <input checked="" type="checkbox"/> Others: ENAIRE y ATNS</p>	

APÉNDICE / APPENDIX A

- 2 -

The proposal consists of the installation of a REDDIG II ground network node (MPLS) in Johannesburg, with EANA being responsible for non-recurring costs – NRC (installation) and monthly recurring costs – MRC (service), with the following characteristics:

- Link of 5 Mbps bandwidth;
- Monthly availability of 99.7 %;
- The RTT for communications between the two stations, for a 64-byte packet, may not exceed 150ms in 95% of the measurements made in a minimum time window of 10 seconds; and
- The bit error rate (BER) shall be less than 10⁻⁷, 99.5% of the time.

As a suggestion, it is indicated to undertake an ATM/CNS Informal Bilateral Meeting between Argentina and South Africa for the signing of a Memorandum of Understanding (MoU) and the Letter of Agreement (LoA) establishing new communication requirements and air navigation procedures between the two States. The Regional Offices would support the States to carry out this event.

If further clarification is needed, please contact Mr. Francisco Almeida da Silva - SAM Office CNS Officer, falmeida@icao.int, +51 977 814 722.

Accept, Madam, the assurance of my highest consideration.

Yours Sincerely,

A circular blue stamp of the ICAO South American Office (OACI/SAO) is visible behind the signature. The stamp contains the text 'OACI/SAO' at the top and 'ICAO SOUTH AMERICAN OFFICE' around the bottom edge. The signature is written in black ink over the stamp.

Fabio Faizi Rahnemay Rabbani
Regional Director
ICAO South American Office
Lima

Attachment

As indicated



transport

Department:
Transport
REPUBLIC OF SOUTH AFRICA



Forum Building, 159 Struben Street, Pretoria, 0001, Private Bag X193, Pretoria, 0001 Tel: (012) 309 3000

**ICAO Regional Director
South American Office
San Isidro
Lima 15073
PERU**

Ref: **Karen Naidoo**
Tel: **27 12 309 3528**
Email: **Multilateral@dot.gov.za**

**RLA/03/901 - REDDIG MANAGEMENT SYSTEM AND SATELLITE SEGMENT
ADMINISTRATION
IMPLEMENTATION OF REDDIG II GROUND NETWORK (MPLS) NODE IN
JOHANNESBURG, SOUTH AFRICA**

The Department of Transport of the Republic of South Africa presents its compliments to the International Civil Aviation Organization (ICAO) and has the honour to refer to State Letter Ref: LN 3/20.2.13-SA5176 dated 19 April 2021.

Kindly note that the Air Traffic and Navigation Services (ATNS) and Argentina's air navigation service provider (EANA) has commenced in dialogue on the following matters:

- a) Technical performance, design, integration and interoperability between the ATS/DS as well as AMHS systems; and
- b) Requirements for a bi-lateral meeting to conclude the required Memorandum of Understanding and Letter of Procedure as it relates to the services.

ATNS planned for a technical interface review meeting in July 2021 to finalise the interfaces and agree on the installation and commissioning timelines.

The ATNS Technical contact for these engagement are Mr. C Gersbach (CarelG@atns.co.za) and the contact for Operational engagement are Mr. S Nkabinde (SibusisoN@atns.co.za).

The Department of Transport of the Republic of South Africa avails itself of the opportunity to renew to the International Civil Aviation Organization the assurances of its highest consideration.

Yours Sincerely,

MS KAREN NAIDOO
DIRECTOR: AVIATION MULTILATERAL AFFAIRS
DATE: 26-08-2021

**Technical Letter of Agreement between
Empresa Argentina de Navegación Aérea (EANA)
and
Air Traffic and Navigation Services SOC Limited (ATNS)**

**PROCEDURES FOR COORDINATING IMPLEMENTATION OF A
REDDIG II NODE (MPLS) UNDER THE FRAMEWORK OF
THE REGIONAL TECHNICAL COOPERATION PROJECT RLA/03/901**

EFFECTIVE NOVEMBER 24th, 2021

The Air Navigation Service Providers of Argentina (EANA) and South Africa (ATNS) wish to cooperate with each other on technical and procedural arrangements associated with the implementation of a node of the terrestrial SAM Digital Network (REDDIG II) through a Multi-Protocol Label Switching (MPLS) provider, used for Air Traffic communication services. The objective is to establish communications to support the requirements for air navigation services and coordination between the Flight Information Regions under responsibilities of both ANSP, using a technically improved infrastructure, which provides superior service. The node will be implemented by Argentina, as a participant State to the Regional Technical Cooperation Project RLA/03/901, at no expense to the South Africa air navigation service provider (ATNS).

I - PURPOSE

This Technical Letter of Agreement (LoA) identifies and defines the procedures by which each party intends to provide and maintain the connection of the ATNS facilities in Johannesburg to the SAM Digital Network (REDDIG II) administered by the International Civil Aviation Organization (ICAO) South America (SAM) Regional Office. Argentina represented by EANA, as a participant of the ICAO's Regional Technical Cooperation Project RLA/03/901 has proposed and South Africa, represented by ATNS, has agreed to implement this connection to improve aeronautical communications between the Ezeiza and Johannesburg FIRs.

Both parties firmly believe that the implementation of this service will better support the air navigation services provided in the South Atlantic airspace under responsibility of ATNS and EANA, by improving the distribution of aeronautical messages and ATS coordination between the participating States.

II- SERVICE LOCATION

The following is designated as service location, for the purpose of this Technical LoA:

ATNS Air Traffic Control Centre
O. R. Tambo International Airport Gate 14
Bonaero Drive

Bonaero Park
Kempton Park
1622
Tel: +27 11 928 6477
E-mail: frc@atns.co.za

III – PROCESS AND PROCEDURAL RESPONSIBILITIES

A. SERVICES

1. Through the Regional Technical Cooperation Project RLA/03/901, EANA requested the ICAO SAM Regional Office and has provided the necessary resources for installation of a REDDIG II terrestrial network node (MPLS) in Johannesburg.
2. The SAM Regional Office with support of the Technical Cooperation Bureau (TCB) will take the necessary measures to amend the Contract 22502088 with Lumen (former CenturyLink), in order to install a REDDIG II MPLS node in Johannesburg, with the following characteristic:
 - a) 5 Mbps bandwidth link;
 - b) 99.7 % for monthly availability;
 - c) The RTT for communications between the two stations, for a 64-byte packet, may not exceed 150 ms in 95 % of the measurements made in a minimum time window of 10 seconds; and
 - d) The bit error rate (BER) shall be less than 10^{-7} , 99.5% of the time.
3. The telecommunication service provider (Lumen) will install the Point of Presence (PoP) in an ATNS facility, providing the necessary equipment, including a Customer Premises Equipment (CPE) with at least two standard Gigabit Ethernet interfaces.
4. With anticipation of at least 15 days, the telecom provider representative must contact the ATNS Technical Focal Point to schedule the node installation.
5. ATNS shall:
 - a) Provide the physical space for the installation of cabinets and equipment.
 - b) Deliver to the premises the electric power required and grounding system.
 - c) Maintain adequate environmental conditions (temperature, humidity, etc.) in the local where the PoP will be installed.
 - d) Obtain all necessary authorization and assist the telecom provider representatives in the installation process of the node.

B. IMPLEMENTATION OF THE CIRCUITS AND SCHEDULING

1. The following communications will be implemented:
 - a) Voice circuit for ATS purpose (Ezeiza ACC – Johannesburg ACC);
 - b) Voice circuit for Administrative/Maintenance service;
 - c) AMHS (P1) interconnection (Ezeiza – Johannesburg COM Centers);
 - d) Data circuit for surveillance purpose deemed necessary in the future; and;

APÉNDICE / APPENDIX C

- e) Other communications deemed necessary in the future, including communications with other States/Organizations participant of the network.
2. The REDDIG II Administrator will coordinate the configuration of the Johannesburg node (CPE) and the establishment of all communications agreed.
3. The router to be installed as CPE is the limit point dividing the Wide Area Network service, under responsibility of the REDDIG II Administrator, and the Local Area Network service, under responsibility of ATNS Technical Personnel.
4. ATNS must provide the cabling infrastructure to connect the local systems to the REDDIG II node in Johannesburg. The connection of the local systems of Johannesburg to the REDDIG II node will be through standard Gigabit Ethernet ports.
5. Following the successful implementation of the node, migration of services will be scheduled in coordination with the REDDIG II Administrator.
6. The previous communications via CAFSAT network between Argentina and South Africa will be discontinued.

C. MAINTENANCE AND RESTORATION OF SERVICE

1. ATNS and EANA are obligated to notify each other at least thirty (30) days prior to making any changes to their portion of the service that will affect the operations and service between the two parties.
2. ATNS and EANA will coordinate with each other to minimize anticipated interruptions of service and unnecessary engineering modifications to the service.
3. ICAO is responsible for maintaining the contract with the vendor associated with the service. The ATNS and EANA intend to coordinate with ICAO and each other, for their respective maintenance and operational activities affecting the network and associated system service in advance.
4. When the REDDIG II administration determines a networking problem is associated with a disruption, the network administrator shall notify the parties Technical Focal Point as soon as possible.
5. Outages affecting the network will be reported to both parties as soon as practical to do so. The restoration time for service shall be in accordance with the service provider maintenance manual and contract obligation.
6. The 24-hour single point of contact for all coordination regarding the service is:

ATNS: ATNS Fault Reporting Centre
 O. R. Tambo International Airport Gate 14, Bonaero Drive, Bonaero Park, Kempton
 Park, 1622
 Tel: +27 11 928 6477
 E-mail: frc@atns.co.za

EANA: Centro de Comunicaciones Digitales (CECODI)
Ministro Pistarini International Airport - Ezeiza
AU Tte. Gral. Pablo Riccheri Km 33,5, Puerta 50, 4to piso
Tel: + 54 11 4480 2362
Cel: +54 9 11 3156 3055
E-mail: cecodi@eana.com.ar

REDDIG Network Control Center (NCC) REDDIG in Manaus-Brazil
Administrator: CINDACTA IV Av. do Turismo 1350,
Tarumã - CEP 69045-630
Manaus, AM - Brazil
Tel: +55 92 3652 5713 / +55 92 3652 5712
E-mail: jvittor@icao.int

IV – FINANCIAL PROVISIONING

A. Expenditures

1. EANA shall bear the cost of providing MPLS services at a bandwidth rate of 5 Mbps, by means of the Regional Technical Cooperation Project RLA/03/901. The Technical Cooperation Bureau (TCB) will make the necessary arrangements to amend the current contract with the REDDIG II telecommunication provider (Lumen), in order to install and provide service for the Johannesburg node.
2. ATNS shall not incur any additional expenses associated with the establishment of the service for the duration of the agreement.
3. Nothing contained in this Technical LoA shall constitute a waiver of ICAO's privileges and immunities, and, as between ICAO and all REDDIG Participating States, ICAO shall be held harmless from all claims or liability of any kind.

V - AMENDMENTS

This Technical Letter of Agreement will be in effect until December 31, 2024.

This Technical LoA may be amended by mutual written agreement.

The coordination points between ATNS and EANA for any required amendments to this Technical LoA are designated as follows:

ATNS: Carel Gersbach
Senior Manager - Technical Planning and Quality
Address: Eastgate Office Park Private Bag X15
Block C, Kempton Park, South Boulevard Road 1620,
Gauteng, Republic of South Africa

APÉNDICE / APPENDIX C

Tel: +27 11 607 1000
Email: carelg@atns.co.za

EANA:

Malena Reinoso
CNS Engineering Manager
Address: Florida 361, piso 2º, C1005AAG Buenos Aires Argentina
Tel: +54 9 11 3205 9071
Email: mreinoso@eana.com.ar


VI – CONFIDENTIALITY & PROPRIETARY INFORMATION

Both parties undertake not to use or reveal to any third party any proprietary or confidential information about the other party unless required to by law or unless it is necessary to do so to provide the services.

The ATNS and EANA agree to the provisions of this agreement as indicated by the signatures of the duly authorized representatives below.



Mr. Facundo Gatti
Chief Technology Officer
Empresa Argentina de Navegación Aérea S.E.



Mr. Richard Madlala
Chief Technology Officer
Air Traffic and Navigation Services SOC Ltd

Date 24-NOV-2021

Date 24 November 2021