Cuestión 4 del Orden del Día: **Plan de trabajo para el año 2018**

ACTIVIDADES PREVISTAS PARA EL PERÍODO 2018

(Nota de estudio presentada por la Secretaría)

RESUMEN

Esta nota de estudio presenta información relativa a las actividades previstas a ser realizadas por el Proyecto RLA/03/901 - *Sistema de gestión de la REDDIG y administración del segmento satelital*, para el 2018.

REFERENCIAS

- Informe de la Vigésima Reunión del Comité de Coordinación de la REDDIG (RCC/20) (Lima, Perú, 21 al 23 de marzo de 2017).

Objetivos estratégicos de la OACI:	*A – Seguridad operacional; y* *B – Capacidad y eficiencia de la navegación aérea*

1. Introducción

1.1 Las principales actividades programadas para realizarse en el 2018 son:

a) Programa de entrenamiento de la REDDIG II; y
b) Operación de la REDDIG II y análisis de implantación de nuevos servicios.

2. Descripción

PROGRAMA DE ENTRENAMIENTO Y REUNIONES DE LA REDDIG II

2.1 Para el 2018 están previstos los siguientes entrenamientos y reuniones:

- Curso de operación, mantenimiento y programación en fábrica de los modem satelitales SKYWAN 7000/1070 para personal a cargo de la gestión de los NCCs.

- Curso de operación, mantenimiento y programación de los modem satelitales SKYWAN 7000/1070 para personal a cargo del mantenimiento de los nodos de la REDDIG II.

- Séptima Reunión Técnico Operacional de la REDDIG II (RTO/7).

2.2 La Reunión RCC/19 encargó a la secretaría investigar sobre cursos de operación, mantenimiento y programación de los modem satelitales SKYWAN así como los costos para un grupo de 20 personas o de un grupo pequeño de dos o tres personas que posteriormente procederían a extender el entrenamiento a un mayor número de personas a cargo del mantenimiento de la REDDIG II.

2.3 La secretaría presentó información sobre contenidos y costos de cursos en fábrica (NDSATCOM) de los modem SKYWAN IDU 7000/1070 en la reunión RCC/20. La reunión analizó los cursos presentados y consideró que el más apropiado era el curso *SKYWAN IDU 7000/1070 "Network Commission & Operation.* Este curso tiene como objetivo principal planificar y configurar una red con módems SKYWAN, configurar los parámetros relevantes de gestión de red, supervisar y controlar los parámetros relevantes para la operación propia de la red y el mantenimiento del grado de servicio requerido de la red.

Curso de operación, mantenimiento y programación en fábrica de los modem satelitales SKYWAN 7000/1070 para personal a cargo de la gestión de los NCCs

2.4 La Reunión RCC/20 consideró que el curso estuviera dirigido a las personas encargadas de la gestión de los Centros de Control de la REDDIG II, dos personas del NCC principal de Manaos y una persona del NCC de Ezeiza. La Reunión RCC/20 consideró que dicho curso se realizará en el 2018.

2.5 Como **Apéndice A** de esta nota de estudio se presenta el contenido y el costo del mismo. El proyecto RLA/03/901 asumirá el costo del curso y los pasajes (clase económica) y viáticos para tres personas. El curso tiene una duración de 5 días y se dictará tentativamente en la fábrica de NDSATCON en Alemania tentativamente del 17 al 21 de setiembre de 2018.

Curso de operación, mantenimiento y programación de los modem satelitales SKYWAN 7000/1070 para persona a cargo del mantenimiento de los nodos de la REDDIG II

2.6 Del 15 al 19 de octubre del 2018 se realizaría el curso sobre los modem SKYWAN 7000/1070 dirigido al personal a cargo del mantenimiento de los nodos de la REDDIG II. El curso será dictado por el personal que recibió el curso en fábrica. El proyecto RLA/03/901 cubrirá una beca por nodo, el costo de traducción simultánea y el traslado de un instructor (pasaje y viáticos). El curso debería realizarse en el NCC de Manaos.

Séptima Reunión Técnico Operacional de la REDDIG II (RTO/7)

2.7 Con el fin de coordinar las actividades de operación y mantenimiento de la REDDIG II se llevaría a cabo en Manaos, Brasil del 13 al 15 de agosto de 2018 la séptima reunión técnica operacional de la REDDIG II (RTO/7).

OPERACIÓN DE LA REDDIG II Y ANÁLISIS DE IMPLANTACIÓN DE NUEVOS SERVICIOS

2.8 En relación a las actividades a realizar para el 2018 se tiene previsto:

- Adquisición de repuestos REDDIG II y actualización de configuraciones
- Procedimiento de reposición de equipos con falla en los nodos
- Programación mantenimiento preventivo
- Visitas nodos REDDIG II
- Traslado nodo REDDIG II Bogotá
- Instalación de un nuevo nodo REDDIG II en Ezeiza

- Implementación nuevos servicios REDDIG II
- Implementación nuevos servicios MEVA III REDDIG II y consideraciones contractuales.

Adquisición de repuestos REDDIG II y actualización de configuraciones

2.9 Actualmente, se dispone para la REDDIG II un set de repuestos que se muestra en el **Apéndice B** de esta nota de estudio, los mismos fueron adquiridos como parte del proyecto de modernización de la REDDIG II en el contrato 22501200.

2.10 Desde el inicio de la entrada en operación de la REDDIG II, febrero del 2015, hasta la fecha, han ocurrido fallas principalmente en equipos como el modem satelital SKYWAN 1700 de NDSATCOM y el amplificador conversor a la banda C el IBUC (Intelligent Block Up Converter) de la empresa TERRASAT. En relación al amplificador, han ocurrido fallas simultáneas que no han podido atenderse simultáneamente en vista que en almacén de repuesto se dispone de un solo amplificador IBUC por potencia.

2.11 En este sentido, con el fin de poder atender las fallas en los nodos durante el periodo en el cual el equipo dañado se envía en fabrica para su reparación se ha considerado ampliar el almacén de repuesto con los equipos que se presentan como **Apéndice C** de esta nota de estudio, asimismo hay que considerar que los equipos se van envejeciendo.

2.12 Es necesario la actualización del software anti-virus en los servidores, procediendo a la renovación de la licencia. Una vez que se tenga la licencia, se enviará un procedimiento con transferencia de archivo incluido, para la actualización del antivirus y la base de datos a todos los nodos. La licencia del software antivirus (Kaspersky) está vencida (mayo 2017)

Procedimiento de reposición de equipos con falla en los nodos

2.13 Durante la fase de garantía de la REDDIG II el procedimiento para la reposición de los equipos dañados y él envió a fábrica para su reparación fue el siguiente, una vez comprobado que el equipo o pieza estaba dañada , la administración de la REDDIG desde la Oficina SAM de la OACI en Lima donde se encuentra ubicado el almacén de repuestos procede al envío del equipo o pieza de repuesto al nodo donde ocurrió la falla, la unidad dañada se envía a fabrica desde el país del nodo donde ocurrió la fallas y finalmente el equipo reparado, la fábrica lo enviará a la Oficina SAM de la OACI para incorporarlo al almacén de repuestos. Todas las coordinaciones para el proceso anteriormente indicado se realizaban entre INEO en vista que los equipos estaban en garantía, la Administración de la REDDIG y el punto focal de la REDDIG del Estado.

2.14 Al finalizarse el periodo de garantía para la mayoría de los equipos de la REDDIG II, el proceso de atención a la reposición de los equipos dañados y envió a fabrica para su reparación será el siguiente, desde la Oficina SAM de la OACI en Lima la Administración de la REDDIG envía el equipo o pieza de repuesto al nodo del Estado donde ocurrió la falla, el Estado del nodo envía a la Oficina SAM de la OACI el equipo o pieza dañada, la cual una vez recibida se enviará a fabrica para su reparación, el equipo una vez reparado retornará a la Oficina SAM de la OACI y se internará en el almacén de repuesto. Todas las coordinaciones se harán entre la Administración de la REDDIG, los puntos focales de la REDDIG y los representantes de los fabricantes de los equipos.

2.15 En este sentido es importante que los Estados mantengan actualizado la lista de puntos focales de la REDDIG II que se presenta como **Apéndice D** de esta nota de estudio.

Programación de mantenimiento preventivo

2.16 Para el año 2018, la Administración de la REDDIG ha programado un programa de mantenimiento preventivo a todos los equipos de la REDDIG II en los NCCs y en todos los nodos de la REDDIG II, parte de estas actividades de mantenimiento preventivos ya se han realizado. La programación de los mantenimientos preventivos se presenta como **Apéndice E** de esta nota de estudio.

Visita nodo REDDIG II

2.17 La Administración de la REDDIG ha considerado la necesidad que como parte de las actividades de mantenimiento y entrenamiento en la REDDIG II el Administrador de la REDDIG visite uno o dos nodos al año para realizar una evaluación completa del nodo y realizar un curso de actualización general para el personal encargado del mantenimiento del nodo. Para el año 2018 se ha considerado que el Administrador de la REDDIG visite el nodo de Maiquetía. La visita tendrá la duración de una semana y se ha previsto realizarla para mediados de julio.

Traslado nodo REDDIG II de Bogotá

2.18 Como resultado de la inspección en el sitio por parte de INEO realizada del 19 al 20 de febrero de 2017, INEO procedió a la presentación de una nueva oferta de reubicación del nodo. Esta oferta se presenta como **Apéndice F** de esta nota de estudio. A la fecha la oferta está en un proceso de revisión y negociación entre la sección de cooperación técnica de la OACI, la Administración de la REDDIG, Colombia e INEO. Las actividades del traslado del nodo de Bogotá se harán a través del contrato de la REDDIG II 22501200 y los gastos estarán a cargo de Colombia.

Instalación de un nuevo nodo REDDIG II en Ezeiza

2.19 El proceso de revisión de la Oferta de INEO para la instalación de un nuevo nodo de la REDDIG II en Ezeiza por parte de la EANA (Argentina), la sección de cooperación técnica de la OACI, la Administración de la REDDIG e INEO se completó a mediado de abril del 2018. Al respecto la OACI ha negociado con INEO la propuesta del 1/7/2017 para acomodarla con el presupuesto disponible por EANA, resultando en la propuesta B del 16/02/2018 en la cual el cambio más significativo fue la reducción de las unidades del Modem SKYWAN 7000, de dos unidades a una, reutilizándose uno de los modem del actual nodo de Ezeiza. Esto fue aprobado por EANA a mediados de abril del 2018. La nueva propuesta se presenta como **Apéndice G** de esta nota de estudio. Esta actividad se incluyó en el contrato de la REDDIG II 22501200 y los gastos serán cubiertos por Argentina. En este sentido se está en espera del envío del cronograma de actividades por parte de INEO, se espera que la nueva estación esté en operación a finales del 2018.

Implantación de nuevos servicios REDDIG II

2.20 Para el 2018 está prevista la implantación de nuevos circuitos AMHS. El **Apéndice H** presenta un cuadro con los circuitos a implantar y la fecha estimada de implantación.

2.21 Asimismo, en la planificación regional como parte del proyecto de automatización ATM, se tiene pendiente el intercambio de datos radar y AIDC (este último ya se viene implementando a través de los circuitos AFTN/AMHS existentes). Se espera que complementen los intercambios de datos radar planificados entre Argentina - Chile, Argentina -Paraguay y Ecuador – Perú.

Implementación nuevos servicios MEVA III REDDIG II y consideraciones contractuales

2.22 En la interconexión MEVA III - REDDIG II estaría previsto para el 2018 la implantación del AMHS entre Bogotá -Panamá, Lima-Atlanta y Brasilia-Atlanta.

2.23 El grupo MEVA III en vista del crecimiento de nuevos servicios en su red como la implantación de varios circuitos AMHS y el intercambio de datos de vigilancia requiere incrementar su ancho de banda satelital, en este sentido ha considerado que los costos correspondientes al incremento de ancho de banda se dividan en parte iguales en todos los Estados donde se encuentra un nodo MEVAIII incluyendo los nodos de Bogotá y Maiquetía donde se tiene la interconexión con la REDDIG II.

2.24 El primer incremento de ancho de banda satelital requerido por el grupo MEVA al proveedor fue en diciembre del 2016 requiriendo las siguientes implantaciones:

- Línea VSD adicional entre San Juan y Curacao (Q4/2016)
- Línea VSD adicional entre Miami y Cuba (Q4/2016)
- Cambio de circuito AFTN (9.6k) a AMHS IP (64k) entre Dom.Rep y Atlanta (Q4/2016)
- Cambio de circuito AFTN (9.6k) a AMHS IP (64k) entre COCESNA y Atlanta (Q1/2017)
- Cambio de circuito AFTN (9.6k) a AMHS IP (64k) entre Aruba y Atlanta (Q1/2017)
- Cambio de circuito AFTN (9.6k) a AMHS IP (64k) entre Cuba y Atlanta (Q2/2017)

2.25 Para la implantación de todos los servicios arriba indicados el proveedor de la MEVA III requirió de 100khz de ancho de banda satelital adicional a un costo de 500 Dólares mensuales. El grupo MEVA III consideró que este costo se dividiera por los 14 Estados miembros, incluyendo Bogotá y Maiquetía, de esta forma cada Estado pagaría 35.70 Dólares. En el **Apéndice I** se presenta la propuesta de circuito adicional en el contrato con los miembros de la MEVA.

2.26 Los aspectos contractuales entre REDDIG y el proveedor de la MEVA III están especificados en el contrato por lo tanto si los Estados miembros de la REDDIG están de acuerdo en compartir los costos de incremento de ancho de banda se modificaría el contrato al respecto. En caso de no adoptar la compartición de costo considerada por los integrantes de MEVAIII el costo de implantar un circuito que requiera 100kHz es de 500 dólares al mes, este costo lo cancelarían los Estados involucrados.

3 Acción sugerida

3.1 Se invita al Comité de Coordinación a:

a) Tomar nota de la información suministrada;
b) analizar las actividades previstas para el 2018 descritas en la Sección 2 y en los Apéndices de esta nota de estudio; y
c) analizar cualquier otra consideración relacionada con las actividades del proyecto REDDIG RLA/03/901 para el 2018 que considere necesaria.

ND SATCOM

SKYWAN IDU 7000/1070 COURSE OVERVIEW

Premium Satellite Communications
Systems & Solutions

Version: August 2015

ND SATCOM

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August 2015

1 COURSE OVERVIEW: SKYWAN 7000/1070 SATELLITE NETWORKS (VSAT)

ND SatCom offers training in various areas such as installations, operations, maintenance and management of our products and solutions. Convenient **classroom & hands-on training** is available all year-round at our training center in Friedrichshafen. We also offer trainings on request at our regional branches or at customer premises.

ND SatCom training is the most efficient way to get a full comprehension of ND SatCom products and solutions.

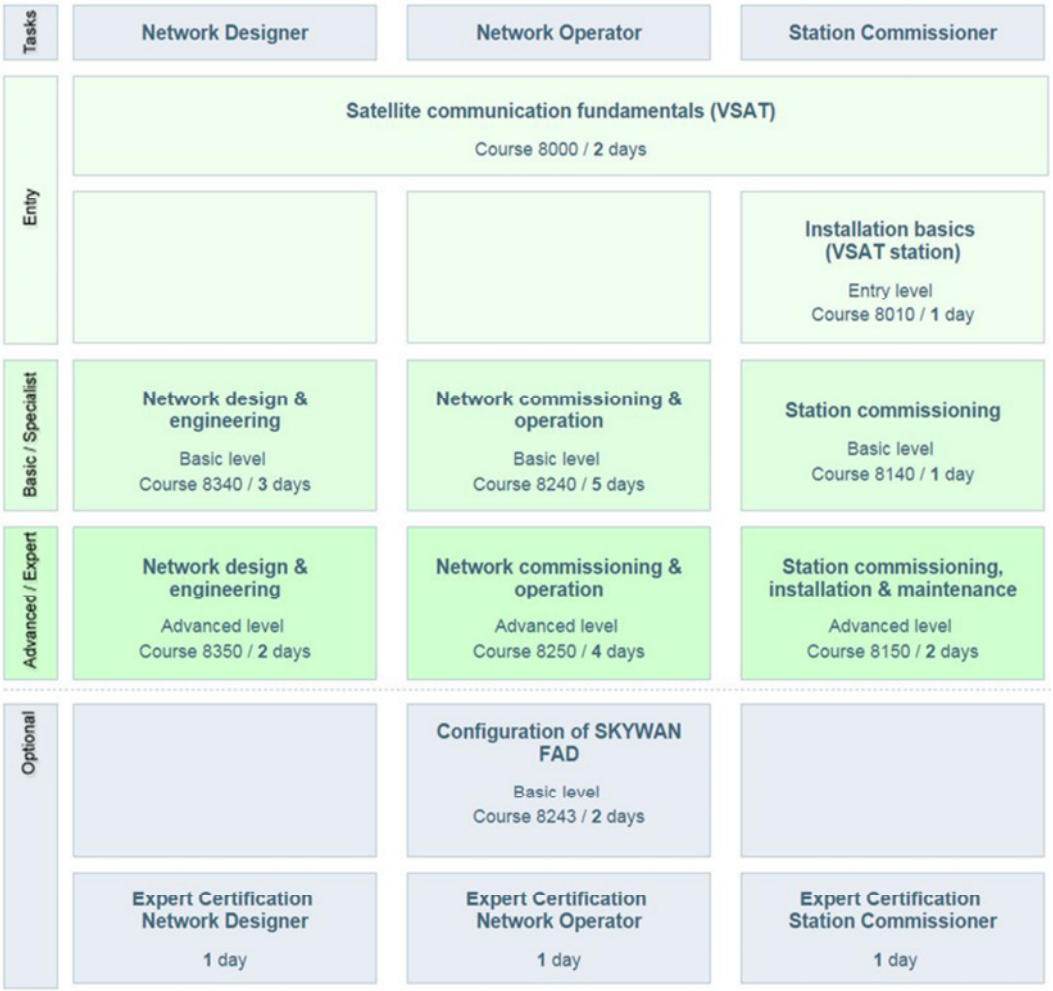
The following training course catalogue is based on the current SKYWAN generation with IDU 7000 series and IDU 1070 series. Detailed descriptions of well-proven predefined courses about SKYWAN are available for review.

Beside the SKYWAN predefined courses various customized training packages are possible. Such courses will be defined according to customer specific needs and requirements. The flexible content can be a selection of existing course modules enriched by additional customer topics. For the arrangement of a customized package please contact our training experts. The professional training courses covering all relevant topics for SKYWAN satellite networks.

August 2015

Our hands-on training enables you to quickly install your VSAT stations, discover how to commissioning and operate your network and learn through ongoing monitoring and maintenance how network downtime can be minimized.

The following figure illustrates the standard course overview for SKYWAN satellite networks:



The following course descriptions will provide the necessary detailed information about available course modules.

1.1 Station Commissioning (8140)

Title	8140 - SKYWAN IDU 7000/1070 Station Commissioning
Level	Basic / Specialist
Objectives	The participant will be able to: Prepare & commission a SKYWAN station to become a member of a SKYWAN network and perform tests at station level, i.e.: • Install a SKYWAN indoor unit, • Setup a SKYWAN IDU with a predefined parameter set, • Run station specific functional tests, • Control relevant parameters for proper station operation.
Contents	Description of SKYWAN solution: • SKYWAN features, hardware & interfaces, • Configuration file & software images, • Interfacing of outdoor unit (RFT, LNB, cabling), • SKYWAN station setup wizard. Installation check of outdoor equipment (ODU): • Visual checks, • Check of antenna pointing. Installation steps & Line-up procedure: • Loading a predefined configuration, • Change essential configuration parameters, • Required information for proper Line-up, • Procedures (perform tests, final adjustments, cross-pol & power settings). Initial station operation: • Basic monitoring (i.e. via LuM and LED indications), • Essential adjustments, • General pitfalls, • Troubleshooting procedure (Identify & localize general failures).
Target Group	Station commissioner (installation staff)
Duration	1 day
Prerequisites	The following prerequisites are mandatory for the participant: • Good knowledge in ‘satellite communication fundamentals (VSAT)’, • Good knowledge in ‘installation basics (VSAT)’ (e.g. like course 8010) • General good English language skills.
Environment	SKYWAN IDU 7000/1070 hardware, PC or notebook with SKYWAN Line-up Manager software (LuM), antenna system with RFT & LNB.
Methods	Lecture, hands-on (partly outside classroom), demonstrations, practical exercises.

1.2 Advanced Station Commissioning, Installation & Maintenance (8150)

Title	8150 – SKYWAN IDU 7000/1070 Station Commissioning, Installation & Maintenance
Level	Advanced / Expert
Objectives	The participant will be able to: Commission a SKYWAN station to become a member of a SKYWAN network and perform tests at station level, i.e.: • Install a SKYWAN indoor unit, • Setup a SKYWAN IDU with a predefined parameter set, • Run station specific functional tests, • Control relevant parameters for proper station operation, • Perform basic maintenance tasks. This course is the mandatory prerequisite for the participation in the additional certification course 'Expert SKYWAN IDU 7000/1070 Station Commissioner'.
Contents	Work on various installation example cases: • Focus on frequent pitfalls and most critical installation steps. Station commissioning and operation: • Run standard site acceptance test (SAT) procedure, • Run advanced trouble shooting procedures, • Interaction with the SKYWAN Network Operator. • Advanced monitoring. Station maintenance: • Perform basic / preventive maintenance tasks, • Failure localization, • Exchange of station components (IDU, IDU-boards, LNB, RFT).
Target Group	Station commissioner (installation staff)
Duration	2 days(if certification is required 1 additional day for certification)
Prerequisites	The following prerequisites are mandatory for the participant: • ND SatCom course 8140, • General good English language skills.
Environment	SKYWAN IDU 7000/1070 hardware, PC or notebook, antenna system with RFT & LNB.
Methods	Lecture, hands-on (partly outside classroom), demonstrations, practical exercises.

1.3 Network Commissioning & Operation (8240)

Title	8240 - SKYWAN IDU 7000/1070 Network Commissioning & Operation
Level	Basic / Specialist
Objectives	The participant will be able to: Plan and configure an entire SKYWAN network ready for network operation based on a predefined design, i.e.: • Set initial network & station parameter configuration, • Configure network management relevant parameters, • Monitor & control relevant parameters for proper network operation, • Maintain the required grade of service within the network.
Contents	Description of SKYWAN solution: • SKYWAN IDU features, • SKYWAN NMS features. SKYWAN NMS installation: Initial parameter configuration: • Network Configurator (Configuration groups & profiles concept; network planning, profile activation & configuration upload), • Satellite link (Configuration of station; network & master/ backup-master), • Network management parameter (Access control for node- & network management). Monitor & control relevant parameters: • Monitoring TDMA parameters (LED indications; essential parameters; monitoring screens), • Reconfiguration cases (Fully meshed to star; new frequencies; add 2nd demodulator), • Basic Pitfalls & Troubleshooting. Configure user traffic: • IP-feature overview (OSPF, RoHC, load-balancing, IP multicast, TCP-A) and IP-router configuration, • FR-feature overview and basic port configuration. SKYWAN NMS network tasks: • Network adjustments, • MIB statistics, • Useful graphs, • Network trouble-shooting procedures.
Target Group	Network Operator
Duration	5 days
Prerequisites	The following prerequisites are mandatory for the participant: • Good knowledge in TCP/IP basics, • Good knowledge in ‘satellite communication fundamentals (VSAT)’, • General good English language skills.
Environment	SKYWAN IDU 7000/1070 hardware, PC or notebook with SKYWAN NMS software, inter-cabling of some SKYWAN stations for a small network.
Methods	Lecture, hands-on with NMS tools, demonstrations, practical exercises.

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1.4 Advanced Network Commissioning & Operation (8250)

Title	8250 - SKYWAN IDU 7000/1070 Network Commissioning & Operation
Level	Advanced / Expert
Objectives	The participant will be able to: Plan and configure an entire SKYWAN network ready for network operation based on a predefined design, i.e.: • Set initial network & station parameter configuration, • Configure network management relevant parameters, • Monitor & control relevant parameters for proper network operation, • Maintain the required grade of service within the network, • Perform necessary FAT- and NAT-procedures. This course is the mandatory prerequisite for the participation in the additional certification course 'Expert SKYWAN IDU 7000/1070 Network Operator'.
Contents	Parameter configuration for certain use cases: • Network Configurator (Configuration groups & profiles concept; network planning, profile activation & configuration upload), • Satellite link (Configuration of station; network & master/ backup-master), • Network management parameter (Access control for node- & network management). Acceptance tests: • Run FAT procedure, • Run NAT procedure, • Troubleshooting approach. Special configurations: • Station & network redundancy, • Basic configuration of serial interfaces (i.e. for standard user FR-traffic). Configure & optimize user IP-traffic: • Quality-of-Service features for IP-traffic, • Advanced router configuration. SKYWAN NMS advanced network tasks: • Advanced network adjustments, • Additional useful graphs.
Target Group	Network Operator
Duration	4 days
Prerequisites	The following prerequisites are mandatory for the participant: • ND SatCom course 8240, • Good knowledge in TCP/IP basics, • General good English language skills.
Environment	SKYWAN IDU 7000/1070 hardware, PC or notebook with SKYWAN NMS software, inter-cabling of some SKYWAN stations for a small network.
Methods	Lecture, hands-on with NMS tools, demonstrations, practical exercises.

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1.5 Network Design & Engineering (8340)

Title	8340 - SKYWAN IDU 7000/1070 Network Design & Engineering
Level	Basic / Specialist
Objectives	The participant will have general knowledge about: • Designing & engineering SKYWAN satellite networks, • Usage of the SKYWAN IDU 7000/1070 TDMA calculation tool.
Contents	Description of SKYWAN solution & features: General carrier design: • Traffic calculation (Networking features overview; calculation tool & procedure), • Carrier design (Essential satellite link layer features: Master/ Slave concept, channel coding & modulation, topologies and populations, reference burst modes, data transport; TDMA parameter optimization tool & procedure). Outdoor unit design (incl. satellite selection): • Essential satellite link features, • Choice of satellite / transponder, • Outdoor unit design process, • SKYWAN link budget tool & procedure. Detailed indoor unit design: • Detailed SKYWAN IDU data, • IP features: IP router, static routing, dynamic routing (OSPF), differentiated services, robust header compression (ROHC), TCP-Acceleration, IP multicast, load balancing, • FR features: port types, basic FR service, traffic shaping, congestion management, communication services, FR multicast), Design finalization & cost optimization: • Optimization of network design, • Operational costs versus hardware costs.
Target Group	Network Designer
Duration	3 days
Prerequisites	The following prerequisites are mandatory for the participant: • Good knowledge in ‘satellite communication fundamentals (VSAT)’, • General good English language skills.
Environment	PC or notebook with SKYWAN IDU 7000/1070 TDMA calculation tool and MS Excel and SKYWAN link budget tool.
Methods	Lecture, demonstrations & exercises, hands-on tool training.

1.6 Advanced Network Design & Engineering (8350)

Title	8350 - SKYWAN IDU 7000/1070 Network Design & Engineering
Level	Advanced / Expert
Objectives	The participant will have good knowledge about: • Designing & engineering SKYWAN satellite networks, • Usage of the SKYWAN IDU 7000/1070 TDMA calculation tool. This course is the mandatory prerequisite for the participation in the additional certification course 'Expert SKYWAN IDU 7000/1070 Network Designer'.
Contents	Work on various engineering example cases: Carrier & outdoor unit design: • Focus on frequent pitfalls and most critical design steps. • Approaches for design optimization, • Usage of DDD template & result documentation, • Interfacing with 'Network Commissioning'. Advanced traffic analysis and QoS-requirements.
Target Group	Network Designer
Duration	3 days
Prerequisites	The following prerequisites are mandatory for the participant: • Participation in ND SatCom course 8340, • General good English language skills.
Environment	PC or notebook with SKYWAN IDU 7000/1070 TDMA calculation tool and MS Excel and SKYWAN link budget tool.
Methods	Lecture, advanced exercises, hands-on tool training.

2 OPTIONAL COURSE MODULES

For certain solutions e.g. with FAD voice multiplexers or flyaway antennas, dedicated / optional courses are available. Some examples you will find on the pages below:

2.1 Configuration of SKYWAN FAD (8243)

Title	8243 – Configuration of SKYWAN FAD
Level	Basic / Specialist
Objectives	The participant will be able to: Configure a SKYWAN FAD for basic operation within the SKYWAN network, i.e.: • Install a SKYWAN FAD unit, • Setup a SKYWAN FAD with a predefined parameter set, • Run specific functional tests of the unit and within a SKYWAN network.
Contents	Description of SKYWAN FAD solution: • Overview about FAD Series 9220 / 9230, • SKYWAN FAD features, • Hardware (interfaces, boards, functionalities, DSP SIMM), • WAN connection & PVCR protocol, • Supported data protocols & voice codecs, • Configuration file & software images, • Interfacing with SKYWAN IDU. Operator access & command line interface. Configuration section & relevant parameters. Basic pitfalls, test procedures and troubleshooting.
Target Group	Network Operator or Application Configurator FAD
Duration	2 days
Prerequisites	The following prerequisites are mandatory for the participant: • Participation in ND SatCom course 8240, • Good knowledge in TCP/IP basics, • Good knowledge in 'satellite communication fundamentals (VSAT)', • General good English language skills.
Environment	SKYWAN IDU 7000 series hardware, SKYWAN FAD hardware, PC or notebook with SKYWAN NMS software, inter-cabling of some SKYWAN stations (with FAD) for a small network.
Methods	Lecture, demonstrations, practical hand-on exercises.

2.2 Installation basics (8010)

Title	8010 – Installation Basics (VSAT Station)
Level	Entry / Beginners
Objectives	The participant will be able to: • perform the proper installation of a VSAT station, • do the antenna pointing, • use the necessary equipment & tools.
Contents	The following topics are included: • Antenna assembling & mounting, • Grounding & lightning protection, • Cabling & soldering (optional), • Mounting of ODU equipment, • Antenna pointing.
Target Group	Especially for persons new with installation tasks, who want to participate in the product specific courses (i.e. ND SatCom course for "station commissioning").
Duration	**1** day
Prerequisites	The following prerequisites are mandatory for the participant: • Basic knowledge in 'satellite communication fundamentals (VSAT)', • General good English language skills.
Environment	Spectrum analyzer, antenna system with RFT & LNB.
Methods	Lecture, hands-on (partly outside classroom), demonstrations, practical exercises.

2.3 Satellite communication fundamentals (8000)

Title	8000 Satellite Communication Fundamentals (VSAT)
Level	Entry / Beginners
Objectives	The participant will get good knowledge about satellite communication fundamentals and will get the prerequisite knowledge to continue with our product specific courses.
Contents	The following topics are included: • History & benefits of satellite communication, • The satellite & the satellite link, • Units & definitions, • Multiplexing methods, • From voice to bits – digitization basics, • From bits to waves – modulation basics, • Basic VSAT ground station overview, • Antenna basics, • Transmit & receive components (demonstration waveguide), • Safety at work, • Spectrum analyzer basics, • Optional: Hands-on antenna pointing exercise.
Target Group	Anyone interested in satellite communication or persons new in satellite communication technology.
Duration	**2** days
Prerequisites	The following prerequisites are mandatory for the participant: • General good English language skills.
Environment	Classroom
Methods	Lecture, discussion, demonstrations.

3 COURSE CERTIFICATE

The ND SatCom courses will provide a solid knowledge about the selected topic for the participant. The following knowledge levels within the available course sequence are introduced:

- Entry level (Beginners)
- Basic level (Silver - Specialist)
- Advanced level (Gold - Expert)

Customer will be able to go for:

- Participation in entry / basic / advanced level courses (without test),
- Participation in additional dedicated Expert certification courses.

ND SatCom provides currently the following standardized certification courses:

- Expert SKYWAN 7000 Network Designer,
- Expert SKYWAN 7000 Network Operator,
- Expert SKYWAN 7000 Station Commissioner.

By passing our certification courses a common and exchangeable base of proven knowledge and skills will be guaranteed.

All Expert certificates are valid for **2 years**. Prolongation requires a dedicated and timely re-certification.

ND SATCOM

ND SatCom Products GmbH, Graf-von-Soden-Str., 88090 Immenstaad, Germany

ICAO South American Regional Office
Av. Victor Andres Belaunde 157 Torre 4 Piso 4
SAN ISIDRO, LIMA
PERU

Contact:
Ricardo Oviedo Valencia
Telefon: + 49 6103-300 86 35

Proposal

Number / Vers. / Date
8009162 / 1 / 22.03.2018
Customer number
53831
Validity period
valid until 31.05.2018
Your contact:
Monika Kresse-Herbert
Phone: +49 (7545) 939-7327
Fax: +49 (7545) 939-8780
E-Mail: monika.kresse@ndsatcom.com

Wladimir Bahury
Phone: +49 (7545) 939
Fax: +49 (7545) 939
E-Mail: wladimir.bahury@ndsatcom.com

Your request for VSAT Training

Dear Mr. Oviedo,

We thank you very much for your request and are pleased to provide you with our proposal as detailed on the next pages and the respective attachment.

If there are any further questions, please contact the following colleagues:

- Hannelore Schwarz, Customer Training SKYWAN
  Tel. +49-7545-939-8602
- Wladimir Bahury, Business Development & Sales SKYWAN
  Tel. +55-21-99779-5089

We trust that our offer meets your expectations and look forward to your positive response.

Best regards

ND SatCom Products GmbH

Wladimir Bahury
Business Development Director

Monika Kresse-Herbert
Finance & Inside Sales

ND SATCOM

ICAO South American Regional Office
Av. Victor Andres Belaunde 157 Torre 4 Piso 4
SAN ISIDRO, LIMA

Number/Date
8009162 / 22.03.2018

Item	Article number	Description	Qty	Price per unit	Currency	EUR Value
00100	E-11K05271	(course module 8340) - Engineering Basic Participation in standard group courses. The price for the group is given per training day. For up to 8 participants (cost is regardless of number of students). The final course content and sequence will be customized based on available standard course modules. Training infrastructure (i.e. IDU / ODU, PC / Server, cabling etc.) required as defined by Training Department and prepared ready-to-use by the customer, if it takes place at the customer premises.	3.0 PU	2,400.00	EUR	7,200.00
	Options:					
00200	E-11K05271	(module 8350) - Engineering Advanced Participation in standard group courses. The price for the group is given per training day. For up to 8 participants (cost is regardless of number of students). The final course content and sequence will be customized based on available standard course modules. Training infrastructure (i.e. IDU / ODU, PC / Server, cabling etc.) required as defined by Training Department and prepared ready-to-use by the customer, if it takes place at the customer premises.	2.0 PU	2,400.00	EUR	
00300	E-11K05271	(module 8240 Network Comm Basic+Adv. Participation in standard group courses. The price for the group is given per training day. For up to 8 participants (cost is regardless of number of students). The final course content and sequence will be customized based on available standard course modules. Training infrastructure (i.e. IDU / ODU, PC / Server, cabling etc.) required as defined by Training Department and prepared ready-to-use by the customer, if it takes place at the customer premises.	5.0 PU	2,400.00	EUR	

ND SATCOM

ICAO South American Regional Office
Av. Victor Andres Belaunde 157 Torre 4 Piso 4
SAN ISIDRO, LIMA

Number/Date
8009162 / 22.03.2018

Item	Article number	Qty	Description Price per unit	Currency	EUR Value
00400	E-11K05271		(module 8250) Network Operation Adv. Participation in standard group courses. The price for the group is given per training day. For up to 8 participants (cost is regardless of number of students). The final course content and sequence will be customized based on available standard course modules. Training infrastructure (i.e. IDU / ODU, PC / Server, cabling etc.) required as defined by Training Department and prepared ready-to-use by the customer, if it takes place at the customer premises.		
		4.0 PU	2,400.00	EUR	
00500	E-11K05271		(module 8140)Station Commissioning Basic Participation in standard group courses. The price for the group is given per training day. For up to 8 participants (cost is regardless of number of students). The final course content and sequence will be customized based on available standard course modules. Training infrastructure (i.e. IDU / ODU, PC / Server, cabling etc.) required as defined by Training Department and prepared ready-to-use by the customer, if it takes place at the customer premises.		
		1.0 PU	2,400.00	EUR	
00600	E-11K05271		(module 8150) Station Commissioning Adv. Participation in standard group courses. The price for the group is given per training day. For up to 8 participants (cost is regardless of number of students). The final course content and sequence will be customized based on available standard course modules. Training infrastructure (i.e. IDU / ODU, PC / Server, cabling etc.) required as defined by Training Department and prepared ready-to-use by the customer, if it takes place at the customer premises.		
		2.0 PU	2,400.00	EUR	

Net Total without Options **7,200.00**

Contract Conditions:
Our offer is based on the ND SatCom Export Conditions.
Find the ND SatCom Export Conditions on our homepage footer under "General Terms & Conditions" (www.ndsatcom.com/en/other/terms_conditions.php)

Number/Date
8009162 / 22.03.2018

Page
4

ICAO South American Regional Office
Av. Victor Andres Belaunde 157 Torre 4 Piso 4
SAN ISIDRO, LIMA

Price conditions:
Please note that our prices are calculated EXW ND SatCom excluding German VAT (19%) add on.
The training price includes the participation of the students, lunch & refreshments during the course and the courseware in electronic format.Cost for student accommodation and transportation will be on customers account.
Please note, that our standard delivery documentation is free of charge. For all other additional documentation we reserve our rights to charge it accordingly.

Training Cancellation Fees:
Confirmed course bookings can be cancelled free of charge before 4 weeks of the start date.
Between 2 and 4 weeks before the start date, 50 % of the cost will be billed and within 14 days of the start date 100 % of the course cost will be billed.

Delivery schedule:
Please contact our Training Department for a Training Slot.

Payment terms:
100% before start of Training.

ALMACEN OACI
REPUESTOS REDDIG I Y REDDIG II

Levantamiento información: Junio 2015 9-May-18

Desc: Repuestos Reddig

	Ubicación	Caja#	Item#	Descripcion	Proveedor	Modelo	Cantidad	Numero de Serie	
	Lista A			**REPUESTOS REDDIG II ENVIADOS DESDE BRASIL**					
				EQUIPOS Y PIEZAS DE REPUESTO EN GENERAL					
1			1.1	Modem Satelital	NDSatcom	skywan 7000	1	730289	Enviado a Manaos, Brasil
2			1.2	Cable de energia			1	-	
3			1.3	Tarjeta MOD	NDSatcom		1	-	
4	**A4**	**1**	1.4	Tarjeta SIC/DEMOD	NDSatcom		1	-	
5			1.5	Tarjeta FPG	NDSatcom		1	-	
6			1.6	Tarjeta UIM	NDSatcom		1	-	
7			1.7	Cable de consola	NDSatcom		1	-	
8			1.8	Cable de RF N-SMA Macho	NDSatcom		1	-	
9			2.1	ROUTER Cisco 2901	CISCO	2901	1	FCZ1719C1BR	
10	**C2**	**2**	2.2	Two port Async-Sync Serial WAN interface card	CISCO	HWIC	1	FOC17173XNG	
11			2.3	Two port Async-Sync Serial WAN interface card	CISCO	HWIC	1	FOC17427CCS	
12			2.4	two port voice interface card FXS	CISCO	VIC3	1	FOC16450PGJ	
13			3.1	ROUTER Cisco 2911	CISCO	2911	1	FCZ175060LX	
14			3.2	24 PORT RJ45 PATCH PANEL	CISCO		1	-	
15			3.3	01 TARJETA EVM-HD TELEFONICO	CISCO		1	-	
16	**C2**	**3**	3.4	Cable serial CISCO V.24 DTE DB25	CISCO		1	-	
17			3.5	Cable serial CISCO V.24 DCE DB25	CISCO		1	-	
18			3.6	Cable telefonico RJ11 cross over	CISCO		1	-	
19			3.7	High density 8 port analog and digital extension module	CISCO		1	FOC180475BH	
20			4.1	ROUTER Cisco 2901	CISCO		1	FCZ175092L8	
21	**C2**	**4**	4.2	Two port Async-Sync Serial WAN interface card	CISCO		1	FOC17427CQP	
22			4.3	two port voice interface card FXS	CISCO		1	FOC17224X7C	
23			4.4	Cable serial CISCO V.24 DCE DB25	CISCO		1	-	
24			5.1	Rx 1+1	Terrasat		1	TE6010431	
25			5.2	Handheld Terminal with 2 m cable	Terrasat		1	439318	
26			5.3	Accesorios para RX 1+1	Terrasat		1	-	
27	**A2**	**5**	5.4	Cables de energia	Terrasat		2	-	
28			5.5	Cable Coaxial de RF con conectores tipo N 6m.	Terrasat		1	-	
29			5.6	Cable de Gestion para LNB	Terrasat		1	-	
30			5.7	Cable Coaxial de RF con conectores tipo N 30 cm.	Terrasat		2	-	
31			6.1	Wave Guide Switch for LNB	Logus		1	0244	
32	**A3**	**6**	6.2	LNB Banda C			1	2386	
33			6.3	LNB Banda C			1	2381	
34	**B2**	**7**	7.1	Switch Netgear de 26 Puertos	Netgear		1	39223C5U0036F	Enviado a Manaos, Brasil
35			7.2	Cable USB			1	-	
36	**B2**	**8**	8.1	Switch Netgear de 26 Puertos	Netgear		1	39223C5U00378	
37			9.1	IBUC 40W	Terrasat		1	TE5022340	
38			9.2	IBUC 40W	Terrasat		1	TE5022352	

ALMACEN OACI
REPUESTOS REDDIG I Y REDDIG II

Levantamiento información: Junio 2015 9-May-18

Desc: Repuestos Reddig

	Ubicación	Caja#	Item#	Descripcion	Proveedor	Modelo	Cantidad	Numero de Serie
39			9.3	1+1 Interface	Terrasat		1	6410574
40	A1	9	9.4	Switch de Guia de Onda	Logus		1	0363
41			9.5	Cable Coaxial con conectores tipo N 30cm			2	-
42			9.6	Cables de gestion con conector tipo Militar			2	-
43			9.7	Cable de gestion tipo ethernet			1	-
44			9.8	Cable de Energia			2	-
45	D1	10	10.1	Manuales de Curso de Rio de Janeiro				-
46	D2	11	11.1	Documentos Oficiales REDDIG II				-
47	D1	12	12.1	Manuales REDIG II				-
48	D1	13	13.1	Documentos Oficiales REDDIG II				-
	Lista B			REPUESTOS REDDIG II ENVIADOS DESDE FRANCIA				
				EQUIPOS Y PIEZAS DE REPUESTO EN GENERAL				
49	B3	14	14.1	Tarjeta Serial MOXA de 8 Puertos RS-232 PCI	MOXA		1	TADBB1062386
50			15.1	Disco Duro Externo IOMEGA NAS 2 Tb	LENOVO		1	V9AP370005
51	B3	15	15.2	Fuente para Disco Duro	LENOVO		1	-
52			15.3	Manuales	LENOVO		1	-
53	B3	16	16.1	UPS Eaton Eclipse ECO 1200 VA	EATON		1	G030D43420
54			17.1	Cable Multipuerto Moxa 8 puertos	MOXA		1	-
55			17.2	Cable Cisco V.24 DTE	CISCO		5	-
56	B3	17	17.3	Cable Cisco V.24 DCE	CISCO		11	-
57			17.4	Cable DB25 Male-Female			6	-
58			17.5	Cable Patch Cord ethernet RJ45			6	-
59			18.01	Cable Multiple Cisco 8 puertos ethernet con adaptadores a DB25	CISCO		2	-
60			18.02	Two port Async-Sync Serial WAN interface card	CISCO		1	FOC17173XSA
61			18.03	Four port Async-Sync Serial HWIC	CISCO		1	FOC17056CG2
62			18.04	Four port Async-Sync Serial HWIC	CISCO		1	FOC17405CTK
63			18.05	Eight port Async interface card	CISCO		1	FOC174673WU
64			18.06	Two Port Voice Interface Card FXS.	CISCO		1	FOC1747821Q
65			18.07	Two Port Voice Interface Card FXS.	CISCO		1	FOC18073ZCY
66			18.08	Two Port Voice Interface Card FXS.	CISCO		1	FOC1747823M
67			18.09	Two Port Voice Interface Card FXS.	CISCO		1	FOC18158WJ8
68			18.10	Two Port Voice Interface Card FXS.	CISCO		1	FOC18158WD0
69			18.11	Two Port Voice Interface Card FXS.	CISCO		1	FOC174781UF
70	C3	18	18.12	Two Port Voice Interface Card FXS.	CISCO		1	FOC18073ZJL
71			18.13	Two Port Voice Interface Card FXS.	CISCO		1	FOC17461BL9
72			18.14	Two Port Voice Interface Card FXS.	CISCO		1	FOC18158WGP
73			18.15	Two Port Voice Interface Card FXS.	CISCO		1	FOC18158WH7
74			18.16	Four Port Voice Interface Card FXS	CISCO		1	FOC1747523F
75			18.17	Four Port Voice Interface Card FXS	CISCO		1	FOC174752RT

ALMACEN OACI
REPUESTOS REDDIG I Y REDDIG II

Levantamiento información: Junio 2015 9-May-18

Desc: Repuestos Reddig

	Ubicación	Caja#	Item#	Descripcion	Proveedor	Modelo	Cantidad	Numero de Serie
76			18.18	Four Port Voice Interface Card FXS	CISCO		1	FOC174751RP
77			18.19	Four Port Voice Interface Card FXO	CISCO		1	FOC1746833R
78			18.20	One Port 2nd Gen Multiflex trunks Voice Wan Interface Card E1/T1	CISCO		1	FOC17451Q66
79			18.21	High Density voice/fax external Module	CISCO		1	FOC17443E08
80			18.22	Two Port 2nd Gen Multiflex trunks Voice Wan Interface Card E1/T1	CISCO		1	FOC17479P39
81			18.23	Eight port Async-Sync interface card	CISCO		1	FOC17446GYD
82	C3	19	19.1	Module Adapter for SM Slot on CI	CISCO		1	FOC17516V0F
83	C3	20	20.1	Module Adapter for SM Slot on CI	CISCO		1	FOC17516UU5
84	B1	21	21.1	Impresora Laser Jet Pro 400 M401dn	Hewlet Packard		1	VNH4222944
85			21.2	Cables de Energia			1	-
86	A3	22	22.1	8 Port Device Server 10/100 eth	MOXA		1	TADAE101113
87			23.1	RSS 16 SLOT 4U Chasis	DATAPROBE		1	115010100300024
88			23.2	Power Module	DATAPROBE		1	193008400000128
89			23.3	Network Control Card	DATAPROBE		1	134006500400093
90			23.4	Dual 8 wire Module Jack A/B card	DATAPROBE		1	111020200200892
91	B1	23	23.5	Dual 8 wire Module Jack A/B card	DATAPROBE		1	111020200200893
92			23.6	D25 A/B Card	DATAPROBE		1	111020000100593
93			23.7	D25 A/B Card	DATAPROBE		1	111020000100594
94			23.8	D25 A/B Card	DATAPROBE		1	111020000100643
95			23.9	D25 A/B Card	DATAPROBE		1	111020000100667
96			24.1	RSS 16 SLOT 4U Chasis	DATAPROBE		1	115010100300011
97			24.2	Power Module	DATAPROBE		1	193008400000115
98			24.3	Network Control Card	DATAPROBE		1	134006500400080
99	B1	24	24.4	Dual 8 wire Module Jack A/B card	DATAPROBE		1	11020200889
100			24.5	Dual 8 wire Module Jack A/B card	DATAPROBE		1	11020200890
101			24.6	Dual 8 wire Module Jack A/B card	DATAPROBE		1	11020200891
102			24.7	D25 A/B Card	DATAPROBE		1	111020000100629
103			24.8	D25 A/B Card	DATAPROBE		1	111020000100630
104			25.1	High density 8 port analog and digital extension module	CISCO		1	FOC174049WM
105			25.2	High density 8 port analog and digital extension module	CISCO		1	FOC174049YH
106			25.3	Cable de consola de Cisco			2	-
107			25.4	KVM Extender			1	F3D46058D140097
108	C3	25	25.5	Convertidor USB - Serial			1	-
109			25.6	Telefono IP DEPAEPE	DEPAEPE		1	PE02001120001826
110			25.7	Mouse Optico USB Negro			1	-
111			25.8	Regleta electrica con 05 tomas			2	-
112			25.9	Teclado Estandar K120	Logitech		1	-
113			26.1	Filtro RF	NORSAT		1	C001128132
114			26.2	Filtro RF	NORSAT		1	C001128140
115			26.3	Barras de Anclaje de acero			3	-

ALMACEN OACI
REPUESTOS REDDIG I Y REDDIG II

Levantamiento información: Junio 2015 9-May-18

Desc: Repuestos Reddig

	Ubicación	Caja#	Item#	Descripcion	Proveedor	Modelo	Cantidad	Numero de Serie	
116	B2	26	26.4	Bloques de anclaje de plastico negro			6	-	
117			26.5	Tornillos de sujecion de acero			20	-	
118			26.6	Blank panel para RSS			3	-	
119			26.7	Regleta electrica con 05 tomas			2	-	
120			26.8	Adaptadores Cambia genero DB25			15	-	
121	C1	27	27.1	Pantalla LCD 27"	SAMSUNG		1	0293H4MDB00709	
122	C1	28	28.1	HP ProLiant DL160 Gen8 Base - Server	Hewlet Packard		1	CZJ34500JZ	
123	A1	29	29.1	NTP Time Server Master Clock	Gorgy Timing		1	138176	No se llego a enviar a La Paz, Bolivia
124			29.2	GPS Antenna + Cable	Gorgy Timing		1	138389	
125	C2	30	30.1	Router Cisco 2901	CISCO	2901	1	FCZ175092KM	
126	C2	31	31.1	Router Cisco 2901	CISCO	2901	1	FCZ170391DX	
127	C2	32	32.1	Router Cisco 2901	CISCO	2901	1	FCZ170592LK	
128	C1	33	33.1	IBUC Terrasat 80 W	Terrasat		1	TE5022355	Enviado a Maiquetia, Venezuela
245	A3	61	61.1	Firewall NETGEAR Prosafe VPN Dual Wan Gigabit	Netgear		1	2CH23A3W501B3	
246	A3	62	62.1	VSAT Terminal IDU SkyWan 1070 19"	NDSatCom		1	00:40:71:F0:50:F0	Enviado a La Paz, Bolivia
			63.1	RT9s NTP Server (with Outdoor Antenna) - recibido en 2017	Gorgy Timing		1	172585	Enviado a BsAs, Argentina OR-17004
				IBUC 80W Amplificador	Terrasat		1	TE5022339	Enviado a Suriname, Dic 2017 OR-17005
				IBUC 80W Amplificador	Terrasat		1	verificacion	Enviado a Suriname, Feb 2018 OR-18001
				REPUESTOS REDDIG I					
				EQUIPOS Y PIEZAS DE REPUESTO EN GENERAL					
129	E2	34	34.1	Fuente de Poder para CX950	Memotec	VLT130-3000S1	1	2634	
130			34.2	Fuente de Poder para CX950	Memotec	VLT130-3000S1	1	2604	
131			34.3	Fuente de Poder para CX950	Memotec	VLT130-3000S1	1	1063	
132			34.4	Fuente de Poder para CX950	Memotec	VLT130-3000S1	1	2434	
133			34.5	Fuente de Poder para CX950	Memotec	VLT130-3000S1	1	1005	
134			34.6	Fuente de Poder para CX950	Memotec	VLT130-3000S1	1	1061	
135			34.7	Fuente de Poder para CX950	Memotec	VLT130-3000S1	1	1067	
136			34.8	Fuente de Poder para CX950	Memotec	VLT130-3000S1	1	1088	
137	E2	35	35.1	Dual Analog Voice Card	Memotec	AZ004010	1	052171060	
138			35.2	Dual Analog Voice Card	Memotec	AZ004010	1	052172487	
139			35.3	Dual Analog Voice Card	Memotec	AZ004010	1	052172484	
140			35.4	Dual Analog Voice Card	Memotec	AZ004010	1	052172486	
141			35.5	Dual Analog Voice Card	Memotec	AZ004010	1	1000339848	
142			35.6	Dual Analog Voice Card	Memotec	AZ004010	1	90030009411	
143			35.7	Dual Analog Voice Card	Memotec	AZ004010	1	9003000738	
144	E2	36	36.1	Fast Ethernet 10/100 Card	Memotec	AZ001011	1	081830913	
145			36.2	Fast Ethernet 10/100 Card	Memotec	AZ001011	1	052173027	
146			36.3	Fast Ethernet 10/100 Card	Memotec	AZ001011	1	052173028	
147	E2	36	36.4	Fast Ethernet 10/100 Card	Memotec	AZ001011	1	05273174	

ALMACEN OACI
REPUESTOS REDDIG I Y REDDIG II

Levantamiento información: Junio 2015 9-May-18

Desc: Repuestos Reddig

	Ubicación	Caja#	Item#	Descripcion	Proveedor	Modelo	Cantidad	Numero de Serie
148			36.5	Fast Ethernet 10/100 Card	Memotec	AZ001011	1	052173175
149			36.6	Fast Ethernet 10/100 Card	Memotec	AZ001011	1	061082686
150			36.7	Fast Ethernet 10/100 Card	Memotec	AZ001011	1	061082680
151			37.01	10 Base-T Ethernet Card	Memotec	AC004150	1	9002000306
152			37.02	10 Base-T Ethernet Card	Memotec	AC004150	1	9002000285
153			37.03	ISDN Card	Memotec	AC004060	1	1000328415
154			37.04	Digital Voice Processor	Memotec	AZ004114	1	1000315047
155			37.05	Digital Voice Processor	Memotec	AZ004114	1	1000315043
156	E2	37	37.06	Digital Voice Processor	Memotec	AZ004114	1	061092235
157			37.07	Digital Voice Processor	Memotec	AZ004114	1	061091982
158			37.08	Digital Voice Processor	Memotec	AZ004114	1	052169078
159			37.09	Digital Voice Processor	Memotec	AZ004114	1	052169066
160			37.10	E1 Expansion	Memotec	AZ004120	1	052169024
161			37.11	V.35 H	Memotec	AZ002312	1	081807596
162			38.1	Multi I/O V.24	Memotec	AZ002325	1	062236450
163			38.2	Multi I/O V.24	Memotec	AZ002325	1	9002000160
164			38.3	Multi I/O V.24	Memotec	AZ002325	1	9002001222
165	E2	38	38.4	Multi I/O V.24	Memotec	AZ002325	1	9002001230
166			38.5	Multi I/O V.24	Memotec	AZ002325	1	062236456
167			38.6	Multi I/O V.24	Memotec	AZ002325	1	9002000250
168			39.01	Modulo Ram 32 MB			1	040525
169			39.02	Modulo Ram 32 MB			1	045385
170			39.03	Modulo Ram 64 MB			1	07AD00134
171			39.04	Modulo Ram 64 MB			1	07AD00114
172			39.05	Modulo Ram 64 MB			1	07AD00113
173			39.06	Modulo Ram 64 MB			1	07AD00135
174			39.07	Slim Card E&M	Memotec	AZ004025	1	1000370325
175	E2	39	39.08	Slim Card E&M	Memotec	AZ004025	1	1000370752
176			39.09	Slim Card E&M	Memotec	AZ004025	1	1000370677
177			39.10	Slim Card E&M	Memotec	AZ004025	1	1000328561
178			39.11	Slim Card E&M	Memotec	AZ004025	1	1000328572
179			39.12	Slim Card E&M	Memotec	AZ004025	1	052167044
180			39.13	Slim Card E&M	Memotec	AZ004025	1	052167058
181			39.14	Slim Card E&M	Memotec	AZ004025	1	052167029
182			39.15	Slim Card E&M	Memotec	AZ004025	1	052167041
183			40.1	Universal I/O	Memotec	AZ002320	1	082389450
184			40.2	Universal I/O	Memotec	AZ002320	1	082389447
185	E2	40	40.3	Universal I/O	Memotec	AZ002320	1	092427151
186			40.4	Universal I/O	Memotec	AZ002320	1	092427153
187			40.5	Universal I/O	Memotec	AZ002320	1	92427152

ALMACEN OACI
REPUESTOS REDDIG I Y REDDIG II

Levantamiento información: Junio 2015 9-May-18

Desc: Repuestos Reddig

	Ubicación	Caja#	Item#	Descripcion	Proveedor	Modelo	Cantidad	Numero de Serie
188			40.6	Universal I/O	Memotec	AZ002320	1	92427154
189	E2	41	41.1	Ring Generator	Memotec	AZ009050	1	072294201
190			41.2	Ring Generator	Memotec	AZ009050	1	082388103
191			41.3	Ring Generator	Memotec	AZ009050	1	92425216
192			41.4	Ring Generator	Memotec	AZ009050	1	92425217
193			41.5	Ring Generator	Memotec	AZ009050	1	92425210
194			41.6	Ring Generator	Memotec	AZ009050	1	052174923
195	C4	42	42.1	Chasis CX950	Memotec	AC001360	1	CA2508
196	B4	43	43.1	Multiplexor CX950e Chasis+Placa Madre	Memotec	AC002010	1	092425306
197			43.2	Cable de consola Memotec	Memotec		1	-
198	E3	44	44.1	Chasis CX950	Memotec	AC001360	1	CA02740
199	E4	45	45.1	Multiplexor CX950e Chasis+Placa Madre	Memotec	AC002010	1	072298778
200	C4	46	46.1	Multiplexor CX950e Chasis+Placa Madre	Memotec	AC002010	1	082389428
201	E3	47	47.1	Modem Linkway 2100	Viasat	2100	1	B6885
202			47.2	Tarjeta MODEM	Viasat		1	31910
203			47.3	Tarjeta Ethernet	Viasat		1	00A09400599A
204			47.4	FR TIA	Viasat		1	CL000225701
205	D4	48	48.1	Fax CANON H12130			1	DRT0671
206			48.2	Telefono analogico CONAIRPHONE			1	-
207	D3	49	49.1	SSPA 40 W	Paradise Datacom	HPAC2040ACBX001	1	2360
208	D4	50	50.1	SSPA 40 W	Paradise Datacom	HPAC2040ACBX001	1	2359
209	E3	51	51.1	Fuente para Modem Linkway		CL0003192-01	1	RU140400198
210			51.2	Fuente para Modem Linkway		CL0003192-01	1	RU140400196
211			51.3	Fuente para Modem Linkway		CL0003192-01	1	RU140400197
212			51.4	Fuente para Modem Linkway		CL0003192-01	1	RU140400193
213			51.5	Fuente para Modem Linkway		CL0003192-01	1	RU140400194
214			51.6	Fuente para Modem Linkway		CL0003192-01	1	RU140400195
215	E3	52	52.1	Fuente para Modem Linkway		AM-120U-S4-916	1	RU082503487
216			52.2	Fuente para Modem Linkway		AM-120U-S4-916	1	RU082503484
217			52.3	Fuente para Modem Linkway		AM-120U-S4-916	1	RU134100215
218			52.4	Fuente para Modem Linkway		AM-120U-S4-916	1	RU134100212
219			52.5	Fuente para Modem Linkway		AM-120U-S4-916	1	RU134100213
220	D2	53	53.1	Rollo de cable ASSy 3 x 2.5 50 m			1	-
221	D2	54	54.1	Rollo de cable Multipar 50 m			1	-
222	D2	55	55.1	Rollo de cable Multipar 50 m			1	-
223	E2	56	56.1	LNB Banda C	NJS	NJS8477EN	1	00870
224	E2	57	57.1	Cables Patch Cord Ethernet 3m			9	-
225			57.2	Cables DB9-DB25 3m			2	-
226	E4	58	58.1	Rollo de Cable Coaxial 50R 50m			1	-
227	E1	59	59.1	SSPA 40 W	Paradise Datacom	HPAC2040ACBX001	1	2346

ALMACEN OACI
REPUESTOS REDDIG I Y REDDIG II

Levantamiento información: Junio 2015 9-May-18

Desc: Repuestos Reddig

	Ubicación	Caja#	Item#	Descripcion	Proveedor	Modelo	Cantidad	Numero de Serie
228			60.01	GPS Datum	Datum	ET6000-RB1	1	5823
229			60.02	Cable de consola Cisco	Cisco		1	-
230			60.03	Cable de Gestion SSPA Paradise	Paradise Datacom		1	-
231			60.04	Concectores Tipo N 50R sin ensamblar			4	-
232			60.05	Pulsera anti estatica			1	-
233			60.06	Paquete de Placas vacias para equipos Memotec.			1	-
234			60.07	Combinador-Divisor de RF	Global Proffesional		1	-
235			60.08	Convertidos RS232-RS485	Lindy		1	78680221KGZ0071
236	D3	60	60.09	Paquete de instalacion SUN SOLARIS	SUN Microsystems		2	-
237			60.10	Tarjeta Multipuerto Serial	COMTROL		1	5850-075665
238			60.11	Cable multipuerto DB25 para Multi I/O Memotec	Memotec		2	-
239			60.12	Cable Patch Cord Ethernet RJ45 5m			2	-
240			60.13	Cable de consola Memotec			1	-
241			60.14	Adaptador DB9-DB25			2	-
242			60.15	Adaptador DB25-M34			1	-
243			60.16	Cable de energia			1	-
244			60.17	Cable RF Coaxial N-SMA Male			3	-

INTER-OFFICE MEMORANDUM

LN 3/20.2.2 - SA5167 Lima, 27 March 2018

To: D/TCB

Cc: C/FOS, C/PRO

From: ICAORD, Lima

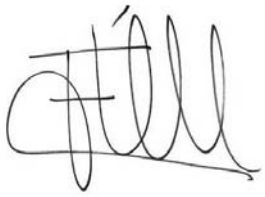
Subject: RLA03901 – Request Quote of List Spare Equipment for REDDIG II

Kindly request to proceed with the quotation of the stock of parts described below for the REDDIG II:

Optional equipment for Additional Spare Parts	Qty
INDOOR equipment	
Satellite modem, including:	
IDU 1070 19" NS + PS AC	1
License Key Mesh Topology (included)	
GORGY TIMING equipment	
GPS Master Clock - RT9s including one outdoor GPS Antenna with pre-wired cable	1
GPS standalone outdoor Antenna for RT9s (without cable)	1
LAN Server	
NPORT 5610-8	1
10 MHz Redundancy Equipment	
BIAS-T switch (10MHz redundancy system)	1
Passive DC-Block (Power injector 10MHz pass)	4
Passive DC-Block (RF Bandwidth)	4
Passive Splitter (2 Port RF Bandwidth)	2
Spare Parts for HPE PROLIANT DL160 Server	
Fans for HPE PROLIANT DL160 Server	10
Hot-Plug HP Midline HDD 500GB 7.2k SATA	2
Outdoor equipment	
RF Transmitter & Receiver	
IBUC 80W	1
Tx 1+1 switching system	1
Rx 1+1 switching system (unit without	1
Waveguide Switch (CPRG flange) + Control cable	1
LNB with external 10MHz reference	1
RF Filter (LNB path)	1
N-Female Type coaxial connector (for CNT/LMR-400 Type coaxial cable)	4
N-Male Type coaxial connector (for CNT/LMR-400 Type coaxial cable)	4
N-Male Type coaxial connector (for CNT/LRM-600 Type coaxial cable)	4

Your expeditious attention to this matter will be very much appreciated

Regards,



Fabio Faizi Rahnemay Rabbani
ICAORD, Lima

APPENDIX D / APENDICE D

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 Shenk	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		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	Rául Avellán Oña	Dirección de Nodo Aeropuerto "José Joaquín de Olmedo" - DGAC	ravellan1@yahoo.com raul.avellan@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	Rohan Garib	Executive Manager Air Navigation Services - CAA	rgarib@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

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
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
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 st...	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

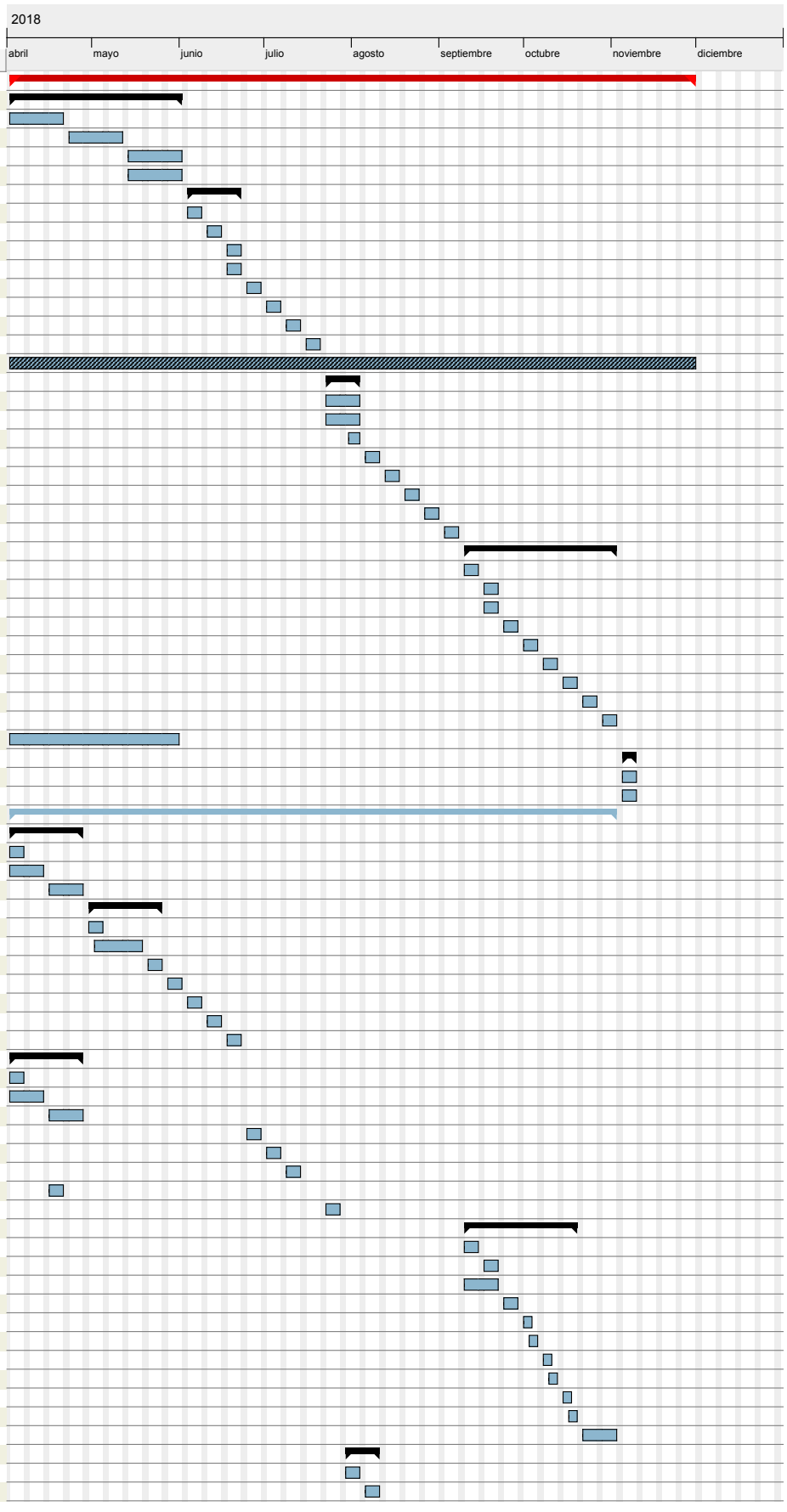


Diagrama de recursos

Nombre	Función	2018 abril	mayo	junio	julio	agosto	septiembre	octubre	noviembre	diciembre

	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

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).

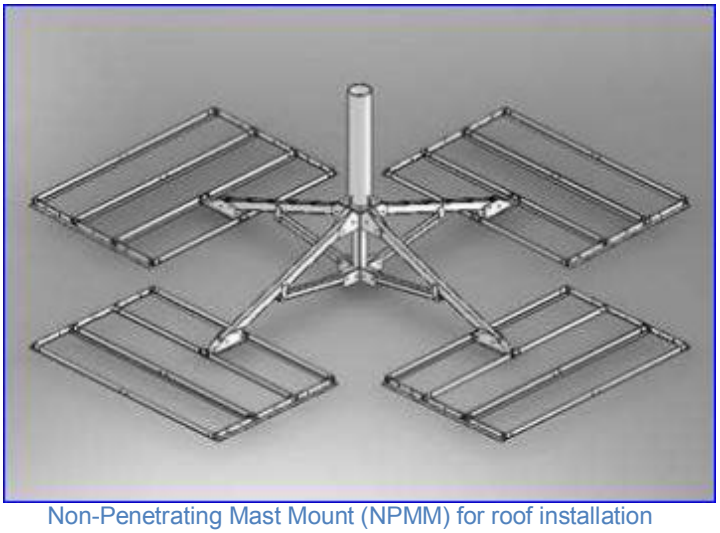
This satellite antenna is a **PRODELIN 1385** type - 3.8m diameter. It is type **approved by Intelsat as F1 antenna**, meaning that it can enter the Intelsat constellation without having to go through a long testing process.

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)

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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																									♦	

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:

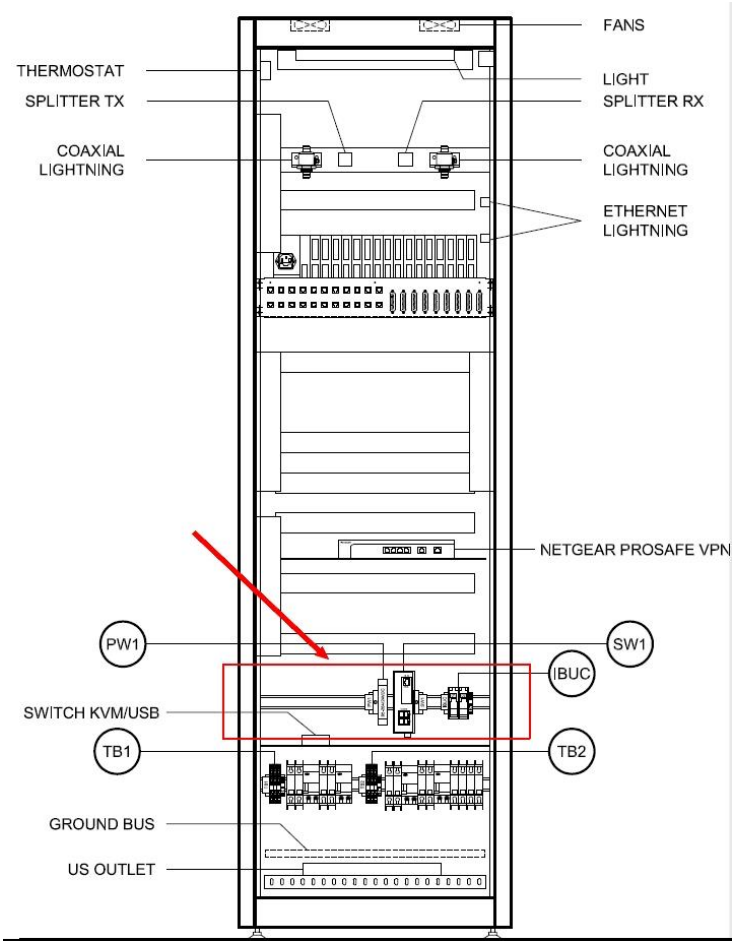
- Data and Services will be available at the new ACC, ready to be connected, prior the arrival of INEO's technician. INEO is considering that this equipment will be operational before the migration of REDDIG-II system.

- 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																									♦	

APÉNDICE H

ESTADO ACTUAL DE IMPLANTACIÓN DE LA INTERCONEXION AMHS EN LA REGION SAM

ESTADO	REQUERIMIENTO DE INTERCONEXIÓN AMHS	FECHA IMPLEMENTACIÓN	OBSERVACIONES
Argentina	Bolivia	Diciembre 2018	No se iniciaron coordinaciones
	Brasil	Abril 2018	Las pruebas operacionales finales para la interconexión AMHS entre Brasilia y Ezeiza se completaron con éxito el 18 de mayo de 2016. Implantación operacional desde 05/04/2018.
	Chile	Marzo 2018	Pruebas operacionales positivas se realizaron la segunda quincena de diciembre de 2016. Falta implantación operacional, decisión Autoridad de Argentina y Chile
	Paraguay	Mar 2012	Implantado y operacional
	Perú	Marzo 2018	Pruebas operacionales positivas realizadas a finales de 2016. Falta implantación operacional, decisión Autoridad de Argentina y Perú
	Sudáfrica	Junio 2019	Se han realizado coordinaciones iniciales en diciembre de 2016. La implantación de la interconexión se hará a través de la CAFSAT. El nodo de la CAFSAT de Ezeiza está previsto modernizarse para mediados de 2018
	Uruguay	Abril 2018	Se logró conectividad nivel del protocolo P1 entre Ezeiza y Montevideo, pruebas operacionales previstas marzo 2018
	Venezuela	Abril 2018	Implantado y operacional (Fuera de servicio falla AMHS Venezuela) desde diciembre de 2016. El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas con Venezuela prevista marzo 2018
	SITA (Atlanta)	Abril 2018	Se realizaron pruebas de conectividad positiva se espera su operación para abril de 2018
Bolivia	Argentina	Diciembre 2018	No se han iniciado coordinaciones
	Brasil	Septiembre 2018	No se han iniciado coordinaciones
	Perú	Junio 2018	Se logró conectividad y pruebas operacionales positivas IP entre MTA de La Paz y el MTA de Lima. Se presentó problema MTA de La Paz AASANA realizará consultas con Thales.
Brasil (Brasilia)	Argentina	Abril 2018	Las pruebas operacionales finales para la interconexión AMHS entre Brasilia y Ezeiza se completaron con éxito el 18 de mayo de 2016. Implantación operacional desde 05/04/2018.
	Bolivia	Septiembre 2018	No se han iniciado coordinaciones
	Colombia	Mayo 2017	Mayo 2017 operacional
	España	Diciembre 2017	Entrada en operación diciembre de 2017, el circuito AMHS se implantó a través de la

ESTADO	REQUERIMIENTO DE INTERCONEXIÓN AMHS	FECHA IMPLEMENTACIÓN	OBSERVACIONES
			CAFSAT A la fecha se encuentra en fase pre-operacional. Para la puesta en operación se está esperando la puesta en operación de la conexión AMHS Brasilia – SITA (abril 2018)
	Estados Unidos	Junio 2018	Se han realizado coordinaciones iniciales entre Brasil y Estados Unidos, la implantación del circuito se hará a través de la interconexión MEVAIII REDDIG II
	Guyana	Julio 2017	Entrada en operación 15 de diciembre de 2016 a las 17:00 UTC. A mediados de febrero de 2017 se regresó a la configuración AFTN, en mayo de 2017 continuación pruebas AMHS. En julio de 2017 se reestableció la conexión operacional
	Guyana Francesa	Diciembre 2018	Guyana Francesa implantó nuevo AMHS en enero de 2018 (COMSOFT). Las interconexiones AMHS planificadas a partir del mes de octubre de 2018
	Paraguay	Junio 2018	Se han realizado pruebas de conectividad IP positiva. Pendiente pruebas operacionales para el mes de marzo de 2018
	Perú	Dic 2015	Implantado y operacional 14 diciembre 2015
	Senegal	Diciembre 2018	Se han realizado coordinaciones iniciales entre Brasil y Senegal (diciembre 2016) La interconexión se llevará cabo a través de la red satelital AFISNET cuyo nodo en Brasil se instaló en Recife
	SITA (Atlanta)	Abril de 2018	Se han realizado con éxito las pruebas de inter operatividad IP y operacionales en agosto de 2017. Se espera su entrada en operación para el mes de abril del 2018
	Surinam	Junio 2018	Entrada en operación 15 de diciembre de 2016 a las 17:00 UTC. A mediados de febrero de 2017 se regresó a la configuración AFTN. Pendiente actualización del sistema AMHS de Surinam
	Uruguay	Abril 2018	Conectividad IP completada (primera semana de octubre 2016) Pruebas protocolo P1 finalizada en forma positiva la semana 28 de noviembre 2016 (30 de noviembre y 1 de diciembre). Pruebas operacionales positivas agosto 2017 y puesta en operación prevista para el mes de abril del 2018
	Venezuela	Marzo 2018	Se logró conectividad nivel del protocolo P1 entre Brasilia y Caracas (octubre de 2016). El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas operacionales positivas febrero de 2018
Chile	Argentina	Marzo 2018	Pruebas operacionales positivas se realizaron la segunda quincena de diciembre de 2016. Falta implantación operacional, decisión Autoridad de Argentina y Chile
	Perú	Dic 2016	Entrada en operación segunda quincena diciembre de 2016
Colombia	Brasil	Mayo 2017	Operacional mayo 2017

ESTADO	REQUERIMIENTO DE INTERCONEXIÓN AMHS	FECHA IMPLEMENTACIÓN	OBSERVACIONES
	Ecuador	Junio 2018	Se realizaron pruebas de conectividad IP positiva. Pendiente continuación pruebas operacionales
	Panamá	Marzo 2018	Se ha establecido una configuración circuital a través de la interconexión MEVA III REDDIG II (mediados de febrero de 2017) Pruebas operacionales positivas en agosto 2017. La implantación operacional se realizará una vez que Colombia y Panamá contraten el circuito AMHS con el proveedor de comunicaciones de la MEVA III en la interconexión MEVAIII/REDDIG II
	Perú	Septiembre 2010	Implantado y operacional
	Venezuela	Diciembre 2017	El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas operacionales positivas noviembre 2017 entrada en operación diciembre 2017
Ecuador	Colombia	Junio 2018	Se realizaron pruebas de conectividad IP positiva. Pendiente continuación pruebas operacionales
	Perú	Julio 2012	Implantado y operacional
	Venezuela	Junio 2018	El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas operacionales con Venezuela realizadas en noviembre 2017, problemas en el MTA de Quito con las prioridades de los mensajes AMHS.
Guyana France sa (Francia)	Brasil	Diciembre 2018	Guyana Francesa implantó nuevo AMHS en enero de 2018 (COMSOFT). Las interconexiones AMHS planificadas a partir del mes de octubre de 2018
	Venezuela	Diciembre 2018	Guyana Francesa implantó nuevo AMHS en enero de 2018 (COMSOFT). Las interconexiones AMHS planificadas a partir del mes de octubre de 2018
Guyana	Brasil	Julio 2017	Entrada en operación 15 de diciembre de 2016 a las 17:00 UTC. A mediados de febrero de 2017 se regresó a la configuración AFTN, en mayo de 2017 continuación pruebas AMHS En Julio de 2017 se restableció la conexión operacional
	Surinam	Junio 2011/ Diciembre 2018	Implantado y operacional hasta finales del primer trimestre 2017. Problemas AMHS en Surinam se está a la espera de su actualización
	Trinidad &Tobago	Diciembre 2018	Pendiente coordinación
	Venezuela	Junio 2018	El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas con Venezuela mayo 2018
Panamá	Colombia	Marzo 2018	Se ha establecido una configuración circuital a través de la interconexión MEVA III REDDIG II (mediados de febrero de 2017) Pruebas operacionales positivas en agosto 2017. La implantación operacional se realizará una vez que Colombia y Panamá

ESTADO	REQUERIMIENTO DE INTERCONEXIÓN AMHS	FECHA IMPLEMENTACIÓN	OBSERVACIONES
			contraten el circuito AMHS con el proveedor de comunicaciones de la MEVA III en la interconexión MEVAIII/REDDIG II
	Estados Unidos	Junio 2018	A mediados de febrero de 2018 se realizaron pruebas operacionales positivas entre el MTA de Panamá y el MTA de Atlanta
Paraguay	Argentina	Mar 2012	Implantado y operacional
	Brasil	Junio 2018	Se han realizado pruebas de conectividad IP positiva. Pendiente pruebas operacionales para el mes de marzo de 2018
Perú	Argentina	Marzo 2018	Pruebas operacionales positivas realizadas a finales de 2016. Falta implantación operacional, decisión Autoridad de Argentina y Perú
	Bolivia	Junio 2018	Se logró conectividad y pruebas operacionales positivas IP entre MTA de La Paz y el MTA de Lima. Se presentó problema MTA de La Paz AASANA realizará consultas con Thales.
	Brasil	Dic 2015	Implantado 14 diciembre 2015
	Chile	Dic 2016	Entrada en operación segunda quincena diciembre de 2016
	Colombia	Septiembre 2010	Implantado
	Ecuador	Julio 2012	Implantado
	Estados Unidos	Diciembre 2018	Se han realizado coordinaciones iniciales para implantar la conexión AMHS a través de la interconexión MEVA III REDDIG II
	Venezuela	Diciembre 2017	El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas operacionales positivas con Venezuela octubre 2017, puesta en operación diciembre de 2017
Surinam	Brasil	Junio 2018	Entrada en operación 15 de diciembre de 2016 a las 17:00 UTC. A mediados de febrero de 2017 se regresó a la configuración AFTN. Pendiente actualización del sistema AMHS de Surinam
	Guyana	Junio 2011/ Diciembre 2018	Implantado y operacional hasta finales del primer trimestre 2017. Problemas AMHS en Surinam se está a la espera de su actualización
	Venezuela	Junio 2018	El 20 de septiembre de 2017 entró en operación el nuevo sistema AMHS en Venezuela. Las pruebas y puestas en operación se harán una vez que Surinam actualice su sistema AMHS
Uruguay	Argentina	Abril 2018	Se logró conectividad nivel del protocolo P1 entre Ezeiza y Montevideo, pruebas operacionales previstas marzo 2018
	Brasil	Abril 2018	Conectividad IP completada (primera semana de octubre 2016) Pruebas protocolo P1 finalizada en forma positiva la semana 28 de noviembre 2016 (30 de noviembre y 1 de diciembre). Pruebas operacionales positivas

ESTADO	REQUERIMIENTO DE INTERCONEXIÓN AMHS	FECHA IMPLEMENTACIÓN	OBSERVACIONES
			agosto 2017 y puesta en operación prevista para el mes de abril de 2018
Venezuela	Argentina	Abril 2018	Implantado y operacional (Fuera de servicio falla AMHS Venezuela) desde diciembre de 2016. El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas con Venezuela marzo 2018
	Brasil	Marzo 2018	Se logró conectividad nivel del protocolo P1 entre Brasilia y Caracas (octubre de 2016). El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas operacionales positivas febrero de 2018
	Colombia	Diciembre 2017	El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas operacionales positivas noviembre 2017 entrada en operación diciembre 2017
	España	Diciembre 2018	Pendiente coordinaciones iniciales. La interconexión se haría a través de un circuito de comunicaciones arrendado a proveedores de comunicaciones locales se está en trámite para su implantación
	Estados Unidos	Diciembre 2018	Pendiente coordinaciones iniciales. El circuito AMHS se implantaría a través de la interconexión MEVA III/REDDIG II
	Ecuador	Junio 2018	El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas operacionales con Venezuela realizadas en noviembre 2017, problemas en el MTA de Quito con las prioridades de los mensajes AMHS.
	Guyana	Junio 2018	El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas con Venezuela mayo 2018
	Guyana Francesa	Diciembre 2018	Guyana Francesa implantó nuevo AMHS en enero de 2018 (COMSOFT). Las interconexiones AMHS planificadas a partir del mes de octubre de 2018
	Perú	Diciembre 2017	El 20 de septiembre de 2017 entra en operación el nuevo sistema AMHS en Venezuela. Pruebas operacionales positivas con Venezuela octubre 2017, puesta en operación diciembre de 2017
	Surinam	Junio 2018	El 20 de septiembre de 2017 entró en operación el nuevo sistema AMHS en Venezuela. Las pruebas y puestas en operación se harán una vez que Surinam actualice su sistema AMHS
	Trinidad&Tobago	Diciembre 2018	El 20 de septiembre de 2017 entró en operación el nuevo sistema AMHS en Venezuela. Se realizaron coordinaciones iniciales

Sombreado en verde Interconexión AMHS en operación
Verde claro pre operacional

VSAT-MEVA III

Proposal - Additional Circuits

V1.2/08.09.2015

CFT Ref.:	**Sealed Tender ST-22501390**
Project No.:	**20131007**
Doc-ID.:	**VSAT-MEVA III_PAC_V1.2**
Customer:	**ICAO MEVA III, Mexico/Canada**

Revision History

Version	Date	Description	Resp.
V1.0	23.04.2015	Initial Version submitted as response	
V1.1	03.06.2015	Modified Version based on request while TMG/30	
V1.2	08.09.2015	Updated Version based on TMG clarifications	

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Contents

1 General

(1) With reference to the requirement of the MEVA III Task Force and Member States, COMSOFT prepared and submit the following price proposal implementing additional service circuits and related tasks (e.g. installation, etc.), based on the situation that existing network equipment is available and can be used or new equipment is needed.

(2) In the case of no additional equipment is required to implement a new service circuit, COMSOFT developed a special Bandwidth/Budgetary Calculator, which is attached to this document in form of an Excel sheet.

(3) The offered prices are valid for the period of the MEVA III network operation – **until 31 March 2020, plus selected extension**.

1 Detailed Price List

(1) COMSOFT is providing a price breakdown of the following items.

- **Pricing per 100 kHz of additional bandwidth**
- **Pricing for each services (voice, 9.6kbps data, 64kbps data, etc.)**
- **Pricing for the lease of each piece of equipment**
- **Pricing for the installation of additional equipment**
- **Bandwidth/Budgetary Calculator**

1.1 Price – Additional Bandwidth (100 kHz)

(1) As general fact, the purchase of additional bandwidth is based on 100 kHz steps and there is no availability of less bandwidth than 100 kHz. This is a worldwide regulatory of the satellite operators.

(2) Therefore, please receive the following proposal on this specific inquiry.

Space Segment 100 kHz (minimal bookable unit) - 500,00 USD / month

(3) According to the agreement of the MEVA Member States the purchase of additional space segment per month will be divided between the Member States.

MEVA Member States	United States of America, Aruba, Cuba, Dominican Republic, Haiti, COCESNA (Honduras), Mexico, Sint Maarten, Jamaica, Cayman Islands, Bahamas, Curacao, Panama, ICAO (Venezuela, Colombia)

(4) In the case of required additional bandwidth the above monthly amount will be shared between the Member States, which leads into an increase of the monthly bandwidth costs (MRC) of **35,70 USD / month** of each Member State.

1.2 Price – Additional Service Circuits

(1) **The offered prices for each service in the MEVA III Network are calculated on the following assumption.**

(2) This leads into result that the following price offer includes the space segment, related network services and necessary hardware upgrade for adding additional circuits, if needed.

(3) **Please Note!**

The offered detailed prices are valid the extension of the existing MEVA III Network sites. In the case there will be a requirement for a complete new site (e.g. British Virgin Islands) dedicated turnkey offer will be made.

i. Additional FXS Channel per MEVA III Network Site

Pos.	Description	MRC (in US$)	Duration (Month)	MRC Total (in US$)	Notice
01.	Service (Circuits)	75,00	60	4.500,00	
02.	Space Segment	35,70	60	2.142,00	if needed

Pos.	Description	Qty	NRC (in US$)	Notice
01.	Installation	1	2.100,00	if needed, in the case of additional equipment is required

The monthly leased prices for the related additional equipment are stated in the table of chapter 1.3 "Price – Lease of Equipment (itemized)".

ii. Additional VHF-PTT Channel per MEVA III Network Site

Pos.	Description	MRC (in US$)	Duration (Month)	MRC Total (in US$)	Notice
01.	Service (Circuits)	75,00	60	4.500,00	
02.	Space Segment	35,70	60	2.142,00	if needed

Pos.	Description	Qty	NRC (in US$)	Notice
01.	Installation	1	2.100,00	if needed, in the case of additional equipment is required

The monthly leased prices for the related additional equipment are stated in the table of chapter 1.3 "Price – Lease of Equipment (itemized)".

iii. Additional Serial Channel PAMA up to 16 kbps per MEVA III Network Site

Pos.	Description	MRC (in US$)	Duration (Month)	MRC Total (in US$)	Notice
01.	Service (Circuits)	75,00	60	4.500,00	
02.	Space Segment	35,70	60	2.142,00	if needed

Pos.	Description	Qty	NRC (in US$)	Notice
01.	Installation	1	2.100,00	if needed, in the case of additional equipment is required

The monthly leased prices for the related additional equipment are stated in the table of chapter 1.3 "Price – Lease of Equipment (itemized)".

iv. Additional DAMA AMHS IP Channel 64 kbps per MEVA III Network Site

Pos.	Description	MRC (in US$)	Duration (Month)	MRC Total (in US$)	Notice
01.	Service (Circuits)	75,00	60	4.500,00	
02.	Space Segment	35,70	60	2.142,00	if needed

Pos.	Description	Qty	NRC (in US$)	Notice
01.	Installation	1	2.100,00	if needed, in the case of additional equipment is required

The monthly leased prices for the related additional equipment are stated in the table of chapter 1.3 "Price – Lease of Equipment (itemized)".

1.3 Price – Lease of Equipment (itemized)

(1) COMSOFT will provide the following additional price offer on the lease for each equipment component, which will be used in the MEVA III VSAT Network.

Pos.	Qty.	Description	MRC (in US$)
01.		**Modem Equipment**	
	1	- IDU 7000 MASTER	552,50
	1	- IDU 2570 BASE	285,00
	1	- SKYWAN LICENSE FRAME RELAY PORT	12,00
	1	- SKYWAN LICENSE 8PSK	12,00
	1	- SKYWAN LICENSE MESH TOPOLOGY	95,00
	1	- CABLE INT. RS232 TERMINAL SKYWAN IDU	2,25
	1	- CABLE INT. X21 DCE IDU-FAD92XX/93XX/8400	3,25
	1	- DIAL IN MODEM SET SKYWAN IDU 7000/7000C	3,50
02.		**Multiplexer Equipment**	
	1	- FAD 9230 BASE UNIT UAC	107,50
	1	- FAD 9220 BASE UNIT UAC	75,00
	1	- FAD 8400 BASE UNIT 4 SERIAL PORTS UAC	55,00
	1	- FAD 8400 BASE UNIT 8 SERIAL PORTS UAC	77,50
	1	- FAD 92X0 DUAL FXS MODULE	18,25
	1	- FAD 92X0 QUAD FXS MODULE	35,00
	1	- FAD 92X0 QUAD PTT (E&M) MODULE +48V/-48V	40,00
	1	- FAD 92X0 DUAL SERIAL INTERFACE MODULE	18,25
03.		**RF Equipment**	
	1	- RFT 5040 STANDARD C-BAND 40W	180,00
	1	- MOUNTING KIT STD. RFT 5000 C-BAND	22,00
	1	- POWER SUPPLY 350W FPS 5000 AC/DC	30,00
	1	- MOUNTING KIT MAST FOR FPS 5000	3,00
	1	- LNB-C PLL 3.625-4.2 GHz / F-CON EXT REF	12,75
	1	- FILTER WG, RADAR ELIMINATION W. TRF C-BD	15,25
	1	- IFL GROUNDING KIT RFT 5000	3,00
	1	- 10 MHZ REFERENCE SOURCE TYPE 7551	32,50
	1	- RCU 5000 SET C-BD SW02	380,00
	1	- RCU 5000 WG KIT ANTENNA ESC37 C-BAND	30,00
	1	- 1385 3.8M C-Band Tx/Rx Antenna (GDST-1385C.LIN-CO.WR137), incl. NPMM-Baird (BAIR-PXH-T-1075x3-RP)	470,70

1.4 Bandwidth/Budgetary Calculator

(1) COMSOFT understood that the required prices for additional circuits will be used for budgetary calculations of the respective MEVA III Member States. Therefore, COMSOFT developed a customized **Bandwidth/Budgetary Calculator**, which will be submitted attached to this response.

(2) The Bandwidth/Budgetary Calculator can be also used in the case no additional equipment is needed to implement a new service circuit.

(3) This specially developed tool below (example) is attached as Excel sheet to this document.

Pos.	Description	Qty	MRC (in US$)	ext. MRC	MRC (in US$)	Duration (Months)	MRC Total (in US$)
01.	**Network Access** incl. Spare Parts (Pool) incl. Services	3	150,00	450,00	**450,00**	60	**27.000,00**
02.	**Circuit Charges**						
	AFTN 9.6kbps synch	1	87,39	87,39		60	
	AFTN 2.4kbps	0	8,74	0,00		60	
	ATS Voice	0	113,61	0,00		60	
	Voice (DAMA)	1	10,49	10,49		60	
	AMHS 64kbps (serial)	1	419,48	419,48		60	
	TOTAL				**1.000,00**		**60.000,00**
03.	**Equipment Lease** Have to be calculated on seperatetely on each case	3	N/A	N/A	N/A	60	N/A

Bandwidth/Budgetary Calculator (Example)

FREQUENTIS AG

International Civil Aviation
Organization (ICAO)
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Invoice

No.	951702822		
Date	2-Aug-17	Customer No.	20662
Date of Service	1-Oct-17 - 31-Dec-17	VAT No.	
		FRQ Project No.	CIMAA6
			Meva III

Order Reference	Contract No. 22501729		
Reference		Order Date	14-Nov-14
Contact Person		Offer No.	

Pos.	Description	Unit	Unit Price	Total Amount
10	Maintenance Provision of the Interconnection of the MEVA III and REDDIG II Satellite Telecommunications Networks			15,449.34 USD
20	Price additional bandwidth			107.10 USD
	Total Amount (Net)			15,556.44 USD

Please use the indicated Bank Account Number!

Invoice sent to: pfrai@icao.int und im Original verschicken

Terms of Payment: Payable within 30 days of date of invoice.

"FREQUENTIS AG is an AEO certified company."

Banking Business:
Raiffeisenlandesbank Oberösterreich AG
Europaplatz 1a
4020 Linz
Bank Code: 34000
Bank Account: 70102661973
SWIFT-Code: RZOOAT2L
IBAN: AT023400070102661973

PSP CIMAA6-00-7300 Financing, Revenue

	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					