



**Agenda Item 4: Work plan for 2020**

**ACTIVITIES FORESEEN FOR 2020**

(Presented by the Secretariat)

<b>SUMMARY</b>	
This working paper presents information on the activities foreseen to be carried out in 2020 under Project RLA/03/901 - <i>REDDIG management system and satellite segment administration</i> .	
<b>References</b>	
<ul style="list-style-type: none"> <li>• REDDIG Contract N° 22501200;</li> <li>• Contract N° 22501528 (MEVA III – REDDIG II interconnection);</li> <li>• Twenty-second meeting of the REDDIG Coordination Committee (RCC/22) (Lima, Peru, 5-7 March 2019);</li> <li>• Twenty-third meeting of the REDDIG Coordination Committee (RCC/23) (teleconference, 21 August 2019); and</li> <li>• Eighth technical-operational meeting of REDDIG II (Santiago, Chile, 14-18 October 2019).</li> </ul>	
<b>ICAO strategic objectives:</b>	<i>A – Safety</i> <i>B – Air navigation capacity and efficiency</i>

**1. INTRODUCTION**

1.1 The main activities scheduled for 2020 are:

- a) Operation of REDDIG II and analysis of the implementation of new services
- b) Activities and new services on the MEVA III/ REDDIG II interconnection
- c) 2020 training programme.

**2. DESCRIPTION**

**OPERATION OF REDDIG II AND ANALYSIS OF THE IMPLEMENTATION OF NEW SERVICES**

*Equipment maintenance (damaged equipment in the nodes)*

2.1 As informed in WP03, there have been difficulties in the replacement and restocking process of spare parts stored at the SAM Office since some States are having several months of delays in sending the failed equipment's for maintenance, leaving in some occasions with no operative spare parts in storage. In this regard, it is important to highlight that the established procedures must be followed so that spare parts and equipment can be delivered promptly.

2.2 At present, there is material that needs to be repaired, but is still retained at the nodes, for example:

- La Paz: 2 MODEMs 1070;
- Bogotá: 1 IBUC 80W;
- Maiquetía: 2 IBUCs 80W and 1 MODEM 1070.

2.3 In this regard and in order to be able to maintain a service alike to all States, the following conclusion is submitted to the consideration of the RCC/24 meeting:

<b>CONCLUSION RCC/24-1</b>		<b>PROCEDURE TO SEND DAMAGED EQUIPMENT FOR REPAIR WITHIN A REASONABLE PERIOD OF TIME</b>	
<b>That</b> Regarding the replacement of spare parts stored at the SAM Regional Office, the Administration of the project proceed to:	<ul style="list-style-type: none"> <li>a) After the shipment of the spare part is attended and its receipt has been confirmed, the receiving State has a period of 30 days to send the repair equipment at the factory;</li> <li>b) If the deadline set out in the previous item is not met, the Project Management will not respond to another request for spare material from that State;</li> <li>c) States which are currently with broken equipment held shall apply as set out in this conclusion.</li> </ul>	Expected impact:	<input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/operational
<b>Why:</b> To ensure that spare parts are available to meet the requests of as many participants of Regional Project RLA/03/901 as possible and as soon as possible.			
<b>When:</b> Immediately		<b>Status:</b> Definitive	
<b>Who:</b> <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Others: Users/industry			

*New network activities and services (REDDIG III)*

2.4 Taking into account the service life of the network (ten years maximum) and the recurrent failures in some units in particular, which will become more frequent, it is necessary to start considering the design of a REDDIG III.

2.5 This new network poses the following questions: will the topology be the same; will the satellite network continue to be the main network; what does the market offer, etc.

2.6 The proposal is to start dealing with these questions in order to have a well-defined project in the next 2 years: considering market options, inviting companies, integrators, etc., to offer solutions, new technologies, and especially, establishing an *ad-hoc* group to start working on this matter.

2.7 In this regard, the following draft conclusion has been developed:

<b>CONCLUSION RCC/24-2</b>	<b>ESTABLISHMENT OF THE REDDIG III AD-HOC GROUP</b>

<p><b>That</b> The States participating in Regional Project RLA/03/901 establish an <i>ad-hoc</i> group to study technological proposals for the use of the future REDDIG III, to be implemented as of 2022.</p>	<p>Expected impact:  <input type="checkbox"/> Political / Global  <input type="checkbox"/> Inter-regional  <input checked="" type="checkbox"/> Economic  <input type="checkbox"/> Environmental  <input checked="" type="checkbox"/> Technical/operational</p>
<p><b>Why:</b> Taking into account the service life of the network and the recurrent failures in some units in particular, as well as the projections for the current network, there is a need to start analysing the design of REDDIG III.</p>	
<p><b>When:</b> Immediately</p>	<p><b>Status:</b> Underway</p>
<p><b>Who:</b> <input checked="" type="checkbox"/> Status <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: Users/industry</p>	

2.8 The RTO/08 meeting proposed that, in order to protect the service life of the equipment, a single chain should continue to operate, thus extending the service life of one of the modems and of one of the amplifiers.

2.9 States should consider the possibility of having only one chain of REDDIG II VSAT stations in operation, in order to extend the service life of the equipment.

2.10 Another issue of concern related to the service life of REDDIG II is corrosion of antennae and outdoor equipment/accessories in some REDDIG II nodes. States are responsible for maintaining metallic structures, cables, atmospheric discharge protection systems and other equipment/accessories in REDDIG II nodes.

*Extension of the contract with the ground network provider and new bidding process*

2.11 In December 2019, taking into account that the contract with the ground network service provider was concluding, contract 22501220 was extended until 30 June 2020. Likewise, a new bidding process for the REDDIG ground network (MPLS) was started.

2.12 For this new tender the same requirements of the current network are maintained, only three nodes have been added to the existing ones: Cochabamba (Bolivia), Honduras (COCESNA) and Lima (ICAO). The idea is to have an operational network with all the specified nodes starting on 1 July 2020.

*Purchase of firewall equipment*

2.13 In mid-2019, arrangements were initiated with TCB for the development of technical specifications for the acquisition of 40 firewall equipment and 20 switches; The tender is currently expected to be published in the coming days and concluded in the first half of 2020.

2.14 According to this process, the equipment will be delivered in Lima, where training will be provided to the technical personnel of the network who will have to configure the equipment in each node. Subsequently, the equipment will be sent from Lima to the corresponding node, to be installed by the previously trained technicians.

2.15 It is estimated that training will take place during the second semester of 2020.

*Preventing maintenance programming*

2.16 For the year 2020, the REDDIG Administration has established a preventive maintenance programme for all the equipment in all REDDIG II nodes. The preventive maintenance programme schedule is the same as that presented at the RCC/22 meeting in 2019.

*Visit to REDDIG II nodes*

2.17 For the year 2020, the Piarco and Guayaquil nodes are to be visited by the REDDIG Administrator, in addition to the assistance that must be provided during the transfer of the Bogota node. In the first two cases, the visit will last one week. In the case of the transfer of the Bogota node, the Administration of Colombia will cover the costs involved in having the Administrator present during this process; these costs will be charged in the annual fee.

*Interconnection of regional IP networks (CRV, PENS and REDDIG)*

2.18 At present, there are three regional IP networks implemented: CRV in the APAC Region, PENS in the EUR Region, and REDDIG II in the SAM Region. These networks use the services of telecommunication providers (MPLS), which could interconnect the different networks.

2.19 Currently, the interconnection between Regions is done through dedicated circuits between States/organisations, usually satellite circuits with limited bandwidth and services implemented.

2.20 The interconnection through telecommunication providers will offer the possibility of reducing the contracting of specific circuits, since the infrastructure would be used more efficiently with the Internet protocol suite (IPS).

2.21 In order to discuss and implement network interconnection, a meeting between ICAO officers (HQ, APAC, EUR and SAM) and the representatives of the three telecommunications companies (PCCW Global (APAC), British Telecom (PENS) and CenturyLink (REDDIG II) has been scheduled.

2.22 The presence of the secretary of the Communications Panel (CP) is important to provide guidance on the assignment of IP addresses, security aspects, and compliance with the provisions of Doc 9896, *Manual for ATN using IPS Standards and Protocols*.

2.23 In this regard, the following conclusion is submitted to the consideration of the Meeting:

<b>CONCLUSION RCC/24-3</b>	<b>INTERCONNECTION OF REGIONAL IP NETWORKS</b>
<p><b>That</b></p> <p>a) The Secretariat take the necessary administrative steps to hold a meeting in Lima, with the participation of ICAO officers and the telecommunication providers of the regional IP networks of the APAC, EUR and SAM Regions.</p> <p>b) The participation of the secretary of the Communications Panel (CP) is ensured with resources of Regional Project RLA/03/901 (air tickets and daily allowance).</p>	<p>Expected impact:</p> <p><input type="checkbox"/> Political / Global</p> <p><input checked="" type="checkbox"/> Inter-regional</p> <p><input checked="" type="checkbox"/> Economic</p> <p><input type="checkbox"/> Environmental</p> <p><input checked="" type="checkbox"/> Technical/operational</p>

<b>Why:</b> To start discussions for the interconnection of the implemented regional IP networks in order to create a global ATN, thus reducing the cost of leased circuits between regions.	
<b>When:</b> Immediately	<b>Status:</b> Definitive
<b>Who:</b> <input type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input checked="" type="checkbox"/> ICAO HQ <input type="checkbox"/> Others: Users/industry	

*Ninth technical-operational meeting of REDDIG II*

2.24 Regarding the Ninth technical-operational meeting of REDDIG II, offers by States to host this meeting are being awaited.

ACTIVITIES AND NEW SERVICES IN THE MEVA III/ REDDIG II INTERCONNECTION

*Extension of contract N° 22501528 (MEVA III – REDDIG II interconnection)*

2.25 In March 2020, the contract N° 22501528, signed between ICAO (TCB), on behalf of the States participating in Project RLA/03/901, and Frequentis, for the provision of the interconnection between the MEVA III (NAM/CAR) and REDDIG II (SAM) networks, shall be extended.

2.26 The intention is to maintain the same terms as in Amendment II (**Appendix A** to this working paper), except for the charges for the AFTN circuits of Brazil and Peru (network access = USD 284.30 and AFTN circuit = USD 263.37), which shall be excluded because they are no longer necessary.

2.27 In this regard, the following draft conclusion has been developed:

<b>CONCLUSION RCC/24-4</b>		<b>EXTENSION OF CONTRACT N° 22501528 MEVA III – REDDIG II INTERCONNECTION</b>	
<b>That</b> The Secretariat take administrative steps to extend Contract N° 22501528, under the terms previously agreed in Amendment II, excluding the costs of AFTN circuits of Brazil and Peru.		Expected impact: <input type="checkbox"/> Political / Global <input checked="" type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/operational	
<b>Why:</b> To maintain the MEVA III – REDDIG II interconnection with the necessary circuits/services.			
<b>When:</b> Immediately		<b>Status:</b> Underway	
<b>Who:</b> <input type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: <input checked="" type="checkbox"/> Users/industry (Frequentis)			

REDDIG II TRAINING PROGRAMME

2.28 The following training activities are foreseen for 2020:

- a) Recurrent training on REDDIG II operation and maintenance
- b) Course on security policies and firewall configuration
- c) Advanced course on firewall management and monitoring

- d) Training for Manaus NCC staff on analysis of IP packages using sniffer (RADAR, AMHS, etc.)

*Recurrent training on REDDIG II operation and maintenance*

2.29 This activity is carried out every year, during scheduled visits to the nodes by the Administrator. This training is intended for the technical personnel responsible for the operation and maintenance of a REDDIG station, with emphasis during new implementations, preventive maintenance work plans, use of the WUG tool, troubleshooting of station components and with other stations, etc. The same programme applied in 2019 (Appendix A to WP/4 of RCC/22) is used, but adjusted to the evolution of services in the visited node.

2.30 Following the RTO-08 meeting in Santiago, Chile, a seminar/workshop was held on the basics of services provided over REDDIG. The objective was to enable the technical personnel to analyse voice and data packages carried over the network in each node, using technological tools available for that purpose.) For follow-up purposes, advantage will be taken of the visits to the nodes to look into issues addressed in that regard.

*Course on security policies and firewall configuration*

2.31 Depending on the purchase of firewall equipment, training will be provided to the technical staff of the REDDIG nodes, NCC staff, the REDDIG Administrator, and the SAM CNS Officer.

2.32 The purpose of training is, first, to introduce staff to the security policies and, then, to allow participants to configure the equipment to be installed in each node.

2.33 Taking into account that the purchased equipment would be delivered to the Regional Office, training would be provided in Lima, for which a fellowship per State will be granted.

2.34 This training would last one week and the participants will configure the equipment to be installed in their nodes. The participants will be required to have networking knowledge. In this sense, it should be noted that, through the project, the staff has received various courses on this subject.

2.35 Costs involved in the provision of the course will be included in the purchase of the equipment, while fellowships will be covered by the Project.

2.36 The course will have one participant per node, in addition to the REDDIG Administrator and the SAM CNS Officer. The vacancies corresponding to the Ezeiza and Manaus nodes will be assigned to NCC staff.

*Advanced course on firewall management and monitoring*

2.37 This course is intended for NCC staff, the REDDIG Administrator and the SAM CNS Officer.

2.38 The course is directly related to the “*Course on security policies and firewall configuration*”. Accordingly, it will be subject to the holding of the former.

2.39 Costs involved in the provision of this course will be included in the purchase of the

equipment, while fellowships are to be covered by Regional Project RLA/03/901.

*Training for the Manaus NCC staff on analysis of IP packages using sniffer*

2.40 This training is intended for the Manaus NCC staff and its purpose is to give support to the network and ensure data transport and integrity.

2.41 Training will be provided throughout the year. It will consist of a theoretical segment and, then, using the tools provided, analyses for the assessment, identification and, finally, resolution of the various issues arising in data transport.

2.42 This training entails no cost and will be provided by the network Administrator.

**3. SUGGESTED ACTIONS**

3.1 The Coordination Committee is invited to:

- a) take note of the information provided herein;
- b) review the activities foreseen for 2020; and
- c) discuss any other matter it may deem appropriate in relation to the activities scheduled for 2020 under Project RLA/03/901.

## APÉNDICE A / APPENDIX A



### Amendment II to Contract 22501528

Contract 22501528 for the provision of the interconnection of the MEVA III and REDDIG II satellite telecommunications networks for MEVA III and REDDIG II Member States/Territories/International Organization is hereby amended to include an additional satellite bandwidth of 100kHz (covering upgrade stages 1, 2 and 3), and to increase the Contract price accordingly. The duration of the implementation schedule shall remain unchanged but is adapted to the bandwidth increments.

This Amendment II shall form part of ICAO Contract 22501528 between the International Civil Aviation Organization (ICAO) acting on behalf of and as mandatory for the MEVA III and REDDIG II Member States/Territories/International organization, and shall become effective on the date of signature of this document by ICAO and Frequentis AG.

All articles of Contract 22501528 not covered in this Amendment II or previous Amendments shall remain unchanged and in force.

***Article 4.1.4 is added and Article 5.1.1, 5.1.2 and 5.2.1 are hereby amended and shall become:***

“4.1.4 The Contractor shall be responsible for the proper functioning of the additional satellite bandwidth of 100kHz (covering upgrade stages 1, 2 and 3), subject of Amendment II.”

“5.1.1 The total price of this Contract is **US \$327,821.80 (three hundred and twenty-seven thousand, eight hundred and twenty-one United States dollars and eighty cents)**, broken down as follows:

*US \$17,535.00 (one-time fees)*

*US \$61,797.36 (year 1 of leasing period)*

*US \$61,797.36 (year 2 of leasing period)*

*US \$61,797.36 (year 3 of leasing period)*

*US \$61,797.36 (year 4 of leasing period)*

*US \$61,797.36 (year 5 of leasing period)*

*US \$1,300 (year 5 + 1 month of leasing period, i.e. from 1 March 2019 to 31 March 2020) for the additional satellite bandwidth of 100kHz, subject of Amendment II”*

“5.1.2 This price is based on a one (1) + four (4) year leasing period, subject to availability of funds from the REDDIG II Member States.

The monthly recurring charges are as follows:

Description:	US \$ per month	US \$ per year
Network access	<b>2,818.11</b>	<b>33,817.32</b>
- for Brazil	284.30	
- for Caracas (Venezuela)	1,409.06	
- for Bogota (Colombia)	840.45	
- for Peru	284.30	
Total circuit (AFTN/PAMA/DAMA circuits)	<b>2,331.67</b>	<b>27,980.04</b>
- for Brazil	263.37	
- for Caracas (Venezuela)	907.31	
- for Bogota (Colombia)	897.62	
- for Peru	263.37	
Total Monthly Recurring Price until 28 February 2019:	<b>5,149.78</b>	
<b>Summary of Monthly Recurring Price, per year</b>		<b>61,797.36</b>
Additional satellite bandwidth of 100kHz (covering upgrade stages 1, 2 and 3), subject of Amendment II	<b>100</b>	<b>1,300.00 (for 13 months)</b>
Total Monthly Recurring Price starting from 1 March 2019:	<b>5,249.78</b>	
<b>Summary of Monthly Recurring Price, per year</b>		<b>62,997.36</b>

The above prices are valid until 31 March 2020.

Price validity for optional years after year 5 (subject to Contract Amendment as per Articles 5.1.7 and 24):

i- Site Bogota (Colombia)

Pos.	Description	MRC (in US\$)	Duration (Month)	MRC Total (in US\$)
01.	Option 1 Year (Contract Prolongation)	2.177,14	12	26.125,63
02.	Option 2 Year (Contract Prolongation)	2.086,42	24	50.074,13
03.	Option 3 Year (Contract Prolongation)	1.995,71	36	71.845,49
04.	Option 4 Year (Contract Prolongation)	1.904,99	48	91.439,71
05.	Option 5 Year (Contract Prolongation)	1.814,28	60	108.856,80

ii- Site Caracas (Venezuela)

Pos.	Description	MRC (in US\$)	Duration (Month)	MRC Total (in US\$)
01.	Option 1 Year (Contract Prolongation)	2.120,86	12	25.450,27
02.	Option 2 Year (Contract Prolongation)	2.032,49	24	48.779,69
03.	Option 3 Year (Contract Prolongation)	1.944,12	36	69.988,25
04.	Option 4 Year (Contract Prolongation)	1.855,75	48	89.075,95
05.	Option 5 Year (Contract Prolongation)	1.767,38	60	106.042,80

”

“5.2 **Payment Schedule and Invoicing**

5.2.1 All invoices shall be issued to ICAO Finance Branch for payment in accordance with the payment schedule as indicated below:

**Part 1:**

Ref.	Milestone
1	US \$17,535.00 for Non-Recurring Charges due upon successful network integration (signed Site Acceptance Certificate)
2	Year 1 of the leasing period: US \$61,797.36, consisting of twelve Monthly Recurring Fees of US \$5,149.78 (to be paid one month in advance, on a quarterly basis following the successful network integration (signed Site Acceptance Certificate))

**Subsequent Parts:**

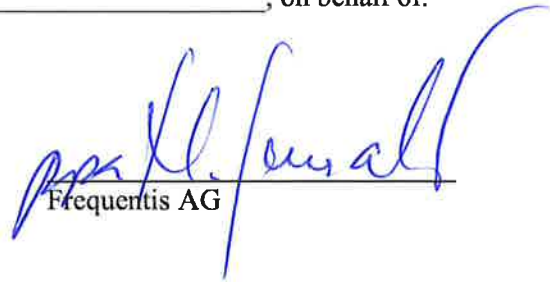
3	<p>a. Year 2 to year 4 of the leasing period, subject to availability of funds as per Article 5.1.2: US \$61,797.36 per year, consisting of twelve Monthly Recurring Fees of US \$5,149.78 (to be paid one month in advance, on a quarterly basis) + US \$100 for the month of March 2019.</p> <p>b. Year 5 of the leasing period, subject to availability of funds as per Article 5.1.2: US \$62,997.36, consisting of twelve Monthly Recurring Fees of US \$5,249.78 (to be paid one month in advance, on a quarterly basis), starting from 1 April 2019 to 31 March 2020.</p>
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***Attachment II is hereby revised to amend the scope of supply and to increase the price of the Contract, subject of Amendment II.***

Signed on \_\_\_\_\_, on behalf of:  
Date

\_\_\_\_\_  
ICAO  
Technical Cooperation Bureau

  
\_\_\_\_\_  
Frequentis AG

**Revised Attachment II  
Scope of Supply and Pricing**

**Part 1:**

***A. Non-Recurring One Time Fee (for Bogota and Caracas nodes):***

Description	US \$
Site Survey	14,535.00
Network Integration/Installation	
Activation and Operation	
Training Package	3,000.00
<b>Total One Time Fees:</b>	<b>\$17,535.00</b>

***B. Monthly recurring charges:***

***Year 1 of the leasing period:***

Description:	US \$ per month	Total (US \$)
Network access	<b>2,818.11</b>	<b>33,817.32</b>
- for Brazil	284.30	
- for Caracas (Venezuela)	1,409.06	
- for Bogota (Colombia)	840.45	
- for Peru	284.30	
Total circuit (AFTN/PAMA/DAMA circuits)	<b>2,331.67</b>	<b>27,980.04</b>
- for Brazil	263.37	
- for Caracas (Venezuela)	907.31	
- for Bogota (Colombia)	897.62	
- for Peru	263.37	
<b>Sub-Total, Year 1:</b>	<b>5,149.78</b>	<b>61,797.36</b>
<b>Original Contract price (Non-recurring and recurring charges):</b>		<b>\$ 79,332.36</b>

**Subsequent Parts:**

***Year 2 to year 5 (31 March 2020) of the leasing period, subject to availability of funds as per Article 5.1.2:***

Description:	US \$ per month	Total (US \$)
Network access (for price breakdown per country refer to year 1)	<b>2,818.11</b>	<b>33,817.32</b>
Total circuit (AFTN/PAMA/DAMA circuits) (for price breakdown per country refer to year 1)	<b>2,331.67</b>	<b>27,980.04</b>
<b>Sub-Total, per year:</b>	<b>5,149.78</b>	<b>61,797.36</b>
<i>Sub-total, year 2 to year 5</i>		<i>247,189.44</i>
Additional satellite bandwidth of 100kHz (covering upgrade stages 1, 2 and 3), subject of Amendment II, from 1 March 2019 to 31 March 2020 (13 months):	<b>100.00</b>	<b>1,300.00</b>
<b>Sub-total, from 1 March 2019 to 31 March 2020</b>		<b>1,300.00</b>
<b>Total Contract price (Non-recurring and recurring charges):</b>		<b>\$327,821.80</b>

The above prices are valid until 31 March 2020.

**C. Bogota, Colombia:**

**C.1. Non-Recurring Charges**

Pos.	Description	Qty	NRC (in US\$)
01.	Installation	1	6.491,43
02.	Training (OJT)	1	1.500,00

**C.2. Monthly Recurring Charges for year 1 to year 2 (years 3 to 5 subject to annual renewals as per Article 5.1.2)**

Pos.	Description	MRC (in US\$)	Duration (months)	MRC Total (in US\$)
1	Service (Circuits)	906.95	12	10,883.40
2	Space Segment	298.22	12	3,578.64
3	Equipment Maintenance	143.00	12	1,716.00
4	Equipment Spare pool	466.11	12	5,593.32
5	Equipment Lease	812.56	12	9,750.72
<i>Subtotal</i>				<i>31,522.08</i>

The above prices are valid until 31 March 2020.

**C.3. Options (not included in Contract price): Monthly Recurring Charges after 5 years**

Pos.	Description	MRC (in US\$)	Duration (Month)	MRC Total (in US\$)
01.	Option 1 Year (Contract Prolongation)	2.177,14	12	26.125,63
02.	Option 2 Year (Contract Prolongation)	2.086,42	24	50.074,13
03.	Option 3 Year (Contract Prolongation)	1.995,71	36	71.845,49
04.	Option 4 Year (Contract Prolongation)	1.904,99	48	91.439,71
05.	Option 5 Year (Contract Prolongation)	1.814,28	60	108.856,80

#### C.4. Scope of supply of Leased Equipment

Pos.	Qty	Description
01.		<b>Modem Equipment</b>
	1	- IDU 2570 BASE
	2	- SKYWAN LICENSE FRAME RELAY PORT
	1	- SKYWAN LICENSE DYNAMIC ROUTING
	1	- SKYWAN LICENSE MESH TOPOLOGY
	1	- CABLE INT. RS232 TERMINAL SKYWAN IDU
	2	- CABLE INT. X21 DCE IDU-FAD92XX/93XX/8400
	1	- USER MANUALS SKYWAN IDU7000 SERIES
	1	- DIAL IN MODEM SET SKYWAN IDU 7000/7000C
02.		<b>Multiplexer Equipment</b>
	1	- FAD 9230 BASE UNIT UAC
	1	- FAD 8400 BASE UNIT 4 SERIAL PORTS UAC
	1	- FAD 92X0 SINGLE T1/E1 MODULE (VCE/DATA)
	1	- FAD 92X0 DSP SIMM 15 CHANNELS
03.		<b>RF Equipment</b>
	1	- COMBINER / SPLITTER 2-fold
04.		<b>Installation material</b>
	1	- 19" RACK
	1	- PATCH PANEL IDU RFT5X/ SMA -N-FEM 1.5m
	1	- VARIOUS ITEMS

#### C.5. Spare parts

Pos.	Qty	Description
01.		<b>Local Spares</b>
	1	- FAD 92X0 SINGLE T1/E1 MODULE (VCE/DATA)
	1	- FAD 8400 BASE UNIT 4 SERIAL PORTS UAC

**D. Caracas, Venezuela:**

**D.1. Non-Recurring Charges**

Pos.	Description	Qty	NRC (in US\$)
01.	Installation	1	8.043,57
02.	Training (OJT)	1	1.500,00

**D.2. Monthly Recurring Charges for year 1 to year 2 (years 3 to 5 subject to annual renewals as per Article 5.1.2)**

Pos.	Description	MRC (in US\$)	Duration (months)	MRC Total (in US\$)
1	Service (Circuits)	906.95	12	10,883.40
2	Space Segment	251.32	12	3,015.84
3	Equipment Maintenance	143.00	12	1,716.00
4	Equipment Spare pool	466.11	12	5,593.32
5	Equipment Lease	755.56	12	9,066.72
<i>Subtotal</i>				<b>30,275.28</b>

The above prices are valid until 31 March 2020.

**D.3. Options (not included in Contract price): Monthly Recurring Charges after 5 years**

Pos.	Description	MRC (in US\$)	Duration (Month)	MRC Total (in US\$)
01.	Option 1 Year (Contract Prolongation)	2.120,86	12	25.450,27
02.	Option 2 Year (Contract Prolongation)	2.032,49	24	48.779,69
03.	Option 3 Year (Contract Prolongation)	1.944,12	36	69.988,25
04.	Option 4 Year (Contract Prolongation)	1.855,75	48	89.075,95
05.	Option 5 Year (Contract Prolongation)	1.767,38	60	106.042,80

#### D.4. Scope of supply of Leased Equipment

Pos.	Qty	Description
01.	1 1 1 1 1 1 1 1	<b>Modem Equipment</b> - IDU 2570 BASE - SKYWAN LICENSE FRAME RELAY PORT - SKYWAN LICENSE DYNAMIC ROUTING - SKYWAN LICENSE MESH TOPOLOGY - CABLE INT. RS232 TERMINAL SKYWAN IDU - CABLE INT. X21 DCE IDU-FAD92XX/93XX/8400 - USER MANUALS SKYWAN IDU7000 SERIES - DIAL IN MODEM SET SKYWAN IDU 7000/7000C
02.	1 1 2	<b>Multiplexer Equipment</b> - FAD 9230 BASE UNIT UAC - FAD 92X0 DUAL SERIAL INTERFACE MODULE - FAD 92X0 QUAD FXS MODULE
03.	1 1 1	<b>Installation material</b> - 19" RACK - PATCH PANEL IDU RFT5X / SMA -N-FEM 1.5m - VARIOUS ITEMS

#### D.5. Spare parts

Pos.	Qty	Description
01.	1 1 1	<b>Local Spares</b> - FAD 92X0 DUAL SERIAL INTERFACE MODULE - FAD 92X0 QUAD FXS MODULE - FAD 92X0 QUAD PTT (E&M) MODULE +48V/-48V