



- Agenda Item 1:**           **Analysis to the proposals for the MEVA II / REDDIG Networks total homogeneous integration/interoperation**
- Agenda Item 3:**           **Development of a proposal for actions to implement the recommended option for the integration/interconnections of the MEVA II and REDDIG networks**

### **FEASIBILITY STUDY ON HOMOGENEOUS INTEGRATION / INTEROPERABILITY**

(Working paper presented by the Rapporteur of the MEVA II / REDDIG Working Group)

#### **SUMMARY**

This working paper presents the feasibility study on homogeneous integration / interoperability carried out during the meeting of the Working Group, carried out in Lima from 24 to 28 April 2006, for its analysis during the Meeting, with the aim of deciding upon the most appropriate configuration.

#### **References:**

- Report of the MEVA II/REDDIG Coordination Meeting (Lima, Peru, 20-22 March 2006);
- Report of the ninth meeting of the REDDIG Coordination Committee Meeting (RCC/9);
- GREPECAS/12 Report;
- ATM/CNS/SG/4 Report; and
- GREPECAS/13 Report.

## **1. Background**

1.1           The purpose of the interconnection/interoperability between digital networks in the CAR/SAM Regions is to improve effectiveness, efficiency, quality and availability of the Aeronautical Fixed Service (AFS) voice and data communications circuits, to reduce costs, as well as facilitate the introduction of ATN and its applications in an evolutionary manner.

1.2           GREPECAS/12 meeting highlighted the importance of continuing efforts to reach the homogeneous interconnection and interoperability between CAR/SAM digital communications networks, formulating Conclusion 12/39 – *Additional Interconnection Points for Regional and Inter-regional Digital Networks*.

1.3 ATM/CNS/SG/4 meeting took under consideration the need of continuing with interconnection / interoperability tasks between both networks, through the holding of coordination meetings related with MEVA II and REDDIG projects.

1.4 GREPECAS/13 meeting formulated Conclusion 13/70 – *Establishment of Agreements to Achieve the MEVA II – REDDIG Interconnection/Interoperation.*

1.5 The MEVA II/REDDIG Coordination Meeting formulated Conclusion 2/2 – *Study of Options 1 and 2 on Integration / Interconnection and Interoperability Solutions.*

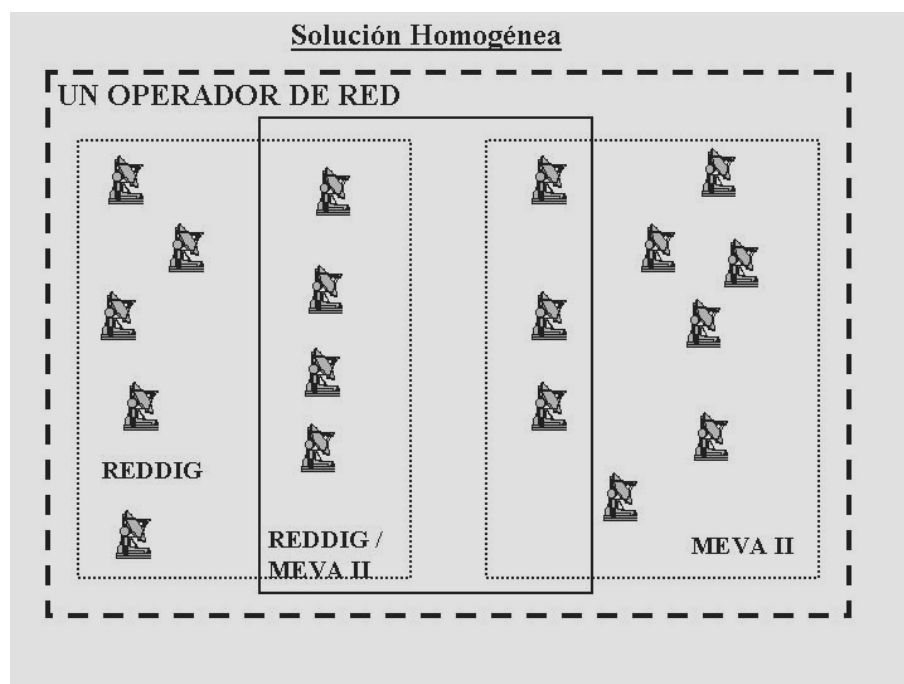
1.6 RCC/9 meeting concluded in the establishment of a Working Group, to meet in Lima between 24 and 28 April 2006, to elaborate a study on the position of REDDIG members. This position will also be coordinated with the remainder REDDIG member States via electronic mail.

## 2. Analysis

2.1 This option would permit a homogeneous interoperability of the VSAT MEVA II and REDDIG networks, i.e., as if there were one VSAT network without the need of implementing other communications means for the interconnection.

2.2 This interconnection will be easy, since the MEVA II VSAT network will be developed under a full mesh topology, using TDMA/Frame Relay satellite access, PAS 1R satellite with a beam directed over United States / Latin America, C band operation frequencies and vertical polarization.

2.3 The main technical characteristics of MEVA II, described in the previous paragraph, are the same as of the REDDIG VSAT network. In addition, MEVA II network will be using equipment similar and compatible with those of REDDIG, such as those corresponding with FRAD and satellite MODEM, thus contributing even more to a homogeneous interconnectivity between both networks.



### **Technical considerations to be taken into account**

#### 2.4 Premises for a homogeneous integration:

##### a) Network Management Centre

- Equipment redundancy with hemispheric geographical diversity.
- MRT and AMRT use with geographical diversity to avoid solar interference.
- Dedicated circuit between MRT and AMRT.
- 24x7x365 operation of the network management centre in English, Spanish and Portuguese.
- Use of up to 1.25 Msps carriers with QPSK and FEC 1/2 modulation.
- Establishment of three user groups: NAM/CAR, SAM and NAM/CAR-SAM.
- 99.95% minimum availability.
- The network is exclusive and closed for all member States, and should not be interconnected with any public network.

##### b) Remote nodes

- Redundant equipment.
- 99.95% minimum availability.
- BER equal or more than  $10^{-6}$ .

#### 2.5 The additional cards necessary to carry out the implementation at the REDDIG nodes, is indicated below:

- a) Colombia: FOUR (4) digital voice modules.
- b) Ecuador: TWO (2) digital voice modules.
- c) Venezuela: FOUR (4) analogue voice cards.

**NOTE:** *This working paper has not determined, for MEVA II network, the number of additional cards or modules necessary for the operation of the new circuits.*

### **Institutional arrangements for the implementation of this configuration**

#### 2.6 These arrangements have been divided into two stages.

- a) Initial Stage: Elaboration of a Memorandum of Understanding between REDDIG and COCESNA and CAR/NAM States, while MEVA II's contract with ACS is valid, with the objective of establishing the various organizational levels of this Integrated American Network and the responsibilities involved, still keeping the current service providers.
- b) Consolidation Stage: Establishment of a Multiregional Organization (OMR), to hire the operation and outsourcing services of the Integrated American Network to one service provider.

2.7 The Memorandum that States should be at the highest level as partners, equal in voice and vote. In addition, given the number of States involved, a Directive Council should be elected. In this manner, work would be carried out in line with GREPECAS, receiving support from this mechanism with the consequent achievement of objectives of both REDDIG and MEVA II.

2.8 The services providers would be at a second level, in this case, AGS and REDDIG administration, through RLA/03/901 project. The Directive Council should request the ICAO Technical Cooperation Bureau to supervise both providers for the compliance of agreements or other mechanism.

2.9 At the initial stage, both network administrations would continue with the same services providers, i.e, REDDIG would keep with RLA/03/901 project. Under this regulatory framework, an agreement should also be sought between AGS and ICAO as regards network control, be it through:

- a) One alternation, for a determined period of time, between the main NCC and the alternate NCC.
- b) The AGS main NCC and the REDDIG alternate NCC.
- c) The REDDIG main NCC and the AGS alternate NCC.

2.10 All this, as long as the benefits at least maintain themselves and the costs for the provision of services are equal or less to the current ones for the REDDIG partners. In addition, it is important to take into consideration that the availability of the network is kept for it to have possibility to exchange information between the administrations; in the case of REDDIG, this is ensured through the equipment redundancy and a ground backup network.

2.11 The alternation should be complemented with an addendum to the AGS contract with COCESNA and CAR/NAM States, to define responsibilities when the main NCC is REDDIG's.

2.12 Once the MEVA II contract with AGS is finalized, the Consolidation Stage would begin, consisting in the establishment of a Multiregional Organization (OMR), to hire the operation and outsourcing services of the Integrated American Network to one services provider. In addition, the OMR would coordinate the planning and development of the aeronautical communications services in the Regions, as well as the respective implementations, having as platform the Integrated American Network.

2.13 The OMR would supervise the compliance of the Service Level Agreement (SLA) with the services provider.

### **Cost/benefit analysis**

#### **A. Costs**

2.14 To carry out the traffic study and determine the use of the satellite segment, three (3) user groups were established:

- a) Group "A" for communications between NAM/CAR Regions.
- b) Group "B" for communications in the SAM Region.
- c) Group "C" for communications between NAM/CAR-SAM Regions.

2.15 **The costs refer only to REDDIG; MEVA II applicable costs have not been taken into account.**

- a) One Time Charge.

- a.1) Group “A”
  - a.1.1) Equipment refers to additional implementations for the indicated nodes.  
Estimate cost = US\$ 9.500
  - a.1.2) Installation and operation of additional equipment.  
Estimate cost = US\$ 3.500
- b) Monthly or Annual Recurring Charges.
  - b.1) Group “B”
    - b.1.1) Network Operations Center.
    - b.1.2) Spare parts support, maintenance and logistics (Outsourcing).  
Annual Budget Group “B” 2006 (b.1.1 + b.1.2) = US\$328.375
    - b.1.3) Satellite Segment (Bandwidth).  
Annual Budget Group “B” 2006 = US\$235.889
  - b.2) Group “C”
    - b.2.1) Network Operations Center.
    - b.2.2) Spare parts support, maintenance and logistics (Outsourcing).  
Annual Budget Group “C” 2006 (b.2.1 + b.2.2) = included within the costs expressed in b.1.2)
    - b.2.3) Satellite Segment (Bandwidth).  
Estimate Annual Budget Group “C” = US\$ 60.000

**B. Benefits per cost savings**

2.16 The links currently implemented are as follow:

- a) Brazil / USA
- b) Perú / USA
- c) Ecuador / COCESNA
- d) Colombia / COCESNA
- e) Venezuela / San Juan
- f) Colombia / Panama
- g) Colombia / Jamaica
- h) Colombia / Curazao
- i) Venezuela / San Juan
- j) Venezuela / Aruba
- k) Venezuela / Curazao

2.17 The annual costs of the mentioned links are US\$ 279.320.

**C. Cost/Benefit**

2.18 Taking under consideration the cost analysis and the benefits obtained by the links to be disconnected, and on the basis of a 5-year horizon in the MEVA II contract with a 12% interest rate, a positive value is obtained which renders this option profitable (see **Appendix A**).

**3. Action suggested**

3.1 The meeting is invited to:

- a) Take note of the information provided;
- b) Analyze the technical considerations to be taken into account, indicated in Section 2, paragraphs 2.4 and 2.5;
- c) Analyze the institutional arrangements for the implementation of the technical configurations indicated in Section 2, paragraphs 2.6 to 2.13;
- d) Analyze the results of the cost/benefit analysis indicated in Section 2, paragraphs 2.14 to 2.18.
- e) On the basis of the analysis to the above indicated items, select the most convenient technical configuration and administrative arrangement to the interest of REDDIG and MEVA II member States.

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**APÉNDICE / APPENDIX**  
**ESTUDIO COSTO/BENEFICIO / COST/BENEFIT STUDY**

	1	2	3	4	5
<b><i>COSTO REDDIG SEGMENTO C / REDDIG C SEGMENT COST</i></b>					
<i>Costos REDDIG</i>	-60.000	-60.000	-60.000	-60.000	-60.000
<i>Costos MEVA</i>	Se omite	Se omite	Se omite	Se omite	Se omite
<i>Costos líneas dedicadas entre NCC</i>	-36.000	-36.000	-36.000	-36.000	-36.000
<b><i>TOTAL COSTOS / TOTAL COSTS</i></b>	<b>-96.000</b>	<b>-96.000</b>	<b>-96.000</b>	<b>-96.000</b>	<b>-96.000</b>

<b><i>BENEFICIOS AHORRO COSTOS LINEAS DEDICADAS</i></b>					
Brasil/USA	12.000	12.000	12.000	12.000	12.000
Peru/USA	44.000	44.000	44.000	44.000	44.000
Ecuador/COCESNA	30.000	30.000	30.000	30.000	30.000
Colombia/COCESNA	37.800	37.800	37.800	37.800	37.800
Venezuela/San Juan	21.984	21.984	21.984	21.984	21.984
Colombia/Panama	35.400	35.400	35.400	35.400	35.400
Colombia/Jamaica	48.000	48.000	48.000	48.000	48.000
Colombia/Curaçao	24.000	24.000	24.000	24.000	24.000
Venezuela/Aruba	13.068	13.068	13.068	13.068	13.068
Venezuela/Curaçao	13.068	13.068	13.068	13.068	13.068
<b><i>TOTAL AHORRO DE COSTOS / TOTAL COSTS SAVINGS</i></b>	<b>279.320</b>	<b>279.320</b>	<b>279.320</b>	<b>279.320</b>	<b>279.320</b>

<b><i>BENEFICIO NETO / NET BENEFIT</i></b>	<b>183.320</b>	<b>183.320</b>	<b>183.320</b>	<b>183.320</b>	<b>183.320</b>
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<b><i>INVERSION / INVESTMENT</i></b>	
04 Modulos voz digital E1 DIM	
02 Modulos voz digital E1 DIM	
04 Tarjetas de voz Analógicas	
Equipamiento adicional para nodos REDDIG	-9.500
Instalacion y puesta en servicio	-3.500
<b><i>TOTAL INVERSION / TOTAL INVESTMENT</i></b>	<b>-13.000</b>
<b><i>VAN</i></b>	<b>578.417</b>