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WORKING PAPER

MEVA/TMG/29 — WP/09
07/12/14

Twenty-ninth MEVA Technical Management Group Meeting (MEVA/TMG/29)
Mexico City, Mexico, 9 to 12 December 2014

Agenda Item 4: MEVA III Implementation Activities
4.3 MEVA III Interconnection Matters

MEVA III – REDDIG INTERCONNECTION DOCUMENTATION

(Presented by MEVA III Task Force Rapporteur)

EXECUTIVE SUMMARY	
This working paper presents the changes needed to update the existing MEVA/REDDIG Interconnection documentation with respect to MEVA III as a proposal for the coordination/ approval of these documents between MEVA III and REDDIG II.	
Action:	The suggested actions are detailed in Section 3
<i>Strategic Objectives:</i>	<ul style="list-style-type: none">• Safety• Air Navigation Capacity and Efficiency• Environmental Protection
<i>References:</i>	<ul style="list-style-type: none">• Report of Twenty-eighth MEVA Technical Management Group Meeting (MEVA TMG/28) Meeting, Miami, United States, 26 to 30 May 2014• MEVA – REDDIG interconnection Management agreement-• MEVA- REDDIG network integration considerations

1. Introduction

1.1 Under Conclusion 28/08 letter c, the MEVA TMG/28 Meeting tasked the MEVA III Task Force, in coordination with COMSOFT, to review the existing MEVA II-REDDIG interconnection agreements (MEVA-REDDIG Memorandum of Agreement (MoA) and integration considerations, and update accordingly the documentation to reflect the implementation of MEVA III:

CONCLUSION
MEVA TMG/28/08

**DEVELOPMENT AND APPROVAL OF RELEVANT MEVA
 DOCUMENTATION FOR MEVA III**

That, in order to ensure the appropriate operations of the MEVA III Network, including its interconnection/integration with the REDDIG Network:

- a) *the MEVA III Task Force, Aruba and Curacao, in coordination with COMSOFT, take the necessary actions to maintain or improve the network documentation and references when transitioning to MEVA III and considering the existing MEVA II material **by the beginning of the MEVA III site installations;***
- b) *COMSOFT present its MEVA III webpage design/template by **31 July 2014** or within the System Design Documentation (SDD) proposal; and*
- c) *the MEVA III Task Force, in coordination with COMSOFT, review the existing MEVA II-REDDIG interconnection agreements (MEVA-REDDIG Memorandum of Agreement (MoA) and Integration considerations) for its customization for MEVA III by **15 September 2014.***

2. Discussion

2.1 During the MEVA III TF/03 meeting, the Task Force Members reviewed the existing documentation and realised that not only MEVA II is being transitioned to MEVA III but that REDDIG was also transitioned to REDDIG II. Thus, special care must be taken with the technical details of the interconnection between the 2 networks.

2.2 The WP/16 of the TMG/28 meeting is of special importance and was reviewed by the Task Force and COMSOFT. The Task Force noted the following:

- a) The MEVA-REDDIG Memorandum of Agreement (MOA) needs to be revised to reflect the implementation of MEVA III and REDDIG II
- b) The MEVA-REDDIG MOA needs to be revised to reflect the implementation of REDDIG II, and to do so the REDDIG Administration should provide technical details on equipment and interfaces to replace similar details already in the MOA.
- c) COMSOFT to present documentation of how, technically, the interconnection of the AFTN circuit (async-sync conversion) will be implemented. Although there is already a paragraph about the MEVA-REDDIG Interconnection in Chapter 1 of the MEVA III SDD, the technical aspects should be detailed.

2.3 COMSOFT provided comments presented in **Appendix A** of this working paper. These comments are mostly in agreement with the Task Force comments listed above.

2.4 A proposed review of these two documents is shown in **Appendices B and C.**

2.5 A MEVA III-REDDIG II Interconnection Coordination meeting is planned for 25-26 May 2015 follow by the MEVA TMG/30 in Aruba. The agenda of the MEVA III-REDDIG II Interconnection Coordination meeting will be coordinated between the two networks and all MEVA Members involved in the interconnection are expected to attend.

3. Suggested Actions

3.1 The Meeting is invited to:

- a) take note of the information provided in this working paper;
- b) request from COMSOFT to augment the MEVA-REDDIG Interconnection paragraph in Chapter 1 of the MEVA III SDD with technical details of the AFTN async-sync conversion;
- c) review and approve the initial revision of the MEVA-REDDIG Memorandum of Agreement to reflect the MEVA III and REDDIG II implementations and the integration Document.

Reference Document: ICAO MEVA III – REDDIG II Interconnection (WP/16)
 Change request dated: 01.12.2014
 Response dated:

Reference in MEVA/TMG/28 – WP/16	Substitute/Comment	COMSOFT Response
General Notice	MEVA II and REDDIG	Generally, COMSOFT requests to adapt the respective paragraphs to the new MEVA III – REDDIG II interconnection, instead of MEVA II and REDDIG.
Section 1, (1.1) Page 1	The MEVA III transition process must ensure that all services from MEVA II transferred to the MEVA III Network infrastructure are done without any affectation or degradation of the services to the users (optional/technical), while complying with the MEVA III contractual agreement and the committed Service level of Agreement (SLA).	In accordance to the SDD, COMSOFT requests to add the following statement at the end of this paragraph. “... <i>Service Level Agreement (SLA), except minimum downtimes, in accordance to the Transition Plan, submitted and approved in the MEVA III SDD.</i> ”
Section 1, (1.3) Page 1	Similarly, as requested in the MEVA III Network Tender requirements, the MEVA II had agreed with the REDDIG Network the corresponding responsibilities and role of each party in the troubleshooting of problems and the management of common activities for both networks, including the vision for the integration of both networks.	COMSOFT would like to request a detailed description of the responsibilities and roles of each party.
Section 3, (3.2) Page 2	The Interconnection of the Caracas and Bogota REDDIG nodes to the MEVA II network includes a Viasat Linkway 2100 modem, two DVP2 E-1 cards for the FRAS MEMOTEC CX 950 equipment (1 for the MPS A and 1 for the MPS B), three two-port L-band dividers, and three L-band combiners, installed in the Bogota REDDIG node; and a Viasat Linkway 2100 modem, 4 DAV cards for the FRAD MEMOTEC CX 950 equipment (2 for the MUX A and 2 for the MUX B), three two-port L-band dividers, three two-port L-band combiners and two Datacom Standard 75 Watt C-band amplifiers, installed at the Caracas (Maiquetia) REDDIG node.	Please clarify if this is a summary of the existing interconnection and part of the new MEVA III – REDDIG II Interconnection or it has to be adapted to the new network / equipment configuration. The MEVA III and REDDIG II network are using other network equipment as in the old network configuration.
Appendix A(2) Chapter 1	Under this networks integration concept, VSAT MEVA II and REDDIG networks interoperability will be allowed in a homogeneous way, as if only one VSAT network exist without the need to implement other communication	For a much better understanding, COMSOFT requests a detailed explanation of the meaning of this paragraph in order to provide our comments.

	means for interconnection.	
Appendix A(2) Chapter 2	Interoperability is possible since the technical characteristic of both (MEVA II and REDDIG) are similar: network topology type Full Mesh, using TDMA/Frame Replay typical satellite access modality, IS 1R satellite with beam addressed over the United States / Latin America, band C and vertical lineal polarization operation frequency. In the same way, both network use similar and compatible equipment, such as those corresponding to FRAD and satellite MODEM.	In accordance to the MEVA III / REDDIG II network configuration, COMSOFT requests to change the following parts of this paragraph. IS 14 instead of IS 1R Please add "... similar and compatible equipment (Modem IDU 7000)...." The definition of the multiplexer should be clarified and identical.
Appendix A(2) Chapter 3	One of the fundamental parameters for establishing a homogeneous MEVA II – REDDIG network is synchronization of MEVA II and REDDIG carries. This synchronization could be carried out with the MRT (Master Reference Terminal, located in the Viasat Linkway MODEM) of the REDDIG NCC or the MEVA II NCC.	COMSOFT requests to delete this paragraph from the document, because it is technically not possible to realize this functionality.
Appendix A(2) Chapter 4	The MEVA II and REDDIG networks, being integrated in the same transponder, could operate with different groups of nodes or users according to the traffic between them and to respective frequencies being used. In this way, a group with all the REDDIG nodes and other with all the MEVA II nodes could be established, as well as a last group including REDDIG and MEVA II nodes requiring voice and data service between them. This third users group would be conformed by the nodes of Colombia, Ecuador and Venezuela (REDDIG), and Aruba, Curacao, Panamá, Jamaica, Puerto Rico and COCESNA (MEVA II). Only one reference carrier (MRT) would be used for the synchronization of the homogeneous network.	One reference carrier (MRT) is not available in the modem technology (SkyWAN) of both networks – MEVA III and REDDIG II. Therefore, COMSOFT requests to delete the last sentence of this paragraph.
Appendix A(5) Conclusion Bullet 1	<ul style="list-style-type: none"> For any communication between any of the MEVA II and REDDIG nodes only one satellite hop will be used keeping at minimum the delay in voice and data communications 	Based on the fact that both networks - MEVA III and REDDIG II - are completely independent networks and operated by different responsible providers, one satellite hop is technically and operatively not possible. COMSOFT requests to delete or modify this statement in the document.
Appendix B(4)	The interconnection technical solution shall be carried out under premise that	With reference to the actual situation in both networks

Section 3 (3.1.2)	the REDDIG and MEVA II VSAT network is developed under a full mesh network topology, using TDMA/Frame Relay satellite access, as well as a IS 1R satellite transponder with a beam directed over United States / Latin America, C band operation frequencies and co-linear vertical polarisation.	– MEVA III and REDDIG II – COMSOFT requests to change the satellite into IS 14 instead of IS 1R.
Appendix B(5) Section 3 (3.2.5.2)	<p>When there is any problem in a MEVA II node, with the MODEM or other equipment affect the interconnection with REDDIG, the following shall be applied:</p> <ul style="list-style-type: none"> a) The REDDIG Administration shall call the MEVA II Service Provider informing of the happening; b) The MEVA II Service Provider shall call respective node and shall establish an audio conference between REDDIG Administration and local technicians, as necessary; c) MEVA II NCC, under control of the Service Provider, shall supervise communications between REDDIG Administration and MEVA II nodes technicians. 	<p>Related to the actual site configuration, COMSOFT would like to remind ICAO (REDDIG and MEVA TMG) that the Outdoor Unit (Antenna, RF equipment) is provided by REDDIG and under their responsibility.</p> <p>In this case, COMSOFT suggest to clarify and define this part in the document in a detailed and specific way.</p>
Appendix B(6) Section 3 (3.3.1)	Additional equipment to be installed at REDDIG nodes, with MEVA II MODEMs requirements, can be purchased by the REDDIG members in accordance with the requirements established for the interconnection.	<p>In both paragraphs, COMSOFT would like to state that a consideration of the BUC power is mandatory, if such scenario will be happen.</p> <p>Therefore, COMSOFT requests to add an additional paragraph which states the above point.</p>
Appendix B(6) Section 3 (3.3.2)	Additional equipment to be installed at REDDIG nodes, with MEVA II MODEMs requirements, can be purchased by the REDDIG members (States, Territories, Organisations) to the MEVA II Service Provider, in accordance with the requirements established for the interconnection.	Please see above.

APPENDIX B
**PRELIMINARY STUDY ON INITIAL TECHNICAL CONSIDERATIONS FOR THE
 IMPLEMENTATION OF THE MEVA III / REDDIG II NETWORKS INTEGRATION**

Background and References for Digital Networks Integration

The Third Regional Air Navigation Caribbean and South America Meeting (RAN CAR/SAM/3) (Buenos Aires from October 5th to 15 of 1999) alert GREPECAS the need to develop criterions and pertinent orientation in order to obtain the interconnection among several available and emerging digital networks. Recommendation 9/1 – *Implementation of digital networks to improve the current AFS and to facilitate the introduction of the ATN.*

In order to set up criteria for digital networks interconnection in a regional an interregional level, two informal meetings: CAR/SAM Informal Meeting 01/00 (Mexico, from June 26 to 29, 2000) and CNS-CAR/SAM Informal Meeting 01/01 (Bogota, Colombia, from October 9 to 11, 2001) were held, as well as MEVA and REDDIG networks Interconnection Coordination Meeting (Lima, from November 11 to 12, 2002). In these meetings several proposals of interconnection alternatives were displayed, including the adoption of an memorandum of understanding for the establishment of an homogeneous digital platform based in MEVA II and REDDIG networks interconnection, as well as the transitory implementation of Colombian network nodes in Jamaica, Panama and COCESNA; it was agreed that these measures be applied until the MEVA II / REDDIG interconnection is achieved.

The GREPECAS/10 Meeting (Las Palmas, Spain, October 23 to 27, 2001) adopted a preliminary orientation material referred to digital networks interconnection for aeronautic communications (Conclusion 10/27). Also, the Conclusion 10/28 indicates the need of capacity provision of massive information exchange through aeronautic communications digital networks.

The GREPECAS/12 Meeting (La Habana, Cuba, June 7 to 11, 2004) highlighted the importance to continue efforts in order to achieve interconnection and homogeneous interoperability among CAR/SAM regional digital networks, considering present and future communication requirements of voice and data and, in this sense, formulated Conclusion 12/39 – *Additional inter-connection points for regional and inter-regional digital networks.*

The GREPECAS/13 Meeting, based in the recommendation of CNS/COMM/4 Meeting, considered:

- the need to continue interconnection/interoperability efforts between two networks, using, in this respect, the coordination meetings of ICAO Technical Cooperation Projects, related with MEVA II y la REDDIG
- research alternatives, such as implementation of an homogeneous type interconnection or the establishment of interconnection points for a non-homogeneous solution
- it is important to achieve the purpose of interconnection/inter-performance between MEVA II and REDDIG and consequently, Conclusion 13/70 (*Establishment of Agreements to achieve the MEVA II – REDDIG interconnection/interoperation*) was formulated

The Fifth Meeting of the ALLPIRG/Advisory Group (ALLPIRG/5), held in ICAO Headquarters, Montreal, Canada, 23 to 24 March 2006, among issues related to VSAT networks implementation, formulated Conclusion 5/16 – Implementation of very small aperture terminals (VSATs), which discourage proliferation of VSAT networks where one/some of the existing ones can be expanded to serve new areas of interest.

Considerations and Initial Operational Technical Aspects for the Integration

Under this networks integration concept, VSAT MEVA III and REDDIG II networks interoperability will be allowed in a homogeneous way, as if only one VSAT network exist without the need to implement other communication means for interconnection.

Interoperability is possible since the technical characteristic of both (MEVA III and REDDIG) are similar: network topology type Full Mesh, using TDMA/Frame Relay typical satellite access modality, IS 1R satellite with beam addressed over the United States / Latin America, band C and vertical lineal polarization operation frequency. In the same way, both network use similar and compatible equipment, such as those corresponding to FRAD and satellite MODEM.

One of the fundamental parameters for establishing a homogeneous MEVA III – REDDIG network is synchronization of MEVA III and REDDIG II carriers. This synchronization could be carried out with the MRT (Master Reference Terminal) of the REDDIG II NCC or the MEVA III NCC.

Due to the MRT importance and in order to avoid collapsing the network when this fails, it is necessary to have an alternate MRT, as presently in the REDDIG II . When a MRT fails, the NCC will use the alternate to maintain the network synchronism. This change will be automatic and transparent for the network users. The principal and alternate MRT should be geographically separated and joined in a direct way through a communications mean. For the MEVA III – REDDIG II integration, the REDDIG II MRT (operating in Manaus) and the MEVA III MRT could be considered.

The MEVA III and REDDIG II networks, being integrated in the same transponder, could operate with different groups of nodes or users according to the traffic between them and to respective frequencies being used. In this way, a group with all the REDDIG II nodes and other with all the MEVA III nodes could be established, as well as a last group including REDDIG II and MEVA III nodes requiring voice and data service between them. This third users group would be conformed by the nodes of Colombia, Ecuador and Venezuela (REDDIG II), and Aruba, Curacao, Panamá, Jamaica, Puerto Rico and COCESNA (MEVA III). Only one reference carrier (MRT) would be used for the synchronization of the homogeneous network.

In the same way, the following particular premises could be identified:

- a) Network Management Centre
 - Equipment redundancy with hemispherical geographical diversity
 - Use of the MRT and AMRT with geographical diversity to avoid solar interference
 - Dedicate circuit between MRT and AMRT
 - Operation of the Network Management Centre during 24x7x365 in English, Spanish and Portuguese languages
 - Use of carriers up to 1.25 Msps with QPSK and FEC ½. Modulation
 - Conformation of three groups of users NAM-CAR, SAM and NAM-CAR/SAM
 - Minimum availability: 99.95%
 - The network is exclusive and closed for member States and should not be interconnected to any Public Network

- b) Remote Nodes

- Redundant equipment desirable
- Minimum availability: 99.95%
- BER equal or above 10⁻⁶

Present communications requirements identified for integration between the SAM Region and CAR Region and the SAM Region and NAM Region

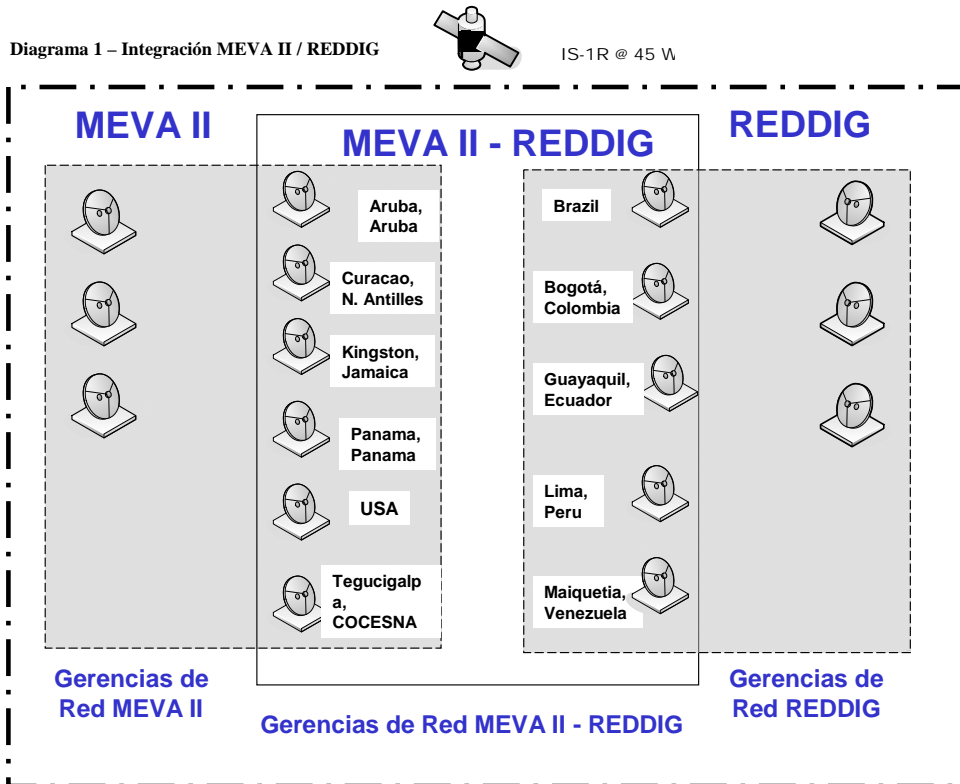
Within the networks integration, initially the voice and data communications requirements between the SAM and CAR Regions (presented in table 1) have been considered, as well as data requirements between the SAM and NAM regions (presented in table 2).

Table No. 1 – Summary of CAR/SAM interoperability requirements																		
No.	State/Station	ARUBA, Aruba	COLOMBIA	Barranquilla	Bogota	Cali	Medellín	San Andrés	ECUADOR, Guayaquil	JAMAICA, Kingston	NETHERLANDS A. Curacao	PANAMÁ, Panamá	PUERTO RICO, San Juan	VENEZUELA	Caracas	Josefa Camejo	COCESNA, Tegucigalpa	Total per State
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	ARUBA, Aruba															V		1 Voice
2	COLOMBIA																	8 Voice + 1 Data
2.1	Barranquilla									V	V	V						
2.2	Bogotá											D,V					V	
2.3	Cali											V						
2.4	Medellín											V						
2.5	San Andrés											V						
3	ECUADOR, Guayaquil																V	1 Voice
4	JAMAICA, Kingston			V														1 Voice
5	NETHERLANDS A. Curacao			V											D,V			2 Voice + 1 Data
6	PANAMÁ, Panamá			V	D,V	V	V	V										5 Voice + 1 Data
7	PUERTO RICO, San Juan														D,V			1 Voice + 1 Data
8	VENEZUELA																	3 Voice + 2 Data
8.1	Caracas										D,V		D,V					
8.2	Josefa Camejo	V																
9	COCESNA, Tegucigalpa				V				V									2 Voice
	Total per Station	1 Voice		3 Voice	2 Voice + 1 Data	1 Voice	1 Voice	1 Voice	1 Voice	1 Voice	2 Voice + 1 Data	5 Voice + 1 Data	1 Voice + 1 Data		2 Voice + 2 Data	1 Voice	2 Voice	

Note: Additionally to requirements expressed in Table No. 1, ATN routers interconnection should be added, as well as new services for the radar data Exchange and other communications services, all of which is in process of revision a definition. .

Table No. 2 – Summary of NAM/SAM interoperability requirements		
No.	Communications services	Type
1	2	3
1	Main AFTN circuit BRASIL , Brasilia – UNITED STATES	Data
2	Main AFTN circuit PERU , Lima – UNITED STATES	Data
3	Main AFTN circuit VENEZUELA , Caracas – UNITED STATES	Data
4	ATN routers interconnection No. 1 (Plan under review)	Data
5	ATN routers interconnection No. 2 (Plan under review)	Data
6	Other future services	Data

Initial architecture proposed by the MEVA III / REDDIG II Coordination meetings for integration of both networks and their suggested operation



Note: The interrupted dark line represents a total network operator

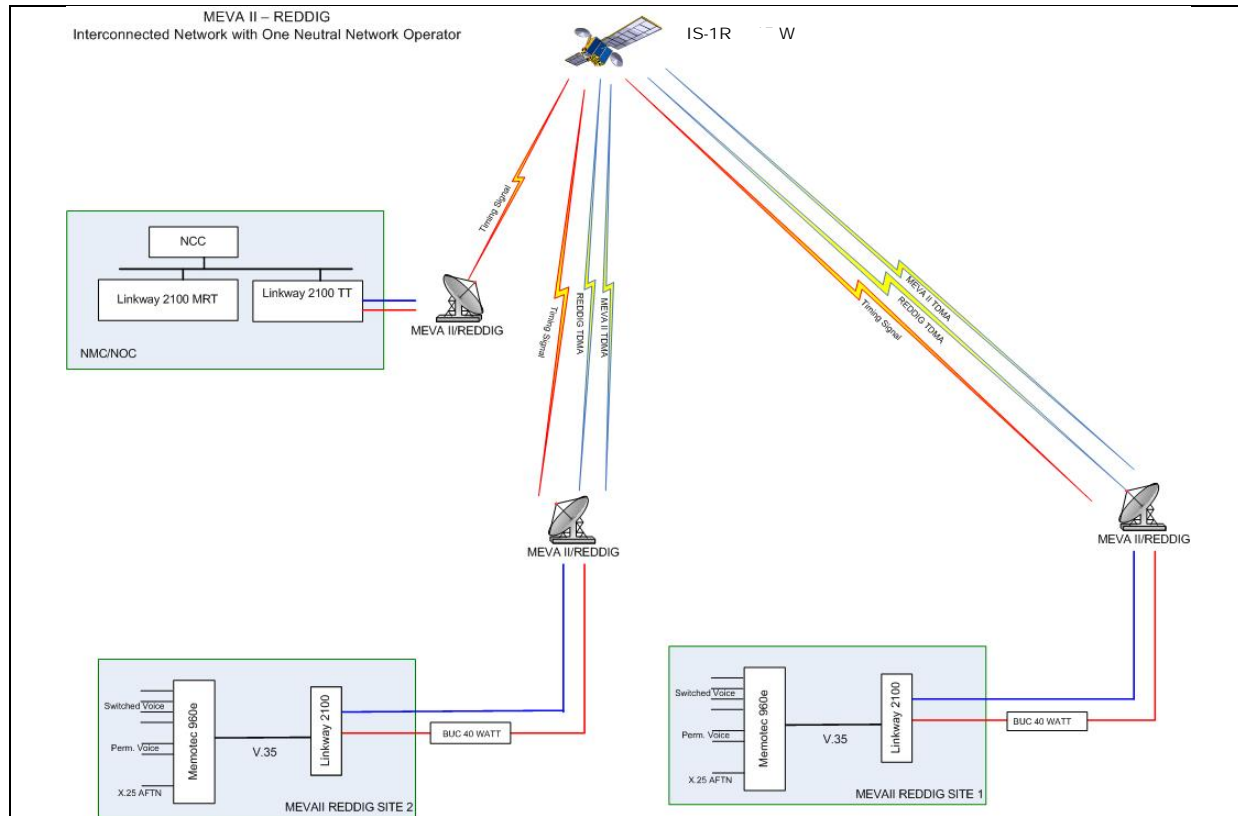


Diagram 2 – MEVA III – REDDIG II Networks Interconnected with only one Network Operator

Conclusion

Taking into account these initial considerations on operational technical aspects for the MEVA III and REDDIG II networks integration, failing to study in-depth operational, administrative and institutional aspects, as well as review other considerations from the experience in operating both networks interconnection, it could be concluded that both networks integration is technically feasible and among the principal advantages that could be achieved are:

- For any communication between any of the MEVA III and REDDIG II nodes only one satellite hop will be used keeping at minimum the delay in voice and data communications
- Independent and transparent operation for users of groups without interconnection, there should not be interference on those groups traffic
- Being a homogeneous network in technology and equipment, interconnection and interoperability among MEVA III and REDDIG II would be carried out without mayor additional investments in principal equipment or stations
- Flexibility to increase new interconnection users in any of the networks
- Fulfill interoperability principles of regional digital networks
- Facilitates implementation of ATN applications

APPENDIX C
AMENDMENT TO THE MEMORANDUM OF UNDERSTANDING BETWEEN
STATES/TERRITORIES/INTERNATIONAL ORGANISATIONS MEMBERS OF MEVA III
AND REDDIG II PROJECT ORGANISATION

1. SECTION 1. INTRODUCTION AND PURPOSE OF THIS DOCUMENT

1.1 INTRODUCTION

1.1.1 With the aim of effectively and efficiently fulfilling aeronautical telecommunications requirements in these regions, the members of the MEVA III and REDDIG IIVSAT networks decide to interconnect the two networks. For this purpose, the Members decided to establish this Memorandum of Understanding (MoU). This Agreement is being established jointly under coordination of the ICAO North American, Central American, and Caribbean (NACC) Office in Mexico City, Mexico and the ICAO South American (SAM) Office, in Lima, Peru.

1.1.2 The Third MEVA II / REDDIG Coordination Meeting (MR/3) concluded that the interconnection implementation will operate for a five-year period, as an initial basis, after finalising the implementation.

1.1.3 The main body of this document consists of four (4) sections and 2 Appendices. The content of the sections and appendices is summarised below: In accordance with the interconnection development, when considered necessary, and if the interested Parties of both networks agree to do so, other Appendices could be added as necessary.

- a) Section 1.0: Presents a brief overview and statement of purpose.
- b) Section 2.0: Provides an explanation of the Technical Cooperative Agreement process.
- c) Section 3.0: Describes the technical terms of reference.
- d) Section 4.0: Describes the financial responsibilities of the parties to this agreement.
- e) Appendix A: A list of reference documents used in support of this Agreement.
- f) Appendix B: Technical-operational coordination agreement for the establishment of VSAT MEVA III and REDDIG II networks interconnection

1.1.4 This document is based on the former MEVA II-REDDIG Memorandum of Understanding (MoU).

1.2 SECTION 1 – PURPOSE

1.2.1 The goal of this MoU is to foster a coordinated plan for in the development of MEVA III and REDDIG II networks and its interconnection implementation.

1.2.2 This MoU is a living document through which members of the MEVA III and REDDIG II networks shall convene, as necessary and at locations agreed upon, to review or amend the details of the Agreement. Revised versions of this Agreement, or paragraph changes, shall be coordinated and distributed by the ICAO NACC and SAM Regional Offices to the signatory parties of the Agreement as appropriate.

1.2.3 This MoU document establishes the following coordination and cooperation process:

- a) The holding of coordination meetings to analyse and identify the requirements and preferred technical solution(s), alternatives, and options for achieving interconnection of the MEVA III and REDDIG IIVSAT networks via a common satellite and use of similar equipment.
- b) The exchange of technical reports and documentation, program plans and schedules, as may become necessary, to assure the successful and timely completion of these efforts.
- c) Operational-technical coordination between the Parties involved in MEVA III and REDDIG II networks, as necessary.
- d) Planning, technical coordination, and development participating member States/Territories/International Organisations of the MEVA III and REDDIG II Networks.

2. SECTION 2 – THE TECHNICAL COOPERATIVE AGREEMENT PROCESS

2.1 To reach the goal of this MoU, the MEVA III and REDDIG II members have developed an interconnection solution that shall be implemented to operate during an initial five-year phase after finalising the implementation. During this initial phase, the members of these networks shall also define and develop a solution that shall enable the integration of the two networks at a later stage, which will be properly protected in a separate document.

2.2 RELATIONSHIPS AND RESPONSIBILITIES OF THE PARTIES

2.2.1 In order to achieve the interconnection of the networks in a timely and mutually beneficial way, the parties to this Agreement recognise the need to coordinate their actions and exchange updated operational-technical information.

2.2.2 The Parties also recognise the need to develop common technical solutions for interconnecting and/or integrating these networks, in a manner that shall not negatively impact the planned operation, performance, or management of the either network.

2.2.3 ICAO NACC and SAM Regional Offices shall convene coordination meetings, as needed.

2.2.4 The Parties of this MoU agree to exchange reports, technical documents, plans and programming that may be necessary in order to guarantee the successful and timely fulfilment of the interconnection of these networks.

2.2.5 The Parties of this MoU agree to implement during the initial phase the MEVA II / REDDIG interconnection solution as presented in Appendix B.

3. **SECTION 3 – TECHNICAL TERMS OF REFERENCE**

3.1 The interconnection solution's objectives and their technical operational principles are described under the Appendix B of this document.

4. **SECTION 4 – FINANCIAL RESPONSIBILITIES OF THE NETWORK PARTIES**

4.1 MEVA II / REDDIG members shall, as individual administrations, be responsible for their own financial obligations, in accordance with the Agreement contained in Appendix B.

4.2 The Parties to this Agreement understand that they shall not commit to any action that may result in a financial obligation to other Parties, without first obtaining an Agreement, in writing, from all other parties to this Agreement.

NOTES:

MEVA II - The term "MEVA II", as used in this document, refers to the VSAT network currently providing voice and data aeronautical telecommunications services to States/Territories/International Organisations in the Caribbean Region. The network is managed by Caribbean States/Territories/International Organisations members, through the Technical MEVA Group (TMG), and is coordinated by the ICAO NACC Regional Office.

REDDIG - The term "REDDIG", as used in this document, refers to the VSAT network presently implemented in the South American region under the technical cooperation project RLA/03/901 coordinated by the ICAO Lima Office.

TECHNICAL-OPERATIONAL COORDINATION AGREEMENT FOR THE ESTABLISHMENT OF VSAT MEVA III AND REDDIG II NETWORKS INTERCONNECTION

1. SECTION 1 – PURPOSE OF THIS AGREEMENT

1.1 PURPOSE

1.1.1 To establish technical, operational and administrative aspects necessary for the digital VSAT MEVA III and REDDIG II networks interconnection, to meet aeronautical telecommunications requirements between the CAR/SAM Regions.

2. SECTION 2 – CO-OPERATIONAL TECHNICAL PROCESS OF THE AGREEMENT

2.1 RELATIONSHIP AND RESPONSIBILITIES OF THE PARTIES

2.1.1 During this stage, the management of MEVA III and REDDIG II shall continue with their respective service providers, i.e, REDDIG shall continue with its REDDIG Administration, and MEVA II, with the MEVA III Service Provider.

2.1.2 States/Territories/International Organisations members of MEVA III and REDDIG II networks shall be responsible for the normal operation of each of their nodes, having to establish mechanisms necessary to ensure the degree of availability required for each of the services under consideration.

3. SECTION 3 – TECHNICAL TERMS OF REFERENCE

3.1 TECHNICAL TERMS OF REFERENCE

3.1.1 Members of MEVA III and REDDIG II networks have mutual interest in establishing the interconnection of their respective communications networks in a manner that they provide the capacity for current and future voice and data aeronautical telecommunications services between the designated nodes within these networks, so as to support aeronautical telecommunications in the CAR/SAM Regions.

3.1.2 The interconnection technical solution shall be carried out under premise that the REDDIG and MEVA II VSAT network is developed under a full mesh network topology, using TDMA/Frame Relay satellite access, as well as a IS 1R satellite transponder with a beam directed over United states / Latin America, C band operation frequencies and co-linear vertical polarisation.

3.1.3 For the interconnection of the additional equipments to be initially installed at each node involved, **XXXXXX**, as well as any other necessary equipment, shall be acquired.

3.1.4 The interconnection implies the following implementations:

a) Additional equipment at Bogota (Colombia) and Caracas (Venezuela), REDDIG II nodes; and

b) Additional equipment at Tegucigalpa, Honduras, COCESNA MEVA III node.

3.2 MANAGEMENT TERMS OF REFERENCE

3.2.1 Implementation of the interconnection option shall not involve modifications to the technical, operational and control management of MEVA III and REDDIG II networks, with exception of the necessary maintenance coordination procedures detailed in paragraph 3.2.5 of this Attachment.

3.2.2 The configuration, synchronisation, supervision and control of additional MODEMs participating in the interconnection and installed at REDDIG II nodes, shall be carried out by the MEVA III Network Control Centre (NCC). Also, the configuration, synchronisation, supervision and control of additional MODEMs participating in the interconnection and installed at MEVA III nodes, shall be carried out by the REDDIG NCC.

3.2.3 The band-width, number and type of circuits installed in the MEVA III node for communications with REDDIG II, shall be managed by REDDIG II.

3.2.4 The band-width, number and type of circuits installed in the REDDIG II node for communications with MEVA III, shall be managed by MEVA III.

3.2.5 Maintenance coordination procedures between the NCCs

3.2.5.1 When there is any problem in a REDDIG II node, with the MODEM or other equipments involved in the interconnection with MEVA III, the following shall be applied:

- a) MEVA III Service Provider shall call the REDDIG II Administration informing of the happening;
- b) The REDDIG II Administration shall phone the respective node and shall establish an audio teleconference between MEVA III Service Provider and Caracas or Bogota local technicians, as necessary;
- c) REDDIG II NCC, under control of the REDDIG II Administration, shall supervise communications between MEVA III Service Provider and REDDIG II nodes technicians.
- d) The MEVA III Service Provider is the only one that may call the REDDIG Administration to start or close the respective trouble ticket.

3.2.5.2 When there is any problem in a MEVA III node, with the MODEM or other equipment affect the interconnection with REDDIG, the following shall be applied:

- a) The REDDIG II Administration shall call the MEVA III Service Provider informing of the happening;
- b) The MEVA III Service Provider shall call the respective node and shall establish an audio conference between REDDIG II Administration and local technicians, as necessary;
- c) MEVA III NCC, under control of the Service Provider, shall supervise communications between REDDIG II Administration and MEVA III nodes technicians.

- d) The REDDIG Administration is the only one that may call the MEVA III Service Provider to start or close the respective trouble ticket.

3.2.6 SECURITY REQUIREMENTS

3.2.6.1 The minimum security arrangements required by REDDIG, and that should be followed by the MEVA III, are:

- a) MEVA III network have no direct communications with public networks.
- b) The equipment is not shared with services different to MEVA III.
- c) Access restriction to equipment belonging to the network, through the use of a password.
- d) The network must exclusively support services to which it was originally constituted for.

3.2.6.2 The minimum security arrangements required by MEVA III, and that shall be followed by REDDIG II, are:

- a) REDDIG II network have no direct communications with public networks.
- b) The equipment is not shared with services different to REDDIG II.
- c) Access restriction to equipment belonging to the network, through the use of a password.
- d) The network must exclusively support services to which it was originally constituted for.

SECTION 4 – FINANCIAL RESPONSIBILITIES OF THE PARTIES

3.3 EQUIPMENT PURCHASING

3.3.1 Additional equipment to be installed at REDDIG II nodes, with MEVA II MODEMs requirements, can be purchased by the REDDIG II members in accordance with the requirements established for the interconnection.

3.3.2 Additional equipment to be installed at MEVA III nodes, with REDDIG MODEMs requirements, can be purchased by MEVA III members (States, Territories, Organisations) to the MEVA III Service Provider, in accordance with the requirements established for the interconnection.

3.4 SPARE PARTS LOT PURCHASING

3.4.1 The spare parts for the additional equipment to be installed at the REDDIG II nodes, with MEVA III MODEM and other device requirements, can be purchased by REDDIG II, and would form part of the spare parts lot existing in REDDIG II.

3.4.2 The spare parts for the additional equipment to be installed at the MEVA III nodes, with REDDIG II MODEM and other device requirements, shall be purchased by MEVA III Members.

3.5 MAINTENANCE

3.5.1 The additional equipment that would be installed in the REDDIG II nodes and that would route communications requirements with MEVA III nodes, shall be maintained by the respective REDDIG II member States, under the coordination of the REDDIG II Administration.

3.5.2 The additional equipment that would be installed in the MEVA III node, with communications requirements with REDDIG II nodes, shall be maintained by MEVA III Member, in coordination with the MEVA III Service Provider.

3.6 SPACE SEGMENT

3.6.1 The carriers, as well as the band width requirement for communications between REDDIG II nodes shall be the same as those currently rented with INTELSAT. The payment of the space segment to INTELSAT shall continue being carried out through the REDDIG II Administration, who shall be in charge of collecting contributions from each SAM State member of REDDIG II.

3.6.2 The carriers, as well as the band width requirement for communications between MEVA III nodes shall be done through the MEVA III Service Provider. MEVA III members shall pay the bandwidth consumption to the MEVA III Service Provider.

3.6.3 The circuits necessary for communications between a REDDIG II node having MODEMs participating in the interconnection with MEVA III shall be administrated by the MEVA III Service Provider. The amount charged for circuits used by the REDDIG II Member of the aforementioned node mentioned shall be provided by the MEVA III Service Provider, and the respective consumption payment to the provider shall be made through REDDIG II Administration.

3.6.4 The circuits necessary for communications between a MEVA III node having MODEMs participating in the interconnection with REDDIG II shall be administrated by REDDIG II. The amount charged for circuits used by the mentioned node shall be provided by the REDDIG Administration, and the respective consumption payment shall be made by the MEVA II member of the aforementioned node to the REDDIG II Administration.