



- Agenda Item 2: Review of air navigation matters**  
**2.3 Air navigation specific activities:**  
**2.3.2 Communications, Navigation and Surveillance (CNS)**

## **VSAT NETWORKS AND MEVA II / REDDIG INTERCONNECTION ACTIVITIES**

(Presented by the Secretariat)

<b>SUMMARY</b>	
This paper presents the activities carried out by the VSAT networks in the CAR Region, as well as the follow-up of the actions envisaged for the interconnection of the MEVA II and the REDDIG VSAT Networks.	
<b>References:</b>	
<ul style="list-style-type: none"><li>Seventh MEVA II/REDDIG Coordination Meeting (MR/7) Report, Mexico City, Mexico, 10 to 11 June 2009</li><li>MEVA TMG/20 Meeting Report, Mexico City, Mexico, 8 to 9 June 2009</li><li>GREPECAS/15 Meeting Report</li></ul>	
<b>Strategic Objectives</b>	<i>This working paper is related to Strategic Objectives A and D.</i>

### **1. Introduction**

1.1 Digital communication networks based on very small aperture terminal (VSAT) are being used in the provision of aeronautical ground-ground communications in areas where terrestrial communication systems are unavailable, unreliable or uneconomical. VSAT networks are generally flexible, scalable, versatile, easy to implement/operate and cost-effective in certain areas, terrains or conditions.

1.2 A wide variety of often incompatible architectures, configurations, access techniques, management, operation schemes and protocols are used in different VSAT networks. Moreover, almost all VSAT networks available in the market employ some proprietary products. As a result, in general, non-identical VSAT networks are not interoperable.

1.3 ICAO has promoted ALLPIRG Conclusion 5/16 – *Implementation of very small aperture terminals (VSATs)* that urges the PIRGs to discourage the proliferation of VSAT networks where one/some of the existing ones can be expanded to serve the new areas of interest, work towards integrated regional/interregional digital communication networks with a single (centralized) operational control and preferably based on the Internet Protocol (IP) and give due consideration to managed network services (e.g. a virtual private network [VPN]), subject to availability and cost-effectiveness and has set the VSAT networks performance guidelines to manage the end-to-end performance of digital communication networks, irrespective of the technologies and protocols utilized.

## **2. VSAT Networks in the CAR Region**

### ***MEVA Network***

2.1 The MEVA network is a VSAT network that has been in operation since 1996, improving the quality and effectiveness of the telecommunication services for the Central Caribbean subregion members. By 2006, the network was updated to meet new CNS/ATM services and the integration of the current VSAT telecommunication networks.

2.2 Based on the assessment of the performance and operation of the MEVA Network after the first years of its upgrade, conducted by the MEVA II member administrations, the results achieved were found highly satisfactory during the Twentieth MEVA II Technical Management Group Meeting (MEVA TMG/20) held from 8 to 9 June 2009. Note was taken of an increase of the use of the network bandwidth. Among the relevant aspects agreed by this MEVA TMG meeting are the following:

- a) formulation of agreements on the implementation of the Contingency Plan;
- b) launching of the MEVA II website with network performance information;
- c) the development of a strategy for the upcoming withdrawal from production of MEMOTEC and Linkways equipment models used in the MEVA II nodes;
- d) plan for the satellite transition from IS 1R to IS-14,
- e) considerations on the transition of the Network Operations Center (NOC);
- f) assessment/preparation for new services such as radar data sharing and the implementation of AMHS; and
- g) progress in the interconnectivity activities of the MEVA II/REDDIG networks.

### ***CAMSAT Network***

2.3 The VSAT network, known as CAMSAT, is a network covering in the six Central American countries and members of COCESNA. It currently has 16 operating stations with aeronautical voice and data communications as well as administrative communications and the provision of an Intranet service (WAN). The CAMSAT network became operable since 2002 as a result of the need to modernize the current digital ground OKI network as well as to develop new sites whose ground implementation (microwave) was highly onerous, and to comply with the new provisions of the Regulatory Entities of the Central American radio-electric spectrum.

2.4 The CAMSAT network is based on Frame Relay technology and the central part of the system is formed by MEMOTEC's model CX1000e switch equipment.

### ***Other VSAT networks***

2.5 Other VSAT networks currently operating in the CAR region have a domestic coverage, such as the Mexican VSAT network and some VSAT stations of the Colombian network.

## **3. Interconnection of the VSAT MEVA II Network and the REDDIG Network**

3.1 Due to the need to comply with certain ANP requirements in a cost-effective manner, taking into account current and future interoperability communications requirements among the CAR, NAM and SAM regions, considering ALLPIRG/5 Conclusion 5/16, and taking advantage of the hemispheric coverage of the satellites available, it was concluded that CAR/SAM States, Territories and International Organizations should implement the requirements through a simple MEVA II and REDDIG VSAT digital networks integration/interconnection solution, to provide high performance at low cost and avoid the use of multiple VSAT networks.

3.2 The analysis and coordination of the MEVA II and REDDIG network interconnection has been conducted through various coordination meetings between the networks, and the results were presented, reviewed and approved by the GREPECAS/15 meeting.

3.3 The Action Plan for the MEVA II / REDDIG Interconnection contains the revision made by the Seventh MEVA II / REDDIG Coordination Meeting (MR/7) that was held in the ICAO NACC Regional Office in Mexico City, from 10 to 11 June 2009. According to this plan, the conclusion of the interconnection is planned for September 2009. **Appendix A** contains said updated Action Plan. After the assessment of other future services related to MEVA II/REDDIG interconnection such as the implementation of the AMHS system and data exchange between the CAR and SAM Regions, the MR/7 Meeting urged that the administrations of MEVA II and REDDIG study these and other initial requirements, taking as reference those identified in **Appendix B**.

## **4. Integration phase of the MEVA II and REDDIG VSAT Networks**

4.1 As a result of the studies carried out during the MEVA II / REDDIG coordination meetings, it was concluded that integration of the MEVA II and REDDIG networks under one control unit represented the best option. Due to the impossibility of changing the current administrative and operational schemes for both VSAT networks, it was agreed that this option would be implemented after a five-year period.

4.2 The MR/7 Meeting discussed the draft document on the future MEVA II/REDDIG integration, and considering that several aspects that need to be studied in detail are typical elements and topics of the operation and management of the networks, it urged that each administration of the MEVA II and REDDIG networks develop a preliminary action plan to finalize the study. This action plan was agreed to be presented at the next MEVA II/REDDIG coordination meeting.

4.3 Due to possible future changes to both VSAT networks in view of the renewal of equipment or software, the MR/7 Meeting urged both administrations to exchange information on the studies and other considerations concerning these changes.

**5. Suggested action**

5.1 The Meeting is requested to:

- a) take note of the information contained in this working paper;
- b) take into account the availability of the existing VSAT networks for the implementation of services and communications, in case they are technically and economically feasible;
- c) review the updated Action Plan on the interconnection contained in Appendix A to this paper, as well as the new services envisaged and listed in Appendix B;
- d) comment on the agreed actions for the preparation of the integration phase of the MEVA II/REDDIG networks as informed under paragraph 4 of this paper, and
- e) agree to any other actions as deemed appropriate.

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**UPDATED ACTION PLAN FOR IMPLEMENTATION OF MEVA II AND REDDIG INTERCONNECTIONS**  
**PLAN DE ACCIÓN ACTUALIZADO PARA LA IMPLANTACIÓN DE LAS INTERCONEXIONES MEVA II Y REDDIG**

Date/Fecha: February/Febrero 2009

Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
1	RFP Completion/Finalización del RFP	COCESNA	30-Apr-07	Completed / Finalizado
2	Required connections: / Conexiones requeridas: Aruba COCESNA Ecuador Colombia Peru Venezuela Brazil / Brasil Panama United States / Estados Unidos Jamaica Curacao / Curazao	MEVA II Service Provider and REDDIG Administration / Proveedor Servicio MEVA II y Administración REDDIG	30-Apr-07 / 30-Abr-07	Completed / Finalizado
3	Identification of Current Equipment / Identificación de Equipo Actual	MEVA II Service Provider and REDDIG Administration / Proveedor Servicio MEVA II y Administración REDDIG	28 Sep-07	Completed / Finalizado
4	Completion of SLA / Finalización de SLA	MEVA II Service Provider and REDDIG Administrator / Proveedor Servicio MEVA II y Administración REDDIG	Mar/09	Valid/Valido Is part of the Service Contract/Es parte del Contrato de Servicio

APPENDIX / APÉNDICE A

C/CAR WG/7 – WP/12-NE/12

**Legend / Leyenda:**

MoU: Memorandum of Understanding / Memorando de Entendimiento

RFP: Request for Tecnical and Econmic Proposal / Solicitud de Propuestas Técnicas y Económicas

SLA: Service Level Agreement / Acuerdo de Nivel de Servicio

Item No.	Action / Acción		Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2		3	4	5
5	Review of RFP / Revisión de RFP		MEVA II and REDDIG Members / Miembros MEVA II y REDDIG	29 June -07/ 29 Junio 07	Completed / Finalizado The RFP was reviewed and approved by all MEVA II / REDDIG Member Administrations. / El RFP fue revisado y aprobado por todas las Administraciones miembros de las redes MEVA II y REDDIG.
6	Proposals response / Respuesta de propuestas		MEVA II Service Provider and REDDIG Administration / Proveedor Servicio MEVA II y Administración REDDIG	26 Sep.-07	Completed / Finalizado The response for the RFP from the MEVA II Service Provider and REDDIG Administration was presented at the MR/5 Meeting/ Las respuestas al RFP por parte del Proveedor de Servicio MEVA II y la Administración de la REDDIG se presentó en la Reunión MR/5.
7	Proposals review / Revisión de propuestas		Coordination meeting / Reunión de coordinación	5 Oct.-07	Completed / Finalizado The proposal was reviewed in the MR/5 Meeting. / La propuesta se revisó en la Reunión MR/5.
8	Focal nomination / Nombramiento Punto Focal	Send a letter to MEVA II / REDDIG Member Administrations / Envío carta a las Administraciones miembros de las redes MEVA II y REDDIG.	ICAO Regional Offices / Oficinas Regionales OACI	15 Oct. 07	Completed / Finalizado The ICAO Regional Offices sent to the States/Organization involved in the MEVAII REDDIG interconnection a letter in order to nominate focal points. Las oficinas regionales de la OACI enviaron una carta invitando los Estados/Organización involucrados en la interconexión la nominación de puntos focales.

Item No.	Action / Acción		Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2		3	4	5
		Focal point designation/ Designación punto focal	MEVA II and REDDIG Members involved / Miembros de MEVA II y REDDIG involucrados	30-Oct-07	Completed / Finalizado All the States/Organization members of MEVA II and REDDIG network involved in the interconnection nominated focal points. Todos los Estados/Organización miembros de la REDDIG y MEVA II involucrados en la interconexión nominaron puntos focales.
9	Application of MoU reviewed / Aplicación del MoU revisado		MEVA II / REDDIG Member Administrations / Administraciones miembros de las redes MEVA II y REDDIG	30-Oct-07	Completed / Finalizado The ICAO Regional Offices sent to the States/Organization of MEVA II and REDDIG network in order to sign the MoU reviewed.
10	Review and acceptance of equipment costs for the MEVA II / REDDIG interconnection by the REDDIG Member Administrations / Revisión y aceptación por parte de las Administraciones Miembros de la REDDIG sobre costo de equipamiento para la interconexión MEVA II / REDDIG		All the REDDIG Member States / Todos Estados miembros de REDDIG	30 Oct-07	Completed / Finalizado No comments were received No se recibieron comentarios al respecto
11	Review and acceptance of equipment costs for the MEVA II / REDDIG interconnection by the MEVA II Member Administrations involved / Revisión y aceptación por parte de las Administraciones Miembros de la MEVA II involucradas sobre costo de equipamiento para la interconexión MEVA II / REDDIG		Aruba, Curaçao, Jamaica, Panama, USA (Miami and Puerto Rico) and COCESNA / Aruba, Curaçao, Jamaica Panamá, USA (Miami y Puerto Rico) y COCESNA	30 Oct -07	Completed / Finalizado No comments were received No se recibieron comentarios al respecto

**Legend / Leyenda:**

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Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
12	Review and acceptance of proposed recurrent costs for the MEVA II / REDDIG interconnection/ Revisión y aprobación costos recurrentes propuestos para la interconexión MEVA II REDDIG	MEVA II/ REDDIG Member Administrations involved / Administraciones Miembros de la MEVA II y REDDIG involucradas	30 Oct- 07	Completed / Finalizado No comments were received No se recibieron comentarios al respecto
13	Revised MoU Signature / Firma del MoU Revisado	MEVA II and REDDIG Members / Miembros MEVA II y REDDIG	30 Nov 07	Completed / Finalizado The following States sent the MoU reviewed signed/Los siguientes Estados enviaron el MoU revisado firmado: Argentina, Brasil, Chile, Cuba, COCESNA, Estados Unidos, Guyana, Peru y/and Uruguay
14	Review, approval and signing of contracts or contract amendments to carry out the MEVA II / REDDIG interconnection presented by the MEVA II Service Provider / Revisión, aprobación y firma de los contratos o enmienda de los mismos para llevar a cabo la interconexión MEVA II/REDDIG presentada a través del Proveedor de Servicio de la MEVA II	MEVA II Member Administrations involved and REDDIG Administration / Administraciones Miembros de la MEVA II involucradas y Administración REDDIG	Mar/ 2009	ICAO reviewed and coordinate with AGS the contract for the provision of the interconnection of the MEVA II and REDDIG Satellite Telecommunication network. The Review contract was accepted by both parts and its signature is pending.  La OACI revisó y coordinó con AGS el contrato para la provisión de la interconexión de las redes de telecomunicaciones por satélite MEVAII y REDDIG quedando pendiente la firma del mismo.



Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
15	To ensure that all MEVA II and REDDIG nodes work with IS-IR Satellite, using Band C transponder with US/Latin America hemispheric beam and Co-Linear Vertical polarization / Asegurar que todos los nodos de la MEVA II y REDDIG operen en el satélite IS-1R, empleando transpondedores de banda C con haz hemisférico US/Latin America y polarización co-lineal vertical.	MEVA II Service Provider and REDDIG Administration/ Proveedor Servicio MEVA II/ Administración REDDIG	Nov /08	Completed / Finalizado In the month of November 2008 AGS proceeded to change the polarity from horizontal to vertical of the MEVA II nodes. With this implementation all the preliminary requirements for the interconnection were satisfied. En el mes de noviembre de 2008 AGS procedió a la implantación del cambio de polaridad de horizontal a vertical de los nodos de la MEVA II. Con esta implantación todos los requerimientos preliminares para la interconexión MEVAII REDDIG están satisfechos.

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Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
16	Equipment and spare parts acquisition for MEVA II/REDDIG interconnection/ Adquisición de equipamiento y repuestos para la interconexión MEVA II / REDDIG.	REDDIG Administration and MEVA II involved Member Administrations / Administración de la REDDIG y Administraciones Miembros de la MEVA II involucradas	Mar/ 09	<p>The ICAO Technical Cooperation completed the bid process in the month of May 2008. The purchase of the equipments will be made once ICAO signs the Contract for the provision of the interconnection of the MEVA II and REDDIG Satellite Telecommunication network. with AGS</p> <p>La Cooperación Técnica de la OACI completó el proceso de licitación para la adquisición de los equipos en mayo de 2008. La adquisición de los equipos se hará una vez que la OACI firme el contrato para la provisión de la interconexión de las redes de telecomunicaciones por satélite MEVAII y REDDIG con AGS.</p>
17	Site survey for Bogota, Caracas and COCESNA, / Inspección sitio para Bogota, Caracas and COCESNA,	MEVA II Service Provider and REDDIG Administration / Proveedor MEVA II y Administración REDDIG	May/ 09	<p>Site survey is considered as part of the services to be provided.</p> <p>El estudio de sitio se considera parte de los servicios a ser provistos.</p>
18	Site preparation for equipment installation for MEVA II / REDDIG interconnection / Preparación de los sitios para albergar equipamiento para la interconexión MEVA II / REDDIG	Colombia, Venezuela and/y COCESNA	Jun/09	
19	Delivery of purchased equipment at the required sites. / Entrega de equipamiento adquirido en los sitios requeridos	MEVA II Service Provider and REDDIG Administration / Proveedor de Servicio MEVA II y Administración REDDIG	Jul/09	

Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
20	Equipment installation / Instalación equipamiento	MEVA II Service Provider and REDDIG Administration / Proveedor de Servicio MEVA II y Administración REDDIG	Jul/09	
21	Satellite line-up, configuration of site equipment and NCC for the interconnection/ Line-up satelital, configuración equipamiento en sitio y NCC para interconexión	MEVA II Service Provider and REDDIG Administration / Proveedor de Servicio MEVA II y Administración REDDIG	Jul/09	
22	End-to-end trials for voice and data circuits / Pruebas de extremos a extremos para los circuitos de voz y datos	MEVAII Service Provider and REDDIG Administration / Proveedor de Servicio MEVA II y Administración REDDIG	Aug/09	
23	System Performance Evaluation / Evaluación de la performance del sistema	MEVA II Service Provider and REDDIG Administration / Proveedor de Servicio MEVA II y Administración REDDIG	Aug/09	
24	Service acceptance / Aceptación de los servicios /	MEVA II / REDDIG Member Administrations / Administraciones miembros de las redes MEVA II y REDDIG	Aug/09	
25	MEVA II / REDDIG Interconnection Implementation / Implantación de la interconexión MEVA II / REDDIG	MEVA II / REDDIG Member Administrations, MEVA II Service Provider and REDDIG Administrator / Administraciones miembros de las redes MEVA II y REDDIG, Proveedor Servicio MEVA II y Administración REDDIG	Sep/09	

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**APPENDIX B**  
**INITIAL FUTURE FRAME RELAY CIRCUIT REQUIREMENTS FOR MEVA II AND REDDIG NETWORKS**

<b>SITE</b>	<b>FRAME RELAY CIRCUIT</b>	<b>AMOUNT</b>
From Caracas (Venezuela) to:		
Curacao	64Kbits/sec duplex AMHS data channel	1
	9.6 Kbps-16 Kbps duplex radar data channel	1
Aruba	9.6 Kbps-16 Kbps duplex radar data channel	1
Puerto Rico	64Kbits/sec duplex AMHS data channel	1
From Bogota (Colombia) to:		
Curacao	9.6 Kbps-16 Kbps duplex radar data channel	1
Aruba	9.6 Kbps-16 Kbps duplex radar data channel	1
Panama	64Kbits/sec duplex AMHS data channel	1
	9.6Kbits/sec duplex radar data channel	1
COCESNA	9.6 Kbps-16 Kbps duplex radar data channel	2
Miami	64Kbits/sec duplex AMHS data channel	2*
From COCESNA to:		
Bogota	9.6 Kbps-16 Kbps duplex radar data channel	2

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\* Both circuits correspond to the AMHS circuits:  
 Lima (Peru) - Atlanta (USA)  
 Brasilia (Brazil) - Atlanta (USA)