International Civil Aviation Organization
North American, Central American and Caribbean Office
First Caribbean Working Group Meeting
(CAR/WG/1)
Port of Spain, Trinidad and Tobago, 21 to 23 June 2007

Agenda Item 3 **CNS Developments**

3.1 Follow-up on the status of the E/CAR AFS and MEVA II digital networks and their related inter and intra-regional interconnection/integration

DEVELOPMENT AND INTERCONNECTION/INTEGRATION OF THE VSAT MEVA II AND E/CAR DIGITAL NETWORKS

(Presented by the Secretariat)

SUMMARY

This working paper makes a review of the progress made in the implementation, development, and interconnection/integration of the MEVA II and E/CAR digital networks.

Strategic Objective
This paper is related to Strategic Objectives A2, A7 and D1.

References:

- Report of the RAN CAR/SAM 3 Meeting, Doc 9749
- Final report of the GREPECAS/12, GREPECAS/13 and GREPECAS/14 Meetings
- Report of the 30th E/CAR WG Meeting, Castries, Saint Lucia, 7-11 August 2006.
- Report of the 20th E/CAR DCA Meeting, Miami, Florida, United States, 4 to 7 December 2006
- Report of the Fourth MEVA II REDDIG Coordination Meeting, (Lima Peru, 7-9 March 2007)

1. Introduction

1.1 The implementation and interconnection of digital networks have been based on Recommendation 9/1 – *Implementation of digital networks to improve the current AFS (Aeronautical Fixed Service) and facilitate the introduction of the ATN* formulated by the Third CAR/SAM Regional Air Navigation Conference (CAR/SAM RAN 3) (Buenos Aires, 5-15 October 1999).

1.2 Following Conclusion 5/17 of the Fifth Meeting of the All Planning and Implementation Regional Group (ALLPIRG/5) / Advisory Group, held in Montreal, Canada, from 23 to 24 March 2006, ICAO prepared some guidelines on performance of VSAT networks to establish a basis for planning and basic system design of such network in support of aeronautical ground-ground communications. IP/03 of this Meeting contains additional information on these ICAO guidelines.

1.3 The GREPECAS/12 Meeting (Havana, Cuba, 7-11 June 2004) stressed that it was important to continue with the efforts to achieve a homogeneous interconnection of digital communication networks within the CAR/SAM Regions and inter-regionally with neighbouring regions, taking into account current and future voice and data communication requirements. To this end, it formulated Conclusion 12/39 – *Additional interconnection points for regional and inter-regional digital networks*. The additional points of interconnection recommended are: Merida (Mexico), Barranquilla or Bogota (Colombia) and Buenos Aires (Argentina). The points of interconnection that were previously considered are: Maiquetia (Venezuela), Miami (United States), San Juan (Puerto Rico), Piarco (Trinidad and Tobago), and Tegucigalpa, Honduras (COCESNA).

1.4 In order to develop a homogeneous network between the MEVA II and the REDDIG networks, the GREPECAS/13 Meeting, held in Santiago, Chile, 14-18 November 2005 formulated Conclusion13/70 - *Establishment of agreements to achieve the MEVA II - REDDIG interconnection/interoperation*.

1.5 As a follow-up on GREPECAS Conclusion 13/70, three MEVA II / REDDIG Coordination Meetings have been held with the participation of the States/International Organisations that are members of these networks; these Meetings were supported by the MEVA II / REDDIG Interconnection Task Force.

1.6 As a result of the studies carried out during the MEVA II/REDDIG coordination meetings, it was concluded that the integration of the MEVA II and REDDIG networks under one control unit represented the best option, but due to the impossibility of changing the current administrative and operational schemes of both VSAT networks, it was agreed that this option would be implemented after a five-year period starting in 2006. During this five-year period, the interconnection of the mentioned VSAT networks will be established and will consist of the installation of one MEVA II MODEM in the REDDIG nodes of Colombia and Venezuela, and the installation of one REDDIG MODEM in the MEVA II node of Honduras (COCESNA). Under the interconnection solution, the two networks would continue operating independently, managed by their respective control centres.

1.7 The Fourth MEVA II / REDDIG Coordination Meeting (MR/4) held in Lima, Peru, from 7 to 9 March 2007, reviewed the following technical-operational aspects for the implementation of the interconnection solution:

a) Interconnection communications service requirements.
b) Premises, equipment and required devices for the interconnection.
c) Requirements for the Bogota REDDIG node.
d) Requirements for the Caracas node.
e) Impact on the Guayaquil, Lima and Manaus REDDIG nodes.
f) Requirements for the COCESNA MEVA II node.
g) Impact on the Aruba, Curaçao, Kingston, Miami, Panama and San Juan MEVA II nodes.

1.8 Additionally, the MR/4 Meeting drafted the MEVA II / REDDIG Memorandum of Understanding (MoU), which has been circulated by the NACC and SAM Regional Offices to Member States/Territories/International Organization of both VSAT networks.

1.9 Likewise, the MR/4 Meeting prepared an Action Plan for the *MEVA II / REDDIG Interconnection* which was reviewed by the GREPECAS/14 Meeting; the results of this revision are presented in Appendix Z to Report of the mentioned Meeting. As a result of these actions GREPECAS drafted Conclusion 14/52 – *Review for the Adoption of the Memorandum of Understanding and Implementation of the Action Plan for the MEVA II / REDDIG Interconnection*.

1.10 Recently, the MEVA II / REDDIG Interconnection Task Force prepared a technical-economical request for proposal (RFP) for the MEVA II / REDDIG interconnection, which was forwarded to the Members of the MEVA II / REDDIG networks for its review and approval. The revised RFP will be forwarded to the MEVA II Service Provider and the REDDIG Administrator.

1.11 **Appendix A** to this paper presents a summary on the implementation and interconnection status of the MEVA II VSAT network with the South American digital network (REDDIG).

1.12 As informed at the 30th E/CAR WG Meeting, held in Castries, Saint Lucia from 7 to 11 August 2006 and the 20th E/CAR DCA Meeting, regarding the E/CAR AFS digital network, as a result of the problems in the voice and data AFS circuits it was agreed that the E/CAR sub-region needs an end-to-end solution which results in increasing efficiency, reliability and availability of the network. Three options were proposed:

a) To replace the existing E/CAR Digital network with a full VSAT solution.
b) To have a combination VSAT and ground lines network.
c) To have a full ground line network similar to what currently exists but with pertinent changes.

1.13 A REDDIG node was activated in Piarco, Trinidad and Tobago, which eases the interconnection of the E/CAR AFS network with the REDDIG.

1.14 **Appendix B** to this paper presents the descriptions of the proposed solutions in the immediate and short term for the E/CAR AFS network.

2. Discussion

2.1 Considering the background presented in the previous paragraphs, it is proposed that the Meeting follows-up the development and interconnection/integration status of the Caribbean sub-regional and regional digital networks.

3. Suggested Actions

3.1 The Meeting is invited to:

a) take note of the information contained in this working paper;

b) review the development and the VSAT MEVA II network interconnection follow-up actions, taking into account the background presented in paragraphs 1.1 to 1.11 and Appendix A to this paper;

c) review the status of the study to the proposed options for the establishment of an end-to-end solution in the AFS E/CAR digital network, considering the contents of paragraphs 1.1 to 1.3 and paragraphs 1.12 to 1.14 and Appendix B of this paper; and

d) consider and propose other aspects deemed appropriate.

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APPENDIX A

SUMMARY ON THE IMPLEMENTATION STATUS OF THE MEVA II VSAT NETWORK IN THE CENTRAL CARIBBEAN AND THE PROCESS FOR ITS INTERCONNECTION WITH THE SOUTH AMERICAN VSAT NETWORK (REDDIG)

1. The MEVA VSAT network was developed and implemented since 1996 mainly in the Central Caribbean, providing voice and data communications of the Aeronautical Fixed Services (AFS) between fifteen VSAT-equipped nodes in the Central Caribbean and neighbouring zones. MEVA operates in the 4-6 GHz C-band on the PAS-1R satellite and uses SCPC/DAMA technology for bandwidth-on-demand communications and circuit management. This network has made possible to implement and improve the AFTN and ATS speech circuits required for this area in the Air Navigation Plan.

2. The States, Territories and International Organizations Members MEVA[1], considering the SARPs contained in Annex 10, Vol. III, Chapter 3, as well as the ICAO guidance related to the need, not only to satisfy the AFS communications requirements, but also aimed at supporting the communications, navigation, surveillance and air traffic management services; that is, to facilitate the introduction of aeronautical telecommunications network (ATN), recognized the need to update the MEVA Network, to facilitate the adoption of protocols and services with common interfaces equipment based on the reference model for the open systems interconnection (OSI) of the International Standardization Organization (ISO), and the MEVA Network interconnection/interoperability achievement with other regional and sub-regional digital networks, Such as the South American Digital Network (REDDIG). This initiative is called “MEVA II Network”.

3. The MEVA Technical Management Group, integrated by experts from States, Territories and an International Organization, studied in detail the MEVA update aspects toward the MEVA II Network implementation, such work represented the basis for the Request for Information (RFI) and subsequently the Request for Proposals (RFP) for the MEVA II and so the evaluation and selection of the best proposal. This stage process culminated with the MEVA/10 Meeting, held in Mexico City, 13 – 15 December 2004, in which the level of Civil Aviation Directors approved the Service Provider for the MEVA II Network, as well as the updated Document of Agreement (DOA) for the MEVA II Network, which has been approved through the signatures of Directors of Civil Aviation.

4. The MEVA II Network has been conceived with a satellite technology access VSAT/TDMA/Frame Relay type, through a “Full Mesh” network topology, the use of PAS 1R satellite with beam directed over United States / Latin America, operation frequencies in the C band, and vertical linear polarization. All of this contributes with the objectives to satisfy the AFS communications required at present, contribute and ease the ATN subnetworks implementation and to achieve interoperability between the MEVA II network and the REDDIG and other CAR Region subregional networks, contributing with the implementation of the new CNS/ATM systems, including the new ATM integrated global system.

5. During the first months of 2005, the MEVA II TMG finalized Annex I of the MEVA II Document of Agreement, which is a technical document describing the network. Likewise, the transition plan of MEVA to MEVA II was developed. Based on these documents and in accordance with the corresponding national laws, the MEVA II Members arranged their contracts with the MEVA II Service Provider. Cuba and Panama established their MEVA contracts through the ICAO Technical Co-operation Bureau.

6. The implementation of the following MEVA II nodes was completed in November 2006:

- Aruba, Aruba
- Bahamas, Freeport
- Bahamas, Nassau
- Cayman Islands, Grand Cayman
- Cuba, Havana
- Netherlands Antilles, Curacao
- COCESNA, Honduras, Tegucigalpa
- Dominican Republic, Santo Domingo
- Haiti, Port-au-Prince
- Jamaica, Kingston
- USA, Miami, FL
- Panama, Panama
- USA, Puerto Rico, San Juan

7. Regarding the interconnection of the MEVA II with the VSAT REDDIG, the Fourth MEVA II / REDDIG Coordination Meeting (MR/4) held in Lima, Peru, from 7 to 9 March 2007, reviewed all technical-operational aspects for the implementation of the interconnection solution in the Bogota and Caracas REDDIG nodes; in the Tegucigalpa COCESNA MEVA II node; as well as the impact that the interconnection would have in the Aruba, Curaçao, Kingston, Miami, San Juan and Panama MEVA II nodes; and in the Guayaquil, Lima and Manaus REDDIG nodes. Additionally, it elaborated the communication service requirements through interconnection and the required premises, equipment and devices for the interconnection.

8. In addition, a MEVA II / REDDIG Memorandum of Understanding (MoU), an Action Plan and a technical-economical request for proposal (RFP) for the MEVA II / REDDIG interconnection were elaborated. These documents have been sent to the members of both networks for review and approval.

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APPENDIX B

(Reference, pa. 2.2.1 and 2.2.2 of Appendix G of the 20th E/CAR DCA Report)

IMMEDIATE AND NEAR TERM PROPOSED OPTIONS TO SOLUTION THE PROBLEMS ON THE E/CAR AFS DIGITAL NETWORK

1. Information Paper 07 of 30th E/CAR WG Meeting advised of problems on the E/CAR digital network regarding voice and data AFS circuits. The quarterly reports compiled and distributed by the TTCAA detail the faults and resolution and also provides statistics of the failures. The Committee agreed that the E/CAR sub-region needs an end-to-end solution from a single provider/point of contact. This ties responsibility for resolution of failures to a single point of contact, which results in increasing efficiency, reliability and availability of the network. Three options were proposed:

a) To replace the existing E/CAR Digital network with a full VSAT solution. To this end the TTCAA has signed a contract to be completed by December 31, 2006 to conduct the following:

- a VSAT survey of the existing VHF high sites with reference to the VHF frequencies coverage areas;
- a study of alternative and/or additional sites to provide the most optimum coverage for the existing and new VHF frequencies,
- provide a digital coverage map of each frequency at the recommended high site,
- propose the most economical and effective means of transporting the VHF information from the high site to the VSAT antenna at the operator site, and
- a survey of the existing Control Towers and AIS operator sites on the Eastern Caribbean islands and French Territories to determine the best location for the VSAT antenna to serve VHF, point-to-point voice, AFTN circuits and RADAR data.

b) To have a combination VSAT and ground lines network.

c) To have a full ground line network similar to what currently exists but with pertinent changes. This solution proposes retaining the TSTT backbone and tributary links from Cable & Wireless (C&W) but replaces all the end user and interface equipment. In this arrangement each State would be responsible for their first line maintenance with follow up support provided by the TTCAA. Each State would receive the appropriate training and compliment of spares required to support first line maintenance for both software and hardware as it relates to the AFTN. There would be no TSTT sub-contractor as currently exists with Sigma. In this regard TTCAA would perform the network management aspect.

2. Each State was previously requested to provide to the TTCAA via email their user requirements to formulate a Request for Proposal (RFP) for the options presented above. After all the responses are received the TTCAA proposes to host a Special Meeting of the E/CAR CNS Committee tentatively set for January 2007 to review the requirements as a team and justify each request and then to discuss the options proposed. The subsequent draft RFP would be circulated via e-mail for finalization before an RFP for the network is issued. To carry out an intelligent comparison on the options the draft RFP must be clearly written and must solicit solutions from the three options. The finalized RFP with recommendation/s on the selected option solution from the options presented would be forwarded to the DCAs for action.

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