International Civil Aviation Organization
CAR/SAM Planning and Implementation Regional Group (GREPECAS)
Fourth Meeting of the Programmes and Projects Review Committee (PPRC/4)
Lima, Peru, 12 to 14 July 2016

Agenda Item 2: Air navigation activities at global, intra- and inter-regional level

2.3 Follow-up to the implementation of inter- and intra-regional activities

CAR/SAM INTER-REGIONAL ACTIVITIES

(Presented by the Secretariat)

SUMMARY

This working paper presents information on inter-regional air navigation activities carried out between the CAR and SAM Regions since the PPRC/3 meeting, as well as on activities scheduled for the remaining of 2016, specifically in the CNS and ATM areas.

References:

- Final report of the First MEVA III REDDIG II coordination meeting (Oranjestad, Aruba, 25-26 April 2015).
- Seminar/workshop on the implementation of advanced surveillance and automation systems, Panama City, Panama, 22-25 September 2015.
- NAM/CAR/SAM ATS Data link implementation workshop, Philipsburg, Sint Maarten, 18-21 April 2016.
- OACI/IATA/CANSO Performance-based (PBN) harmonization, modernization and implementation meeting for the Caribbean (CAR) Region, Miami, Florida, United States, 28 March-1 April 2016.
- Third NAM/CAR Air navigation implementation working group meeting (ANI/WG/3).

ICAO strategic objectives:	*A – Safety* *E- Environmental protection*

1. Introduction

1.1 The CAR and SAM Regions have developed and approved their respective regional air navigation implementation plans in alignment with the ICAO ASBU methodology, and have defined regional implementation priorities, which are also reflected in national priorities.

1.2 The follow-up to the implementation of air navigation services, equipment, and procedures in the CAR and SAM Regions is performed through regional mechanisms such as meetings, seminars, workshops, and teleconferences.

1.3 Global airspace interoperability and harmonisation is a global need and the main objective of the new global air navigation plan. Accordingly, inter-regional coordination between the CAR and SAM Regions is of vital importance when planning the implementation of services, procedures, and equipment.

2 Discussion

2.1 Inter-regional CNS and ATM activities carried out since the PPRC/3 meeting and those scheduled for 2016 are described below.

CNS inter-regional aspects

MEVA-REDDIG interconnection

2.2 Since its commissioning in May 2015, the MEVA III REDDIG II interconnection has been operating with very high performance and availability levels.

2.3 Regarding short-term implementation of new circuits in the MEVA III REDDIG II interconnection during the 2015-2017 period as defined at the First MEVA III REDDIG II coordination meeting (Oranjestad, Aruba, 25-26 April 2015):

No.	Required circuits	Estimated date of implementation
1	Radar data exchange between Curaçao and Venezuela	Before 2017
2	Radar data exchange between Colombia and Panama	Mid-2016
3	Implementation of SAM AMHS circuits with Atlanta • Caracas - Atlanta • Brasilia - Atlanta • Lima - Atlanta • Bogota - Panama	2016-2017
4	Implementation of AMHS Atlanta-PIARCO circuit through the COCESNA REDDIG II node	2016
5	AFTN PIARCO-Curacao circuit	After 15 June 2015

2.4 The MEVA TMG/32 meeting did the follow-up to the aforementioned requirements, which are shown in **Appendix A** to this working paper.

Implementation of ATN ground-ground applications

AMHS interconnection

2.5 As follow-up to AFTN-to-AMHS migration activities between Brazil and United States, coordination started on 13 January 2016 between the focal points of Brazil and United States for the implementation of the AMHS interconnection between the Brasilia MTA and the Atlanta MTA through the MEVAIII REDDIG II interconnection. In this regard, Brazil reviewed a technical letter that the United States (FAA) requires when establishing an interconnection with another country. The technical letter contains administrative and operational aspects of the AMHS interconnection. At present, the technical letter is being reviewed by the United States. Once the technical letter has been completed and signed, interconnection tests will start.

AIDC implementation

2.6 Regarding AIDC applications, positive AIDC tests have been conducted between the CAR and SAM Regions as described in Project D (WP/11), as is the case between the Panama ACC and CENAMER. For the conduction of these tests, the guidelines defined in Conclusion 3/3 formulated by PPRC/3 were followed, in which the NAT/APAC AIDC ICD v1.0 was identified as the base document for AIDC interconnections between adjacent automated centres of the CAR and SAM Regions.

Seminar/workshop on the implementation of advanced surveillance and automation systems

2.7 In order to support the implementation of advanced surveillance (ADS-B and multilateration) and automation (AIDC) systems in NAM/CAR/SAM States, Territories, and international organisations, and meet the operational surveillance and automation requirements specified in the NAM, CAR, and SAM regional performance-based implementation plans within the framework of the ICAO Global Navigation Plan, the Seminar/workshop on the implementation of advanced surveillance and automation systems was held in Panama City, Panama, on 22-25 September 2015.

2.8 The workshop was attended by 82 representatives of 18 NAM/CAR/SAM States, 2 international organisations of the Regions, and 12 enterprises. The conclusions and recommendations formulated by this seminar are shown in **Appendix B** to this working paper. The presentations made at this workshop can be downloaded from the following website: http://www.icao.int/SAM/Pages/MeetingsDocumentation.aspx?m=2015-SEMAUTOM.

NAM/CAR/SAM ATS data link implementation workshop

2.9 This workshop was held in Philisburg, Sint Maarten, on 18-21 April 2016, with the purpose of supporting the effective air-ground and ground-ground data link implementation. It also offered the opportunity of creating networks and exchanging knowledge on best practices and lessons learned, supporting the implementation of ASBU (Aviation System Block Upgrades) B0 modules, and making recommendations to implementation groups and the CAR/SAM planning and implementation regional group (GREPECAS) in support of regional implementation of the aforementioned ASBU modules.

2.10 The workshop was attended by 47 representatives of 15 NAM/CAR/SAM States, 4 international organisations, and 3 industry representatives. The conclusions and recommendations of this workshop, together with the presentations and other details of the event can be found at: http://www.icao.int/NACC/Pages/meetings-2016-ats.aspxn .

Implementation of GNSS infrastructure in support of PBN

2.11 The Workshop for the implementation of navigation infrastructure in support of PBN and precision approach operations of the Global Navigation Satellite System (GNSS) in the NAM/CAR/SAM Regions is scheduled for 15-17 August 2016 at the SAM Office (Lima, Peru). The purpose of this workshop is to provide technical and operational information to the States, navigation service providers (ANSPs), and users for effective implementation of air navigation infrastructure in support of PBN and GNSS precision approach operations.

2.12 This workshop is designed to support the implementation of ASBU (Aviation System Block Upgrades) B0 modules, especially: B0-65/APTA - Optimization of approach procedures including vertical guidance, B0-10/ FRTO - Improved operations through enhanced en-route trajectories, B0-05/CDO - Improved flexibility and efficiency in descent profiles, and B0-20/ CCO - Improved flexibility and efficiency in departure profiles — Continuous climb operations.

Radar data exchange

2.13 One task planned to be carried out between the CAR and SAM Regions is the exchange of radar data, to be completed with the MEVA III - REDDIG II interconnection, (see table in paragraph 2.3), as well as other already planned but not yet implemented exchanges, such as radar data exchange between PIARCO and Venezuela.

CAR/SAM Inter-regional aspects in ATM field

Fifteenth Meeting of the GREPECAS Scrutiny Working Group (GTE/15)

2.14 The Fifteenth Meeting of the GREPECAS Scrutiny Working Group (GTE/15) was celebrated in Lima, Peru from 16 to 20 November 2015 and the Sixteenth Meeting of the GREPECAS Scrutiny Working Group (GTE/16) will be held in Mexico City, Mexico from 5 to 9 September 2016. The objective of these meetings is Large height deviation (LHD) assessment and analysis from 300 ft or more, under the qualitative Collision Risk Model (CRM) and qualitative Safety Management System (SMS).

2.15 The GTE/15 Meeting recognized the qualitative Safety Management System Methodology (SGSO) of LHD is a very important improvement in the LHD analysis, risk assessment and tendency identification, as well as hot spots where LHD are produced and the recommended mitigation measures for States, in order to improve airspace safety in the CAR/SAM Regions. Regarding this system several States informed that the mitigation measures successfully implemented, which means that States and International Organizations are engaged.

2.16 From 1,717 LHD events reports received between January and December 2014, 1.451 LHD were validated to be used for the CRM calculation and 58 LHD in case that LHD with code “E” were not taken account. From 1,451 LHD reports, 60.61% have a risk value over the established, and the remaining 39.39% obtained a risk value under the established.

2.17 GTE/15 noted that the regulation list for not certificated aircrafts that operated in the Reduced vertical separation minimum (RVSM) airspace was 2, 473 from the SAM Region and 494 from the CAR Region. This information was submitted to each Civil Aviation authority in order to approve appropriate RVSM actions and was also presented to the Regional Monitoring Agencies Meeting.

2.18 In accordance with GTE/15 analysis, technical estimated risk analysis for the CAR/SAM Regions FIRs is 0.0508 x 10^{-9} which satisfies the Target Level of Safety (TLS) of 2.5 x 10^{-9} fatal accidents per flight hour due to loss of 1000 ft pattern vertical separation. Total estimated technical risk in the case of the assessed CAR/SAM FIRs is 1.85 x 10^{-9}, which is below the TLS 5.0 x 10^{-9}.

2.19 The Meeting noted that, with the Air traffic services inter-facility data communication (AIDC) implementation LHDs are not totally eliminated, but with the radar signs incorporation, the number of LHD will be almost null. The Meeting also considered important to realize training and motivational actions for ATC controllers and supervisors personnel and ANSP LHD Points-of-Contacts of the CAR/SAM Regions in order to increase Category I LHD event reports.

2.20 Likewise, the Meeting considered appropriate suggesting to the CAR/SAM Regions ANSP a forecast system analysis and meteorological situation update, in order to improve precision and promptness of data provision, such as operational procedures for coordination between MET and ATS services in order to optimize the meteorological information exchange.

2.21 Finally, the meeting noted that Dominican Republic maintain the intention to host a Regional Monitoring Agency (RMA) for the CAR Region, which considers as matter of necessity. However, due to priorities, Dominican Republic will present a RMA implementation plan for the CAR Region in 2016.

PBN

2.22 ICAO, in collaboration with IATA and CANSO, organized a Performance-Based Navigation (PBN) Harmonization, Modernization and Implementation Meeting for the Caribbean (CAR) Region in Embraer facilities, Fort Lauderdale, United States, from 28 March to 1 April 2016. The meeting's objective was to harmonize an efficient PBN routes structure and start the implementation process. Based on ANSP proposals, the ICAO CAR and SAM Regional Offices are appropriately coordinating a Proposal for Amendment (PfA) to Doc 8733 — *Air Navigation Plan - Caribbean and South American Regions*, for new PBN routes implementation and to remove conventional routes which are obsolete and inefficient, which will ease a more effective Air Traffic Control (ATC) supply service in the short and medium term. More detailed information is presented in WP/08.

23 Another important outcome of this meeting was coordination between adjacent FIRs in the two regions to reduce the longitudinal distance from 80 to 40 nautical miles for GNSS-equipped aircraft and, in some cases, to 20 nautical miles. This coordination is critical to avoid bottlenecks caused by different longitudinal separations between aircraft being applied by different FIRs, which affect efficiency and increase ATC workload.

2.24 IATA has stated that it intends to sponsor a second inter-regional harmonisation meeting in early 2017, thus offering a forum for CAR/SAM States, users, and other industry stakeholders to harmonise ATFM and PBN procedures as needed to improve efficiency and safety of operations.

2 Suggested action

3.1 The Meeting is invited to:

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

b) analyse inter-regional activities between the CAR and SAM Regions, as shown in section 2 of this working paper; and

c) review any other related issue it may deem appropriate.

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APPENDIX A

FOLLOW UP TO THE IMPLEMENTATION OF THE NEW CIRCUITS IN THE MEVA III REDDIG II INTERCONNECTION

The MEVA TMG/31 Meeting followed-up the implementation of the new circuits requirement in the MEVA III REDDIG II networks as follows:

- The Radar Data sharing circuit between Curaçao–Venezuela has not been explored, even though several teleconferences were conducted in December 2015, concluding that the Maiquetia Area Control Centre (ACC) automated system was to be updated to increase its capabilities for radar processing. In conclusion, this requirement was valid but has not started, awaiting Venezuela´s updates on radar data processing system.

- The circuits for radar data sharing and Aeronautical Message Handling System (AMHS) between Colombia–Panama are still valid. Colombia and Panama are starting the discussion for the operational matters for radar data exchange and AMHS.

- For the SAM AMHS circuits, United States informed that work for the implementation of the Brazil-Atlanta continues. Moreover, coordination with Panama, Peru and Venezuela for the testing and implementation of AMHS was initiated. The first action is a ratification of a bilateral Technical Letter between States identifying agreement and necessary steps that must be completed prior to implementation.

- Regarding the PIARCO-Atlanta AMHS circuit and the Aeronautical Fixed Telecommunication Network (AFTN) Curaçao-PIARCO Data Circuit, Trinidad and Tobago informed on the possible solutions for these circuits achieved by the Ad-hoc Group comprised by Curaçao, Trinidad and Tobago, MEVA TMG Coordinator, COCESNA, Frequentis and ICAO. The technical solutions identified for the PIARCO-Atlanta AMHS contingency circuit path were:

    i. MEVA–REDDIG interconnection in COCESNA for a circuit between PIARCO and Atlanta. COCESNA only serves as a bridge to complete this circuit.

    ii. MEVA–REDDIG interconnection in COCESNA. COCESNA serves to combine PIARCO’s traffic and switch the PIARCO traffic to Atlanta (no dedicated circuit path for Trinidad and Tobago between COCESNA and Atlanta).

- The original AFTN data circuit Curaçao-PIARCO is intended for complying with the Aeronautical Information Management (AIM) Contingency agreement established between Curaçao and PIARCO, commenting that the primary objective of the AIM Contingency Plan (ACP) implementation is to enable the participating States to continue operation in the event of primary site failure. However, another option presented for further consideration and separate from the ACP is the possibility of sending the AMHS traffic from PIARCO to Curaçao to be switched by Curaçao to Atlanta. Finally, Trinidad and Tobago commented that the data flow shall be the connection of the two AIM Systems of Curaçao and Trinidad and Tobago to work continuously for the ACP. The Meeting then considered that this interconnectivity of the systems at the LAN level will

require several Mbits and a separate Virtual Private Network (VPN) through a dedicated link shall be the most appropriate solution. In this regard the requirement of the AFTN Data Circuit was discarded.

- Based on the above mentioned information, the MEVA TMG Meeting agreed on the following conclusion:

CONCLUSION
MEVA TMG/31/6 FOLLOWUP TO IMPLEMENTATION OF MEVA III – REDDIG II INTERCONNECTION CIRCUIT REQUIREMENTS

That, in order to conduct a follow-up of the MEVA III- REDDIG II Interconnection circuits requirements,

a) MEVA Service Provider resolve the problems identified in the PAD equipment;

b) Curaçao, Panama and United States continue the operational/technical coordination with Colombia, Venezuela and the respective SAM States for the implementation of the radar data sharing and AMHS circuits;

c) Trinidad and Tobago and COCESNA follow-up on the cost/technical aspects for deciding the best solution for the implementation of the PIARCO-Atlanta AMHS circuit, including Letter of agreement updates as needed; and

d) the progress and updates to this implementation be reported to the MEVA/TMG/32 meeting, applying the MEVA III additional circuit process.

APPENDIX B

CAR/SAM SEMINAR/WORKSHOP FOR THE IMPLEMENTATION OF ADVANCED SURVEILLANCE AND AUTOMATION SYSTEM

Based on the presentations and discussion, the participants agreed on the following conclusions and recommendations:

General

Surveillance implementations on civil aircraft must be coordinated between users and airspace service providers, and supported by a business case and/or a positive operational assessment.

Airborne equipment requirements must be harmonised and synchronised (standards and timelines) and be based on pragmatic needs in order to deliver feasible benefits to the customers of airspace users.

For air navigation implementation, all CAR/SAM States should follow the Global Air Navigation Plan (GANP), its technological roadmaps, the ICAO ASBU methodology, CAR/SAM regional plans, and align their implementation activities by developing their respective national air navigation plans.

The staff in charge of surveillance and automation system planning should have at their disposal all ICAO documents and annexes published on the topic.

It is recalled that the third meeting of the GREPECAS Programmes and Projects Review Committee formulated Conclusion 3/10 *Drafting of national air navigation plans aligned with the GANP and the regional performance-based implementation plans.* Accordingly, States that had already drafted their national air navigation plans and that were not yet aligned with the Global Plan (Fourth Edition) and the respective regional plans were urged to complete such process, and those States that had not yet drafted their national air navigation plans were urged to start doing so, based on the same considerations.

In order to address the installation of new advanced surveillance systems, the personnel in charge of their installation and maintenance must be properly trained. In this sense, TRAINAIR PLUS member States were invited to develop a standard training package (STP) in the areas of advanced surveillance and automation. Once developed, the STP could be acquired by interested States. Likewise, ICAO was requested to increase this type of activities and to continue collective efforts to help training centres meet these requirements.

AUTOMATION/ AIDC

In order to optimise AIDC implementation, States should consider taking action to mitigate/resolve filed flight plan (FPL) issues. It was recommended that regional efforts be consolidated in order to coordinate mitigation actions between the CAR and SAM Regions.

The importance for States to comply with plans and commitments to implement radar data and flight plan interconnection was recognised.

Close cooperation is required among States in order to achieve the interconnection of automated systems, for instance, the establishment of MoUs, letters of operational agreement, and definition of common aspects to be implemented.

Non-compliance with ICAO procedures on management of flight plans and associated messages results in increased flow of unnecessary messages.

AIDC implementation has shown its advantages in terms of safety and efficiency:

- ✓ significantly reduces the need for oral coordination between ATS units
- ✓ reduces controller workload
- ✓ reduces repetition/readback errors during coordination
- ✓ reduces coordination errors and "controller-to-controller" language barrier issues
- ✓ mitigates LHDs, thus avoiding mid-air collisions
- ✓ greater support to performance-based navigation initiatives and emerging technologies through automation

It recognised the importance of evaluating each operational scenario involving AIDC implementation and management of desirable messages, and subsequently assessing its impact on controller workload and its end results in order to select the most appropriate AIDC ICD for implementation.

The preferred ICD for the CAR and NAM Regions is the NAM ICD, and the PAN ICD for the SAM Region.

AIDC implementation represents the initial phase towards ground-ground integration and FF/ICE implementation.

SURVEILLANCE

Performance-based surveillance helps to identify the best surveillance solution, based on operational requirements.

ADS B and multilateration provide more precision compared to radar.

ADS-B acquisition and maintenance costs are much lower than those required for installing a radar.

ADS-B is an important element that makes it possible to derive the operational benefits of ASBU modules B0 ASUR, SURF, SNET, TBO, etc.

For ADS-B implementation, some established target dates shall be considered, such as 31 December 2018 for this same implementation for the NAM and CAR Regions, and 1 January 2020 for ADS-B out in the United States with DO-260B transponder. States/Territories should expedite the trials, analysis and commissioning of their ADS-B stations.

Support ICAO's position before the ITU WRC, and establish the necessary protection measures for the installation and operation of surveillance systems.

Taking into account the importance of having common situational awareness information, which is achieved by sharing surveillance data, CAR/SAM States/Territories were urged to continue striving to achieve data sharing both at radar and ADS-B system level.

The study, acquisition, installation, validation, and commissioning of advanced surveillance and automation systems require the development of a management process by a group of technical and operational experts. Examples are cited for the validation of these systems, such as those presented by the United States (Order 8200.25 for ADS-B and 8200.1D for different systems, including WAM).