International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)
Eighteenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/18)
(Punta Cana, Dominican Republic, 9 to 14 April 2018)

Agenda Item 4: Regional air navigation planning and implementation performance framework: Review of programmes and projects

4.4 Projects under the ground-ground and air-ground telecommunication infrastructure programme (B0-FICE, B0-TBO)

Follow-up to the implementation of project activities under the Ground-ground and ground-air telecommunication infrastructure programme for the CAR/SAM Regions

(Presented by the Secretariat)

SUMMARY

This working paper presents updated information on the status of implementation of activities under projects *ATN architecture* (D1) and *ATN ground-ground and air-ground applications* (D2) of the *Ground-ground and air-ground communication infrastructure* programme for the CAR/SAM Regions.

References

- Report of the Third meeting of the Programmes and Projects Review Committee (PPRC/3) (Mexico City, 21-23 July 2015);
- Report of the Fourth meeting of the Programmes and Projects Review Committee (PPRC/4) (Lima, Peru, 12-14 July 2016);
- Reports of the SAM Implementation Group meetings/workshops (SAM/IG/18, Lima, Peru, 17-21 October 2016, SAM/IG/19, Lima, Peru, 22-26 May 2017, and SAM/IG/20 Lima, Peru, 16-20 October 2017).
- Report of the MEVA working group meeting, MEVA/TMG/32, Havana, Cuba, 10-12 May 2017.

ICAO strategic objectives:	*A – Safety* *C – Air navigation capacity and efficiency*

1. Introduction

1.1 Regarding the status of implementation of Projects D1 and D2, significant progress was reported at the PPRC/3 meeting, particularly the successful implementation of the new MEVA III and REDDIG II regional networks, which became operational in February-March 2015, as well as the new MEVAIII/REDDIG II interconnection, which became operational in May 2015.

1.2 The PPRC/3 meeting highlighted the satisfactory implementation of eight automated channels between the Central American air control centre (CENAMER) and its adjacent ACCs for AIDC implementation and mitigation of flight plan errors, which resulted in a general reduction of duplicated flight plans by 40.08% with respect to the previous data collection, and the approval of the IPv4 Version 1.1 addressing scheme for the Caribbean. In the SAM Region, the implementation of a new REDDIG II node in Brasilia in April 2016 was highlighted. With this implementation, the REDDIG II already has 17 nodes of a regional mixed satellite- and ground-based digital network fully based on the IP protocol,

operating with high availability (99.99%). The meeting also noted the progress made in the implementation of AMHS interconnections, such as the AMHS operational connection between Brasilia and Lima on 14 December 2015, and fully AMHS connections with the P1 protocol between Brazil-Spain, Argentina–Brazil, Argentina–Peru, Argentina–Venezuela, Argentina-Uruguay, and Peru-Venezuela.

1.3 The PPRC/4 meeting considered that unfortunately, given the broad area coverage of this programme and the limited resources and scarce participation by experts, action taken so far had not been as effective as expected. Accordingly, the meeting agreed to postpone the implementation of project activities.

2. Discussion

2.1 Project activities have been coordinated among project members, the project coordinator and the programme coordinator, mainly through teleconferences and scheduled implementation meetings at each Regional Office.

2.2 The main achievements and difficulties faced in project implementation since the PPRC/4 are described below:

CAR Region

Project D1 – ATN architecture

2.3 At the last MEVA TMG/31 meeting held in Kingston, Jamaica, on 24-26 May 2016, the TMG reviewed and adopted the revised memorandum of understanding between the MEVA III member States/territories/international organisations and the REDDIG II project organisation for coordination and cooperation concerning the MEVA III/ REDDIG II network interconnection.

2.4 During 2016 and part of 2017, an ATS line between the Maiquetia ACC and the San Juan ACC was implemented (August 2016). Additionally, the following connections are scheduled for implementation, some of which are being tested and one is being analysed in terms of its requirements:

- AMHS between Panama and Colombia
- AMHS between Brazil and the FAA
- AMHS between Peru and the FAA
- AMHS between COCESNA and Trinidad and Tobago
- Radar data exchange between COCESNA and Trinidad and Tobago
- AMHS between COCESNA and Colombia.

2.5 Furthermore, the MEVA/TMG working group is studying the possibility for MEVA to provide services, based on a request made by Curacao to carry satellite ADS-B data over the MEVA network. The MEVA/TMG is analysing this requirement and considering the development of a procedure for using the MEVA infrastructure for sending and receiving data from different providers.

Project D2 – ATN ground-ground and air-ground applications

2.6 The progress made in the implementation of AMHS in the NAM/CAR Regions is described below, and shown in Appendix A to this working paper:

Operational AMHS:

a. Dominican Republic
b. Cuba
c. COCESNA
d. Trinidad and Tobago

AMHS under implementation:

a. Aruba
b. Canada
c. Grand Cayman
d. Jamaica
e. Panama
f. Saint Martin (delayed due to the 2017 hurricane season)

2.7 Regarding regional implementation of CPDLC/ADS-C, Central America implemented this connection through a data link connection with SITA, which is being used in the oceanic area of the Central America Pacific since July 2017. In the case of Trinidad and Tobago, they are currently in the process of updating their control centre to resolve some operational deficiencies that had been identified.

SAM Region

Project D1 - ATN architecture

2.8 Activities under project D1 have been fully implemented. Therefore, this project is considered as finalised, complimenting the coordinator and the experts assigned by the States for completing the activities under this project. The REDDIG group monitors the performance of REDDIG II, which is the ATN platform in the SAM Region, plans and implements new nodes and technology updating requirements, analyses the bandwidth and implements new VPNs. To conduct these activities, the REDDIG group holds periodic (quarterly) teleconferences and annual face-to-face technical, operational and administrative meetings.

Project D2 – ATN ground-ground and air-ground applications

2.9 In early 2006, the SAM Region started the installation of AMHS systems, which are currently installed and operational in all the States. The last installation was in Cayenne, French Guiana, in January 2018.

2.10 Since the PPRC/4 meeting, the following AMHS interconnections have been implemented and commissioned:

- Brasilia - Bogotá
- Brasilia - Madrid
- Brasilia - Georgetown
- Brasilia - Caracas
- Brasilia - SITA (Gateway Atlanta)
- Caracas - Bogotá
- Caracas - Lima
- Caracas - Brasilia
- Ezeiza - Brasilia

It should be noted that the AMHS interconnection between Brasilia and Madrid represents the first inter-regional AMHS interconnection in the SAM Region. This last interconnection was implemented through CAFSAT, the AFI/SAM/EUR VSAT network that carries voice and data services to support air navigation in the South Atlantic corridor.

2.11 Likewise, two AMHS centres in the SAM Region (Brasilia and Ezeiza) will be part of the global AMHS interconnection implementation plan with the SITA AMHS gateway. The means of communication has been established between the Brasilia AMHS and the SITA AMHS gateway, and interoperability (IOT) pre-operational (POT) tests have been conducted. Regarding the Ezeiza AMHS and the SITA AMHS gateway, the means of communication has been established, the document for conducting the IOT has been completed, and IOT and POT dates have been coordinated. It is expected that these AMHS COM centres will be operationally connected with the SITA gateway by the end of the first semester of 2018.

2.12 **Appendix A** shows the progress reported and the action taken for the implementation of AMHS interconnections in each CAR/SAM State.

2.13 AIDC implementation activities are being carried out through project C1 on ATM automation, whose progress is shown in WP/10 of this Meeting.

2.14 Regarding activities for the implementation of ground-air data link applications (ADS-C and CPDLC), coordination started in Peru in May 2017 for their implementation, and the AIRCON ATC simulator system was updated to include ADS-C and CPDLC functionalities in the Lima ACC. On 30 May 2017, ADS-C/CPDLC tests with ARINC were carried out successfully on a Santiago-New York LATAM flight. The next step is the hiring of the "Connectivity service for the implementation of ADS-C surveillance and CPDLC communications in the LIMA FIR airspace" through a public bidding process that should be convened this year under the State Procurement Law of Peru. At present, ADSC /CPDLC has been installed and is operational in the SAM Region at the Cayenne ACC (French Guiana), Atlantic ACC (Recife, Brazil), Santiago Oceanic ACC (Chile) and the Comodoro Rivadavia Oceanic ACC (Argentina). The ADS C/CPDLC service of the Montevideo ACC (Uruguay) and the Ezeiza ACC (Oceanico) is in the pre-operational phase.

2.15 **Appendices B** and **C** describe projects under programme D for the CAR/SAM Regions, respectively.

3 Suggested action

3.1 The Meeting is invited to:

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

b) review the status of implementation of project activities under programme D in the CAR/SAM Regions, as described in section 2 and in the Appendices; and

c) review and approve the changes proposed for project D in the CAR/SAM Regions.

APPENDIX A

CURRENT STATE OF IMPLEMENTATION OF AMHS INTERCONNECTION IN THE NAM/CAR REGION

Update: March 2018 CAR Region AMHS Implementation Matrix														
MEVA/TMG Rapporteur: Dulce Roses (FAA)														
Administration	Status	System Description					System implementation milestones				(COM CHART) Connection with	POC	Remarks
		Location of Facility	AMHS Facility Type	AMHS Vendor	Current Facility Type	Current Vendor	AMHS System Procurement Date	AMHS System Implementation Date	AMHS Interoperability Test	AMHS Service Cutover			
Aruba	Implemented	Aruba		Thales							United States	Joselito Andrade	5-2015 In the process of changing AFTN PAD. No projected date for AMHS 12-2016 signed Technical Letter 3-2017 System-System test 7-2017 Completed Transition
Bahamas		Nassau					1Q 2011 Meeting FAA Feb11	Jun 2011	Jun2011 begin testing		United States	Hillard Walker	Q2 2011: will engage an Isode Integrator to provide an AMHS 5-2015 No recent updates 3-2018 No recent updates
Cayman Islands	Implemented	Grand Cayman	MTA + UA	Frequentis	AFTN switch	Frequentis	end 1Q2011	4Q 2014	2Q2015	TBD	United States	Wayne DaCosta	5-2015 System implemented but not operational. Interoperability testing in process 4-16 Testing has been suspended until further notification from Cayman 3-2017 Initiated testing again 10-2017 Completed implementation
Dominican Republic	Implemented	Santo Domingo	AMHS - MTA/UAs	Ubitech	AFTN Switch		already	Jan2011	May 2012	Oct 2013	United States	Fernando Casso	Originally implemented on MEVA II. Successfully transitioned to MEVA III
Cuba	Implemented	La Habana	AMHS - MTA/UAs	ISODE/ In-house	AFTN Switch	Own system	N/A	TBD	2014Q4 - 2015Q2	Mar 2017	United States	Carlos Jimenez Layla Rodriguez Carmen de Armas	3-201 7Parts of the Interoperability Testing performed on MEVA II; testing resumed under MEVA III and completed transition in Mar 2017
Haiti	Under Study	Port-au-Prince	TBD	TBD	AFTN User	DSA	10/15	03/16	05/16	09/16	United States	Emmanuel Jacques	06-15 - Current vendor needs to be verified. Updated system - implementation of milestones 3-2018 no recent updates
COCESNA	System Implemented-	Tegucigalpa	AMHS Gateway	ISODE/ In-house	AFTN Switch	COCESNA	N/A	TBD	TBD	TBD	Belize - MTA	Mayda Avila Oscar Villela	5-15 Testing with FAA on hold, pending notification from COCESNA 3-2017 - COCESNA/US implementation completed
	ready for testing							TBD	TBD	TBD	Guatemala - MTA		
								1Q 2013	1Q 2013	1Q 2013	Managua - MTA		
								TBD	1Q 2013	TBD	Mexico - MTA		
								TBD	TBD	TBD	San Jose - MTA		
								1Q 2013	1Q 2013	1Q 2013	San Pedro Sula - MTA		
								TBD	TBD	TBD	San Salvador - MTA		
								1Q 2011	Jun 2012	Mar 2017	United States		
Jamaica	Establishment of Testing Circuit	Kingston	AMHS G/W	TBD	AFTN Switch	TBD	Q2-2012		Aug 2012	Oct 2012	United States	Derrick Grant	5-15 No updates 4-16 Updating ATN system, Completion projected for end of 2017. 3-2017 Established testing circuit. 3-2018 Continue testing
Mexico	Coordination initiated	Mexico									Centro-America United States		5 - 2015 Initiated coordination with SENEAM 4-16 No updates provided at this time. 1 - 2018 reinitiated coordination for testing.
Curacao	Scheduled for testing	Curacao	AMHS MTA	Ubitech	AMHS System	Ubitech	May 2012	Jul 2012	Sept 2015	Feb 2016	Caracas- MTA	Jean Baptiste Getrouw	5-15 no updates
Trinidad and Tobago	Implemented- for testing	Port-of-Spain	AMHS MTA/UAs/Gateway	Comsoft	AFTN Switch	Comsoft	Apr 2012	Sep 2012	Sep 12	Sep 12	Anguilla	Veronica Ramdath Randy Gomez	5-15 Interoperability testing in process

Update: March 2018 CAR Region AMHS Implementation Matrix														
MEVA/TMG Rapporteur: Dulce Roses (FAA)														
Administration	Status	System Description					System implementation milestones				(COM CHART) Connection with	POC	Remarks	
		Location of Facility	AMHS Facility Type	AMHS Vendor	Current Facility Type	Current Vendor	AMHS System Procurement Date	AMHS System Implementation Date	AMHS Interoperability Test	AMHS Service Cutover				
									Sep 12	Sep 12	Antigua		6-1-15 Testing to continue after MEVA III implementation. FAA to start coordination with TTO the week of 8 June 2015. End-to-end Testing will be coordinated in segments. 4-16 Interoperability testing in progress. 80% completed	
									Sep 12	Sep 12	Barbados-UA			
									Oct 2012		Caracas- MTA			
									Sep 12	Sep 12	Dominica - UA			
									Sep 12	Sep 12	Fort-de-France- UA			
									Sep 12	Sep 12	Georgetown-UA			
									Sep 12	Sep 12	Grenada-UA			
									Sep 12	Sep 12	Montserrat-UA			
									Sep 12	Sep 12	Pointe-a-Pitre- MTA			
									Sep 12	Sep 12	Saint Kitts and Nevis-UA			
									Sep 12	Sep 12	Saint Lucia-UA			
									Sep 12	Sep 12	Saint Vincent-UA			
	In Interoperability								2015Q2	Jan 2017	United States			
Turks and Caicos	Scheduled for testing	Providenciales	MTA	Stonefield Sys	AFTN Term	Stonefield Sys	1Q 2012	2Q 2012	Feb 2013	Mar 2013	United States	Emmanuel Rigby John T. Smith	5 - 2015 No updates 3 - 2018 Waiting for updates	
Sint Maarten	In Interoperability Testing		AMHS MTA	IDS	AFTN Switch		Q1 2014		Q3 2015	Mar 2017	United States	Lloyd Hinds	Completed Mar 2017	
United States		Atlanta	AMHS G/W	U.S.A.	AFTN Switch	U.S.A.	now	now			Aruba	Dulce Roses	5-15 see notes	
											Brazil Caracas			
											Cayman Centro America			
											Curaçao Grand Turk			
											La Habana			
											Kingston			
											Lima Mexico Nassau-S Panama Port-au-Prince			
											Port-of-Spain Saint Maarten Santo Domingo			
											Tortola			

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AMHS INTERCONNECTION REQUIREMENT AND DATE OF IMPLEMENTATION IN THE SAM REGION

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
Argentina	Bolivia	Dec 2018	Pending initial coordination
	Brazil	Apr 2018	Final operational tests for AMHS interconnection between Brasilia and Ezeiza were successfully completed on 18 May 2016. Operational implementation 05/04/2018.
	Chile	Nov 2017	Positive operational tests carried out on mid December 2016. Pending decision from authorities of Argentina and Chile for operational implementation.
	Paraguay	Mar 2012	Implemented and operational
	Peru	Mar 2018	Positive operational tests carried out at the end of 2016. Pending decision from authorities of Argentina and Peru for operational implementation.
	South Africa	Jun 2019	Coordination began on December 2016. Interconnection implementation will be made through CAFSAT. Modernization of CAFSAT node Ezeiza is foreseen by mid-2018.
	Uruguay	Apr 2018	Connectivity in Protocol P1 level between MTA Ezeiza – Montevideo. Operational test foreseen March 2018.
	Venezuela	Apr 2018	Implemented and operational (out of service- failure in AMHS Venezuela) since Dec 2016. Operational since 20 September 2017. Tests foreseen for March 2018.
	SITA (Atlanta)	Apr 2018	Positive connectivity tests carried out. Operation foreseen December 2017.
Bolivia	Argentina	Dec 2018	Pending initial coordination
	Brazil	Sep 2018	Pending initial coordination
	Peru	Jun 2018	IP connectivity between La Paz and Lima MTAs achieved. Failure occurred in MTA La Paz, AASANA will consult Thales.
Brazil	Argentina	Apr 2018	Final operational tests for AMHS interconnection between Brasilia and Ezeiza were successfully completed on 18 May 2016. Operational implementation 05/04/2018.
	Bolivia	Sep 2018	Pending initial coordination
	Colombia	May 2017	Operational May 2017.
	Spain	Dec 2017	Operations scheduled December 2017. AMHS circuit implemented through CAFSAT. To date in pre-operational

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
			phase. For beginning operations, Brasilia AMHS connection is expected - SITA(April 2018)
	United States	Jun 2018	Coordination began between Brazil and United States. Circuit implementation will be made through MEVAIII/REDDIGII.
	Guyana	Sep 2017	Operations in Protocol P1 level begun on 16 December 2016 at 17:00 UTC. On mid-February 2017 returned to AFTN configuration. AMHS tests resume on May 2017. Connection resume on July 2017.
	French Guiana	Dec 2018	Operation of an AMHS (CONSOFT) system is schedule by January 2018. AMHS interconnection scheduled October 2018.
	Paraguay	June 2018	Positive P1 connectivity tests were carried out. Pending operational tests by March 2018.
	Peru	Dec 2015	Implemented and operational 14 December 2015
	Senegal	Dec 2018	Coordination began between Brazil and Senegal (Dec 2016). Interconnection will be made through AFISNET satellite network which Brazilian node was installed in Recife.
	Sita (Atlanta)	Apr 2018	Successful operational and IP interoperability tests carried out in August 2017. Operation foreseen by April 2018
	Suriname	Jun 2018	Entered into operation on 15 Dec 2016 at 17:00 UTC. On mid-February 2017 returned to AFTN configuration. Pending updating of AMHS system by Suriname.
	Uruguay	Apr 2018	IP connectivity completed. (First week October 2016). IP Protocol tests successfully concluded the week of 28 Nov 2016 (30 Nov and 1 Dec). Positive operational tests made in August 2017 and commissioning in April 2018.
	Venezuela	Mar 2018	Positive connectivity in Protocol P1 level between Brasilia and Caracas (Oct 2016). Operational since 20 September 2017. Positive operational tests foreseen February 2018.
Chile	Argentina	Mar 2018	Positive operational tests carried out in mid-December 2016. Pending decision from authorities of Argentina and Chile for operational implementation.

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
	Peru	Dec 2016	Began operations on mid-December 2016.
Colombia	Brazil	May 2017	Operational May 2017.
	Ecuador	June 2018	Successful IP connectivity tests. Pending resume of operational tests.
	Panama	Mar 2018	Circuital interconnection has been configured through MEVA III/REDDIG II (Mid-February 2017). Positive operational tests August 2017. Operational implementation will be carried out once Colombia and Panama contract the AMHS circuit with MEVA III communication provider in MEVAIII/REDDIGII interconnection.
	Peru	Sep 2010	Implemented and operational
	Venezuela	Dec 2017	Operational since 20 September 2017 with new AMHS System. Tests foreseen November 2017.
Ecuador	Colombia	June 2018	IP connectivity tests successfully made. Pending resume of operational tests.
	Peru	Jul 2012	Implemented and operational
	Venezuela	Jun 2018	Operational since 20 September 2017 with new AMHS System. Operational tests with Venezuela carried out in November 2017. Problems in MTA Quito occurred in AMHS messages.
French Guiana (France)	Brazil	Dec 2018	French Guiana has scheduled for January 2018 the commissioning of an AMHS (CONSOFT) system. AMHS interconnection foreseen to begin October 2018.
	Venezuela	Dec 2018	French Guiana has scheduled for January 2018 the commissioning of an AMHS (CONSOFT) system. AMHS interconnection foreseen to begin on October 2018.
Guyana	Brazil	Jul 2017	Began operations on 15 Dec 2017 at 17:00 UTC. At mid-February 2017 returned to AFTN configuration. AMHS tests resumed on May 2017. Operational connection resumed on July 2017.
	Suriname	Jun 2011	Implemented and operational
	Trinidad & Tobago	Dec 2018	Pending coordination
	Venezuela	June 2018	Operational since 20 September 2017 with new AMHS System. Tests foreseen May 2018.

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
Panama	Colombia	Mar 2018	Circuital interconnection has been configured through MEVA III/REDDIG II (mid-February 2017). Positive operational tests made on August 2017. Operational implementation will take place once Colombia and Panama contract AMHS circuit to the MEVA III communications provider in MEVAIII/REDDIGII interconnection.
	United States	Jun 2018	By mid-February 2018 positive operational test were conducted between MTA Panama and MTA Atlanta
Paraguay	Argentina	Mar 2012	Implemented and operational
	Brazil	Jun 2018	IP interconnectivity tests began mid July 2016. Pending of operational tests on March 2018.
Peru	Argentina	March 2018	Positive operational tests carried out at the end of 2016. Pending decision from authorities of Argentina and Chile for operational implementation.
	Bolivia	Jun 2018	Successful IP connectivity between La Paz MTA and Lima MTA. Failure occurred in MTA La Paz, AASANA will consult Thales.
	Brazil	Dec 2015	Implemented 14 December 2015
	Chile	Dec 2016	Entered into operations the second half of Dec 2016.
	Colombia	Sep 2010	Implemented
	Ecuador	Jul 2012	Implemented
	United States	Dec 2018	Initial coordination has begun for the AMHS connection through the MEVAIII/REDDIGII interconnection.
	Venezuela	Dec 2017	Operational since 20 September 2017 with new AMHS System. Tests foreseen October 2017. Operational since December 2017
Suriname	Brazil	Jun 2018	Began operations on 15 Dec 2016 at 17:00 UTC. At mid-February 2017 returned to AFTN configuration. Pending Suriname AMHS system updating.
	Guyana	Jun 2011/Dec 2018	Implemented and operational until last quarter 2017. AMHS problems in Suriname identified. Pending updating.
	Venezuela	Mar 2018	New AMHS system operative in Venezuela since 20 September 2017. Tests and operation shall begin once Suriname updates its AMHS.
Uruguay	Argentina	April 2018	Positive P1 connectivity between Ezeiza and Montevideo achieved. Operational

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
			tests foreseen March 2017.
	Brazil	April 2018	IP connectivity tests completed (first week October 2016) Protocol P1 successfully concluded the week of 28 November 2016 (30 November and 1 December). Positive operational test made on August 2017. Operations foreseen April 2018.
Venezuela	Argentina	Abril 2018	Implemented and operational (out of service- failure in AMHS Venezuela) New AMHS system started operations in Venezuela on 20 September 2017. Tests with Venezuela foreseen March 2018.
	Brazil	Mar 2018	IP Connectivity achieved between Brasilia and Caracas (Oct 2016) New AMHS system started operations in Venezuela on 20 September 2017. Positive tests carried out in February 2018).
	Colombia	Dec 2017	New AMHS system started operations in Venezuela on 20 September 2017. Positive tests carried out in November 2017. Began operation in December 2017.
	Spain	Dec 2018	Pending initial coordination. Interconnection will be made through a communication circuit rented to a local provider. Implementation in progress.
	United States	Dec 2018	Pending initial coordination. AMHS circuit will be implemented through MEVAIII/REDDIGII interconnection.
	Ecuador	Jun 2018	New AMHS system started operations in Venezuela on 20 September 2017. Operational tests with Venezuela carried out in November 2017. Problems with MTA Quito identified in AMHS messages priorities.
	Guyana	Jun 2018	New AMHS system started operations in Venezuela on 20 September 2017. Tests with Venezuela foreseen May 2018.
	French Guiana	Dec 2018	French Guiana has scheduled for January 2018 the commissioning of an AMHS (CONSOFT) system. AMHS interconnection scheduled since October 2018.
	Peru	Dec 2017	New AMHS system started operations in Venezuela on 20 September 2017. Tests foreseen November 2017.
	Suriname	Jun 2018	New AMHS system started operations in Venezuela on 20 September 2017.

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
			Pending operational tests to be made when Suriname updates its AHMS system.
	Trinidad & Tobago	Dec 2018	New AMHS system started operations in Venezuela on 20 September 2017. Initial coordination done.

Green highlighted: AMHS interconnection operative
Light green: almost operational

APPENDIX B

PROJECT ON THE ATN INFRASTRUCTURE IN THE CAR REGION AND ITS GROUND-GROUND AND GROUND-AIR APPLICATIONS

CAR Region	**PROJECT DESCRIPTION (DP)**		**DP N° D**	
Programme	**Project Title**		**Starting Date**	**Ending Date**
Ground-ground and air-ground communications infrastructure (ICAO programme coordinator: Mayda Avila)	ATN infrastructure in the CAR Region and its ground-ground and ground-air applications Project coordinator: Experts contributing to the project:	Dulce Roses (United States) Carlos Jimenez (Cuba) Fernando Casso (Dominican Republic) Roger Perez (COCESNA) Veronica Ramdath/ Randy Gomes (Trinidad and Tobago) ANI/WG MEVA TMG	March 2010	June 2019
Objective	Support the implementation of the ATN network in the CAR Region and its ground-ground and air-ground applications, based on the regional performance objectives of the NAM/CAR performance-based implementation plan (NAM/CAR RPBANIP) and the CAR/SAM ANP CNS Tables 1Ba, 1Bb, and 1Bc.			
Scope	The project scope includes: • an analysis of the existing capacity for CAR networks for ATN implementation • an assessment and definition of technical improvements and/or requirements for ATN implementation • guidelines and recommendations to expedite the implementation of ground-ground (AIDC, AMHS) and air-ground applications, taking into account Doc GOLD			
Metrics	• Percentage of implementation of ATN architecture and routers • Number of AMHS/AIDC applications implemented in the CAR Region • Number of completed guidelines planned for ATN and its applications.			
Strategy	• Project activities were coordinated and will be coordinated through communications amongst the project members, the project coordinator and the programme coordinator, mainly via teleconferences and eventual meetings held during events according to the activities programme, as was the case of the different meetings of the working groups for the implementation in the CAR Region. • The project Coordinator will coordinate with the programme Coordinator, requirements from other projects and information from the NAM/CAR implementation working groups. Additional experts will be incorporated as required for specialized tasks. • The deliverables of this project will be sent to the programme Coordinator for its application in the NAM/CAR implementation groups.			
Goals	With this Project it is expected to support the following implementation goals of the NAM/CAR Regions: NAM/CAR RPBANIP and ASBU-FICE.			
Justification	Support implementation proposing core documentation so States can use it as a reference for the transition, testing, and ATN interconnection and to expedite ATN applications implementation according to the operation benefits expected.			
Related projects	This project is related to the projects of Programme C (Situational Awareness)			

Project Deliverables	Relation with The Regional Plan performance-based (PFF)	Responsible	Status of Implementation[1]	Date of delivery	Comments
Performance assessment of the MEVA II REDDIG interconnection	RPO 6 of NAM/CAR RPBANIP/ ACDM- FICE	Project D		Completed	2014-2015 Successful performance conducted in the MEVA III-REDDIG II Meeting (Aruba 25-26 May 2015)
Technical study of CAR networks for ATN implementation	RPO 6 of NAM/CAR RPBANIP/ ACDM- FICE	Project D		Completed	
Assessment of preliminary test results to determine the required bandwidth for the ATN network in the CAR and SAM Regions	RPO 6 of NAM/CAR RPBANIP/ ACDM- FICE	Project D		Completed	
Study for the configuration of an IP backbone network	RPO 4,5, 6, 7 and 8 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE-DAIM-AMET	Dom. Rep/ COCESNA		Completed	IPv4 Version 1.1 Addressing scheme was proposed for the CAR Region..
Plan for the transition of ATN and its applications in the CAR Region	RPO 4,5, 6, 7 and 8 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE-DAIM-AMET	United States/COCESNA		Nov 2018	

[1] *Grey* *Task not started yet*
Green *Activity being implemented as scheduled*
Yellow *Activity started with some delay, but expected to be implemented on time*
Red *Activity not implemented on time; mitigation measures are required*

Project Deliverables	Relation with The Regional Plan performance-based (PFF)	Responsible	Status of Implementation[1]	Date of delivery	Comments
AMHS addressing plan	RPO 6 of NAM/CAR RPBANIP/ ACDM- FICE	States/ Territories/ International Organisations		Completed	
Plan for the implementation of ATN ground-ground applications (AMHS)		United States/Dom. Rep/ Cuba/ Trinidad and Tobago		Completed	The CAR Regional AMHS Implementation Matrix was updated. With the new MEVA III Network, it is expected the implementation of 2 AMHS circuits for 2015 and two more are being tested.
Plan for the implementation of ATN ground-ground applications (AIDC)	RPO 6 of NAM/CAR RPBANIP/ ACDM- FICE	United States/COCESNA/ Cuba/ Trinidad and Tobago		June 2019	The Regional NAM/CAR Regional AIDC Implementation Plan was updated. An Action Plan template for implementation using the NAM ICD was developed. A comparison of ICD was made as requested by Conclusion GREPECAS 17/9. Evaluation of interfaces for NAM ICD Class II and III to be included in AIDC Regional Plan implementation.
Assessment and recommendations guide for the ATN applications ground-air implementation according to Doc GOLD	RPO 6 of NAM/CAR RPBANIP/ ACDM- FICE	United States/COCESNA/ Trinidad and Tobago		Completed	The CDPLC/ADS-C service was implemented in 2017 in the CA FIR, and in PIARCO it is necessary to update the software of the Trinidad and Tobago Control Centre..
Plan for the transition of ATN ground-air applications	RPO 6 of NAM/CAR RPBANIP/ ACDM- FICE	Project D		June 2019	

[1] *Grey Task not started yet*
Green Activity being implemented as scheduled
Yellow Activity started with some delay, but expected to be implemented on time

Red Activity not implemented on time; mitigation measures are required

Project Deliverables	Relation with The Regional Plan performance-based (PFF)	Responsible	Status of Implementation[2]	Date of delivery	Comments
Assessment of AMHS infrastructure for MET XML	RPO 6 of NAM/CAR RPBANIP/ ACDM- FICE	United States, Dominican Republic, ICAO		June 2018	
Resources needed	Designation of experts and activities execution by the group of experts (WGs).				

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[2] *Grey Task not started yet*
Green Activity being implemented as scheduled
Yellow Activity started with some delay, but expected to be implemented on time
Red Activity not implemented on time; mitigation measures are required

SAM Region	PROJECT DESRICPTION (PD)	PD N° D1	
Programme	**Project Title**	**Starting Date**	**Ending Date**
Ground-ground and Air-ground Telecommunications Infrastructure (*Programme Coordinator: Onofrio Smarrelli)*	ATN Architecture in the SAM Region *Project Coordinator:* *Contributing experts: Omar Gouarnalusse (Argentina), Michel Areno (France), Jose Luis Paredes (Peru), Aldo Pereira (Paraguay), Francisco Almeida (Brazil) and Murilo Albuquerque Loureiro (Brazil)*	May 2010	April 2016
Objective	Study and implementation of optimum architecture for an IP protocol backbone network (REDDIG II) for the SAM Region		
Scope	Study and implementation of an IP backbone network for the SAM Region, including an optimum configuration and considering, among other deliverables, the following: • Technical review of the regional telecommunications networks (ground, satellite or mixed) for the implementation of ATN under a cost-benefit analysis • Holding of trials to determine the ATN bandwidth necessary to support ground applications • IP addressing scheme (IPv4 and IPv6) and analysis of the data communications infrastructure in support to ATS operational requirements in the short, medium and long term • Drafting of a safety guideline for the implementation of IP networks and of a routing policy for the SAM Region • Support in the bidding process by TCB (Montreal) and in the implementation of the IP backbone network for the SAM Region (REDDIG II)		
Metrics	• Drafting of a study for an IP backbone network for the SAM Region (REDDIG II) • Drafting of technical specifications for REDDIG II implementation • Drafting of a safety guideline for the implementation of IP networks and of a routing policy for the SAM Region • REDDIG II implementation phases completed		
Strategy	• All tasks will be conducted by experts nominated by States of the SAM Region members of the project *ATN Architecture in the SAM Region*, under management of the project coordinator, in coordination with the programme coordinator. Communications among project members, as well as between the project coordinator and programme coordinator, shall be carried out through teleconferences and the Internet. In addition, the programme coordinator, together with the project coordinator and the contributing experts, can convene at SAM/IG implementation meetings • Once studies are completed and REDDIG II is implemented, the results will be submitted to the ICAO programme coordinator as a final consolidated document for its analysis, review, approval and presentation at the GREPECAS PPRC		

Goals	• Complete the drafting of a study for an IP backbone network for the SAM Region by October 2010 (completed) • Complete the drafting of technical specifications for REDDIG II implementation by August 2011 (completed) • Complete the drafting of a safety guideline for the implementation of IP networks and of a routing policy for the SAM Region by May 2013 (completed) • Complete the REDDIG II implementation phases by February 2015 (concluded) • Complete the installation of the new REDDIG II node in Brasilia by January 2016 (concluded)
Justification	• Implementation of an ATN IP backbone network for the SAM Region will permit the region having a high availability communications platform meeting current and future (voice and data) services requirements in support of air navigation, thus guaranteeing the required capacity, efficiency and safety. • This project contributes to the implementation of ASBU modules B0 FICE, B0 ASUR, B0 DATM and B0 AMET and SAM PFF CNS 01, CNS04, ATM 05, ATM 06, MET 04 and AIM 02 and ANRF: B0 FICE, B0 ASUR, B0 DATM and B0AMET of the *Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)*
Related Projects	• Automation • Improve ATM Situational Awareness • ATN Ground-ground and Air-ground Applications

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 modules	Responsible	Status of Implementation[3]	Delivery Date	Remarks
Analysis of the current SAM communications network (REDDIG)	PFF SAM CNS 01 and ANRF FICE	REDDIG Administration, Project Coordinator and Omar Gouarnalusse (Argentina)		August 2010	**Completed**
Analysis of the current MEVA II/ REDDIG interconnection	PFF SAM CNS 01 and ANRF FICE	REDDIG Administration		June 2011	**Completed**
Analysis of the AMHS band width impact on the current REDDIG satellite infrastructure	PFF SAM CNS 01 and ANRF B0 FICE	Project Coordinator and Omar Gouarnalusse (Argentina)		September 2010	**Completed**

[3] ***Gray****: Activity has not started*
Green*: Activity has or will deliver planned milestone as scheduled*
Yellow*: Activity is behind schedule on milestone, but still within acceptable parameters to deliver milestone on time*
Red*: Activity has failed to deliver milestone on time, mitigation measures need to be identified and implemented*

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 modules	Responsible	Status of Implementation[3]	Delivery Date	Remarks
Long term applications requirements in the SAM Region	PFF SAM CNS 01 PFF SAM CNS 04 PFF SAM MET 04 PFFs SAM ATM 05 and 06 PFF SAM AIM 02 ANRF B0 FICE ANRF B0 ASUR ANRF B0 DATM ANRF B0 AMET	ICAO		September 2010	**Completed**
Comparative study on satellite, ground and mixed (satellite and ground) IP based network models for the SAM Region	PFF SAM CNS 01 and ANRF FICE	Project Coordinator, Omar Gouarnalusse (Argentina) and REDDIG Administration		October 2010	**Completed** Approved by REDDIG Member States
Definition of ATN IP network infrastructure model for the SAM Region	PFF SAM CNS 01 and ANRF FICE	Project Coordinator, Omar Gouarnalusse (Argentina) and REDDIG Administration		October 2010	**Completed** Approved by REDDIG Member States

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 modules	Responsible	Status of Implementation[3]	Delivery Date	Remarks
Completion of IPv4 addressing plan for the SAM Region	PFF SAM CNS 01 and ANRF FICE	Project Coordinator and Omar Gouarnalusse (Argentina)		August 2010	**Completed** The addressing scheme was approved through GREPECAS Conclusion 16/37
Drafting of technical specifications for REDDIG II	PFF SAM CNS 01 PFF SAM CNS 04 PFF SAM MET 04 PFFs SAM ATM 05 and 06 PFF SAM AIM 02 ANRF B0 FICE ANRF B0 ASUR ANRF B0 DATM ANRF B0 AMET	Project Coordinator, Omar Gouarnalusse (Argentina) and REDDIG Administration		August 2011	**Completed** Approved by REDDIG Member States
Drafting of safety guideline for implementation of IP networks	PFF SAM CNS 01 and ANRF FICE	REDDIG Administration		May 2013	**Completed** Presented and approved at SAM/IG/11 meeting

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 modules	Responsible	Status of Implementation[3]	Delivery Date	Remarks
Drafting of routing policy document for the SAM Region	PFF SAM CNS 01 and ANRF FICE	Project Coordinator		May 2013	**Completed** Presented and approved at SAM/IG/11 meeting
Support in the bidding process and in the offer evaluation	PFF SAM CNS 01 and ANRF 01	Project Coordinator, Omar Gouarnalusse (Argentina), Michel Areno (France), José Luis Paredes (Peru), Aldo Pereira (Paraguay) and REDDIG Administration		April 2012	**Completed**. The bidding was conducted by TCB, under coordination with the ICAO Regional office. The evaluation process will count with the REDDIG Administration and CNS experts selected by the REDDIG Member States
Support in the implementation of REDDIG II	PFF SAM CNS 01 and ANRF 01	REDDIG II Project Administration and REDDIG II focal points		November 2013-April 2016	The provisional acceptance tests (PSAT) were completed on 6 February 2015, entering into operation the new REDDIG II proceeding to deactivate the REDDIG I. Some problems arose during the PSAT that have been solved gradually, and being expected to be completed by end July 2015 The new interconnection MEVA III REDDIG II in Bogota (Colombia), Caracas (Venezuela) and Tegucigalpa (Honduras) was implemented at the end of March 2015. By mid-April 2016 the new node of Brasilia started operations.
Monitor the ATN architecture project activities in the SAM Region		ICAO		March 2010-April 2016	

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 modules	Responsible	Status of Implementation[3]	Delivery Date	Remarks
Resources necessary	Economic contribution necessary for the implementation of REDDIG II				

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APPENDIX C

SAM Region	**PROJECT DESCRIPTION (PD)**	**PD N° D2**	
Programme	**Project Title**	**Starting Date**	**Ending Date**
Ground-ground and Air-ground Telecommunications Infrastructure (*Programme Coordinator: Onofrio Smarrelli)*	ATN Ground-ground and Air-ground Applications in the SAM Region *Project Coordinator: Gustavo Chiri (Argentina)* *Contributing experts: Javier Vittor (Argentina), Ruben Guillermo Silva (Argentina), Andres Jansen (Brazil), Murilo Loureiro (Brazil), Jorge Garcia (Perú) and Pedro Pastrian (Chile)*	May 2010	December 2019
Objective	Develop the implementation of ATN ground-ground and air-ground applications in the SAM Region		
Scope	Implementation of SAM ATN ground-ground and air-ground applications, including, at least: • Operational integration of international AMHS connections in the SAM Region • Operational integration of international AIDC connections in the SAM Region • Guidelines for the implementation of ground-air data in the SAM Region • Guideline for the implementation of AIDC		
Metrics	• Number of AMHS interconnections as stated in the Declaration of Bogota • Drafting of following guidelines: Guideline for the implementation of AIDC / Guideline for the implementation of ground-air data links in terminal, approach and aerodrome areas / DCL, DATIS and DVOLMET / CPDLC service through VDL in the SAM Region		
Strategy	• All tasks will be conducted by experts nominated by States and organizations of the SAM Region members of the project *ATN Ground-ground and Air-ground Applications in the SAM Region, and States of the SAM Region*, under management of the project coordinator, in coordination with the programme coordinator. Communications among Project members, as well as between the Project coordinator and programme coordinator, shall be carried out through teleconferences and the Internet. In addition, the programme coordinator, together with the project coordinator and the contributing experts, can convene at SAM/IG implementation meetings • Once studies are completed, the results will be submitted to the ICAO programme coordinator as a final consolidated document for its analysis, review, approval and presentation at the GREPECAS PPRC		
Goals	• Complete the migration towards the implementation of AMHS interconnection through IP protocol by December 2019 • Complete the drafting of guideline material for the implementation of AIDC; for the installation of ground/air data links in terminal, approach and aerodrome areas; DCL, DATS and DVOLMET; CPDLC service through VDL in the SAM Region by December 2013.		

Justification	• The implementation of ground-ground and air-ground data communications infrastructure will contribute to the reduction of air traffic control incidents, increasing the capacity of the transition of information with regard to the currently analogue based applications • This project contributes to the implementation of the ASBU modules B0 FICE, B0 TBO, B0 AMET and B0 DATM and SAM PFF SAM CNS 01, CNS 02, ATM 05, ATM 06, MET 03, MET 04, AIM 02 and ANRF B0 FICE, B0 TBO, B0 AMET and B0 DATM of the *Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)*
Related Projects	• Automation (systems interconnection) • ATFM • Improve ATM Situational Awareness

Project Deliverables	Relationship with Performance Based Regional Plan (PFF)	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Review of the regional strategy for the implementation of ground-ground and air-ground applications in the SAM Region	PFF SAM CNS 01 CNS 02 ANRF B0 FICE and ANRF B0 TBO	Omar Gouarnalusse (Argentina)		June 2012	An initial review of the strategy was presented at SAM/IG/8 meeting (Lima, Peru, 10-14 October 2011). In July 2012, the Project Coordinator presented a preliminary version of the Guide, which was reviewed by the Programme Coordinator and presented at SAM/IG/10 implementation meeting for its review and approval
Guideline for the use of AIDC with the aim of reducing coordination errors	PFF SAM CNS 01 ATM 06 and ANRF B0 FICE	Javier Vittor (Argentina) Ruben Guillermo Silva (Argentina)		April 2013	**Completed** The guideline was finalized and presented at SAM/IG/11 meeting (13-17 October 2013) and circulated to SAM States for review.
Guideline for the implementation ground-air data links in the SAM Region	PFF SAM CNS 02 ATM 06 and ANRF B0 TBO	Andrés Jansen (Brazil)		October 2013	**Completed** The finalized guideline was presented and approved at SAM/IG/12 meeting

[1] ***Gray**: Activity has not started*
***Green**: Activity has or will deliver planned milestone as scheduled*
***Yellow**: Activity is behind schedule on milestone, but still within acceptable parameters to deliver milestone on time*
***Red**: Activity has failed to deliver milestone on time, mitigation measures need to be identified and implemented*

Project Deliverables	Relationship with Performance Based Regional Plan (PFF)	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Operational integration of AMHS among States	SAM CNS 01 SAM ATM 05 SAM ATM 06 SAM MET 03 SAM MET 04 SAM AIM 02 ANRF B0 FICE ANRF B0 AMET ANRF B0 DATM	States / Project Coordinator / Programme Coordinator		December 2019	Of all the AMHS installed in the Region, the following are interconnected in AMHS (P1 Protocol) Argentina-Brazil (pre-operational), Argentina-Paraguay (operational), Argentina-Peru (pre-operational), Argentina-Uruguay (pre-operational),Colombia-Peru (operational), Ecuador-Peru (operational), Brazil-Peru (operational), Brazil-Spain (operational), Chile-Peru (operational), Brazil-Colombia (operational), Venezuela-Colombia (operational), Venezuela-Peru (operational), Venezuela-Brazil (operational). Further information on Appendix A of this working paper
Monitor the implementation of ATN ground-ground and air-ground applications activities in the SAM Region		ICAO		March 2010-December 2019	
Resources necessary	Implementation of AIDC operational integration by the States of the Region				