PPRC/4 – WP/10 **REV.**

International Civil Aviation Organization 11/07/16

CAR/SAM Planning and Implementation Regional Group (GREPECAS)

Fourth Meeting of the Programmes and Projects Review Committee (PPRC/4)

Lima, Peru, 12 - 14 July 2016

Agenda Item 3: Review of GREPECAS Programmes and Projects

3.3 Projects under the Automation and ATM Situational Awareness Programme (BO-RSEQ, B0-FICE, B0-SNET, B0-ASUR and B0-SURF)

FOLLOW-UP ON CAR/SAM PROJECT C1 (AUTOMATION) AND PROJECT C2 (ATM SITUATIONAL AWARENESS) ACTIVITIES

(Presented by the Secretariat)

SUMMARY

This working paper presents the implementation status of project(s) activities under Programme C: *ATM Automation and Situational Awareness,* the deliverables assigned to these projects and the follow-up to the related regional air navigation implementation targets.

References:

- Report of the Third NAM/CAR Air Navigation Implementation Working Group Meeting (ANI/WG/3) Mexico City, Mexico, from 4 to 6 April 2016
- Report of the Third Meeting of the Programmes and Projects Review Committee (PPRC/3) Mexico City, Mexico, from 21 to 23 July 2015
- Final report of the SAM/IG/16 meeting (Lima, Peru, 19-23 October 2015)
- Final report of the SAM/IG/17 meeting (Lima, Peru, 9-13 May 2016)

ICAO Strategic Objectives:	*A - Safety* *B - Air Navigation Capacity and Efficiency* *E- Environmental Protection*

1. Introduction

1.1 The GREPECAS PPRC/3 Meeting reviewed Programme C: *ATM automation and Situational Awareness: Project C1 - Automation and Improved ATM Situational Awareness for the CAR Region* and *Projects C1 – Automation for the SAM Region and C2 - Improved ATM Situational Awareness* for the SAM Region*;* noting that in spite of some delays, significant progress had been achieved in the programmed deliverables such as:

CAR Region: refer to paragraph 2.2

SAM Region:

- Preoperational AIDC implementation between Lima ACC and Guayaquil ACC, between Guayaquil ACC and Bogota ACC, and between Bogota ACC and Lima ACC were accomplished, 160 controllers from the ACCs of Bogota, Guayaquil, Lima, Panama and Santiago were trained. In this way 20% of the total scheduled *Bogota Declaration* targeted AIDC implementations (15) was achieved
- Interconnection tests have been performed, as well as the operational implementation of some of the interconnections
- Technical/operational considerations Guide for the full MLAT implementation and the action plan for the ADS-B implementation for the SAM Region were developed
- Currently work is being made to elaborate guides that support the improvements on the situational awareness implementation, the elaboration of the orientation guide with technical considerations for supporting the ATFM

1.2 Finally, the GREPECAS PPRC/3 Meeting took note of the difficulties encountered on Automation and improve ATM Situational Awareness, such as the lack of response and Project member's input, and reviewed the relevant completed activities and the pending activities to complete.

2. Discussion

2.1 Project activities were coordinated among project members, the project coordinator, and the programme coordinator mainly through teleconferences and meetings held from time to time in accordance with work programme activities or face-to-face meetings scheduled at the Regional Offices. Similarly, the Project was supported by the CAR implementation groups: North American, Central American and Caribbean Working Group (NACC/WG) and the Air Navigation Implementation Working Group (ANI/WG) and the SAM Implementation Group (SAM/IG). The progress of the projects of automation and improvement of situational awareness for the CAR and SAM Regions since the GREPECAS PPRC/3 meeting are described below:

CAR Region

Automation and Improved ATM Situational Awareness in the CAR Region

Project C - *Automation and Improved ATM Situational Awareness*

2.2 Progress on the planned deliverables has been achieved as follows:

- Flight Plan (FPL) 2012 Converters Table was updated up to April 2016
- Guidelines for FPL duplicated/errors resolution/mitigation were developed. The efforts concentrated on one error at a time including data collection on the duplicate cases between 14 September and 4 October 2015, the results indicated a significant reduction in duplication. Two data collections are planned for 2016. Taking into account the grand total of over 15,000 cases of duplication collected in the previous process last year, the goal for data collection in September will be 8,000 cases of duplication for the whole region in the three week period
- An implementation Action Plan Template using North American Common Interface Control Document (NAM ICD) was developed

- NAM ICD was updated as version E, which serves as the primary guide for the automated data exchange for automated Air Traffic Service (ATS) systems of the NAM/CAR Regions
- Several Air traffic services inter-facility data communication (AIDC) Memorandum of Understanding (MoU) proposals are developed and reviewed. A sample Letter of Agreement (LoA) for automated data exchange between FIRs was developed
- An Interface Control Document (ICD) comparison was developed in accordance with GREPECAS/17/9 Conclusion. The comparison was conducted between the NAM ICD and PAN ICD for the purpose of harmonization, pointing out the differences in applicability and environment between both ICDs
- Analysis of operational scenarios examples were developed for the comprehensive and effective implementation of the appropriate AIDC ICD
- Initial ADS-B Implementation Concept of Operations (CONOPS) developed
- States have progressed in their ADS-B activities as detailed in **Appendix A**
- Development of an ADS-B Automated Data Processing capability Status Table
- A guidance document on ADS-B Station Technical Specification was generated
- A proposal for surveillance system Plan, including ADS-B and Multilateration (MLAT) was delivered
- AIDC operational implementation between United States (Miami) Area control centres (ACCs), Cuba, Mexico and COCESNA, with this, 42.86% of AIDC implementation in the CAR Region has been achieved.

2.3 The results of the AIDC regional target indicated that a total of nine AIDC interface implementations in the CAR Region by December 2016 are expected. The implementation of AIDC in the NAM/CAR Region currently meets the target performance goal of 50%, now at 81.40%. Currently, there are seven implementations in operation, among which CENAMER is considered as one implementation, although internally there are several interfaces between the upper airspace and the approach area of each member State of COCESNA.

2.4 Considering the project scope for the assessment and identification of the main levels of automation, production of guidelines for use of existing capabilities, proposed improvements to automation levels to enhance operations and safety and due to the lack of responses/contributions for some deliverables some activities have been proposed to be adjusted as detailed in **Appendix B**.

2.5 Due to the wide areas covered in this project with a limited resource and shortage of the participations from experts, unfortunately, the actions taken up to date have not been as effective as expected. Therefore, as indicated in Appendix B, an extension of the completion date for this project is proposed.

SAM Region

Project C1 -– Automation

2.6 From the activities carried out by this project since PPRC/3 meeting to date, it should be highlighted the commissioning of the AIDC between Lima AAC and Guayaquil AAC on 21 March 2016, making corresponding amendments in the letter of operational agreement between both ACCs and the signature.

2.7 Currently in pre-operational phase are AACs, Bogota–Panama, Ezeiza–Cordoba, Guayaquil–Bogota and Lima–Bogota. All are expected to be operational by the end of July 2016. In this regard, the amendments to the letters of operational agreements between ACCs where the AIDC is operational phase are ready to be signed.

2.8 Successful AIDC tests have been carried out between Lima AAC and Iquique AAC, Cordoba AAC and Iquique AAC and Amazonica ACC and Lima ACC. Likewise, Brazil reported that considering the recent implementation of new automated systems in Curitiba ACC, Recife ACC, Manaos ACC and Brasila ACC, the implementation of the AIDC will be made according to the following schedule:

Curitiba – Recife	July 2016
Recife – Brasilia	July 2016
Curitiba – Brasilia	July 2016
Curitiba – Amazonica	July 2016
Amazónica – Brasilia	June 2016
Amazónica – Recife	2 May 2016 (Implemented)

2.9 Thus was achieved to date a 33% of the total of AIDC implementations out of 15 foreseen and considered in the *Declaration of Bogota*. An increase of 13% of implementation has been registered since the PPRC/3.

2.10 In order to support the SAM Region States in the implementation of the AIDC, two meetings has been scheduled, the first held from 28 to 30 March 2016, and the second from 26 to 28 September 2016. Two courses have been planned for October 2016 in Asuncion and Curitiba.

2.11 In support of the implementation of the AIDC, two documents have been developed a standard document on the AIDC operation and a document with the procedure for carrying out AIDC tests, both documents were included as an appendix to the orientation guide for the implementation of the AIDC through automated interconnection centres in the SAM Region.

Project C2 – Improve ATM Situational Awareness in the SAM Region

2.12 At the moment, the activities of this project are the elaboration of supporting guides for improvement on the Situational Awareness implementation. The elaboration of the orientation guide with technical considerations for supporting the ATFM implementation is still pending. The project expected its completion by April 2016, but it could not be developed due to the absence of an expert in the Region available for its elaboration. The task has been postponed for November 2016. In this sense, since CRPP/3 meeting the project C2 has not made any advance**.**

2.13 In support to the implementation of advanced surveillance systems in the NAM CAR SAM Regions, as the ADS-B and Multilatertation, a workshop/seminar was carried out in Panama City, from 22 to 25 September 2015. The event was attended by 82 representatives from 18 States from NAR CAR SAM Regions, two international organizations and 12 operators.

2.14 Appendix B describes the projects C for the CAR Region, and **Appendices C** and **D** show the descriptions of each of the projects C1 and C2 of SAM Region, respectively.

3. Suggested Action

3.1 The Meeting is invited to:

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

b) analyze the progress in the implementation of the activities of the projects of Programme C for the CAR and SAM Regions described in section 2 and in Appendices B, C and D with the purpose of approving its planning, progress and execution; and

c) analyze other considerations respectively, as deemed appropriate by the Meeting.

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APPENDIX A

ADS-B activities in the CAR Region

- COCESNA informed on progress made in the implementation of ADS-B to continue its testing from their Cerro de Hula station; statistics collected on capabilities of aircraft equipped with ADS-B in the region, improvement with their Mode S radars and inclusion of the ability of ADS-B to cover the entire continental area. The plans to conduct feasibility studies of Multilateral (MLAT) systems with ADS-B capability were also informed

- Mexico installed 10 ADS-B stations at strategic locations to feed with ADS-B D0-260 and D0-260A data in Cat 21 Asterix ed. 0.26 for the systems in their four (4) existing Area Control Centres (ACCs). This seeks to improve surveillance for ATC in the Valley of Mexico (TMA helicopters and operations), ATC in Monterrey and Merida Airport Terminal Area, redundancy of monitoring at station Puerto Peñasco and surveillance helicopters flying from/to the oil rig in the Gulf of Mexico. This information also included coordination for the ADS-B stations at Cancun Merida and Tampico

- Canada informed the Meeting of their ADS-B operations, including its current network of ground-based surveillance, the safety study regulatory approvals for the provision of services through ADS-B Out, AIP information related to ADS B, reports of anomalies and testing of NAV CANADA satellite link for ADS-B

- Dominican Republic presented their plans for the evaluation and implementation of multilateration and ADS-B in selected airports with three ADS-B receivers

- Cuba presented its progress and lessons learned from the results of the continuation of the ADS-B trials (since late 2014 and early 2015), the development of software for statistical analysis of ADS-B signals; and its plans for a multilateration system at the Varadero airport

- Jamaica has an ADS-B receptor, but no data are being analyzed as it is currently in the planning process to improve its automation system and plans to summarize the data collection and statistical processing at the end of the year

- Trinidad and Tobago presented its ADS-B trial plans, currently supported by only one equipment, which will require its extension to increase coverage with additional receivers

- An overview of their ADS-B implementation in the United States

    - Regulatory Activities - The FAA has conducted a variety of ADS-B-related regulatory activities and has continued activities planned for the future as ADS-B-In avionics standards continue to evolve, such as Advisory Circular (AC) 20-165B and AC 90-114A, Technical Standard Order (TSO) – C195b, and AC 20-172B
    - Surveillance and Broadcast Services Programme for en-route airspace, terminal area airspace, and on airport surfaces
    - Service Delivery Approach and implementation status. Harris is the prime contractor selected by the FAA under a service contract to provide surveillance and broadcast services and the Exelis ground radio

infrastructure receives/transmits messages from either ADS-B Version 1 or 2 avionics

- Gulf of Mexico Expansion Project with *Servicios a la Navegación en el Espacio Aéreo Mexicano* (SENEAM)
- Service Monitoring
- FAA ADS-B development strategy
- Avionics upgrades to ADS-B version 2 avionics
- Equip 2020- to identify and address barriers to equipping with ADS-B Out by January 2020, as required by FAA regulations
- Air Traffic Control (ATC) separation services
- Using ADS-B to enhance ATC separation services to enable ATC separation services in low-altitude, Gulf of Mexico
- ATC Spacing Services (aka, Interval Management, IM) [ICAO ASBU B0-RSEQ]
- Pilot Advisory Services/Pilot Applications
- Oceanic In-Trail Procedures (ITP) [ICAO ASBU B0-OPFL]
- Interval Management (IM) [ICAO ASBU B1-ASEP]
- Traffic Situation Awareness with Alerts
- Flight Trial of Merging and Spacing and Cockpit display of traffic information (CDTI)-Assisted Visual Separation (CAVS)
- ADS-B on Airport Surface Vehicles

- In reference to Decision ADS-B/TF/02/07 - *Development of Selection Criteria to ADS-B Metrics*, related to the development of requirements (criteria) for the definition of the selected airports related to ADS-B metrics, it was confirmed that the use of ADS-B at aerodromes was a surveillance tool for Surface Movement Guidance and Control Systems (SMGCS) and that the requested implementation criteria are defined in Doc 9476 — *Manual of Surface Movement Guidance and Control Systems (SMGCS)* in view that recipients of ADS-B, either alone or combined with Surface Movement Radar (SMR), are part of the elements necessary for the operation of an airport in low visibility conditions. These criteria should be used as a guide for the States when defining in which of their airports ADS-B should be implemented to improve situational awareness on the surface.

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APPENDIX B

PROJECT C
AUTOMATION AND IMPROVED ATM SITUATIONAL AWARENESS IN THE CAR REGION

CAR Region	**PROJECT DESCRIPTION**	**DP N° C**	
Programme	**Title of the Project**	**Start**	**End**
AUTOMATION AND ATM SITUATIONAL AWARENESS (ICAO programme coordinator: Julio Siu)	**AUTOMATION AND IMPROVED ATM SITUATIONAL AWARENESS IN THE CAR REGION** Project coordinator: Carlos M. Jimenez (Cuba) Alejandro Romero (COCESNA) Experts contributing to the project: Carlos Miguel Jimenez, Jorge Centella (Cuba) Julio Cesar Mejia/ Fernando Casso (Dominican Republic) Michael Polchert / Bill Blake(United States) Adriana Mattos (SITA) ANI/WG	October 2011	JuneMay 20186
Objectives	Based on the of the NAM/CAR Regional Performance-Based Air Navigation Implementation Plan (RPBANIP) regional performance objectives: 1. Support NAM/CAR States with implementation of automated systems and interconnection at a regional level 2. Support implementation of situational awareness improvements at CAR Region ATS units		
Scope	The project contemplates the assessment and identification of the main levels of automation, production of guides for use of existing capabilities, proposed improvements to automation levels to enhance operations and safety, development of studies and guidelines for automation and operational use of capabilities to attain these situational awareness improvements, supporting implementation of different applications such as common display of traffic, common display of meteorological conditions, and communications in general.		
Metrics	• Number of States/ANSPs participating in regional automation tests • Number of States/ANSPs implementing ATC automation functionalities between systems • Complete proposals and guidance material for the reduction of operational errors with before and after effective date of implementation guides for the CAR/NAM Region • Number of States/ANSPs reporting a reduction of incidents resulting from implementing improvements in electronic ground and air alerts • Number of States/ANSPs conducting ADS-B data or multilateration trials using the guides developed		
Goals	This Project is expected to support States with operational improvement resulting from the implementation of ATM automation systems: • NAM/CAR RPBANIP ASBU-ASUR Targets • NAM/CAR RPBANIP ASBU-AMET SIGMET Targets • NAM/CAR RPBANIP ASBU-SNET Targets • NAM/CAR RPBANIP ASBU-FICE AIDC Target		

CAR Region	PROJECT DESCRIPTION	DP N° C	
Programme	**Title of the Project**	**Start**	**End**
Strategy	• Project activities will be coordinated and executed amongst project members, the project coordinator, and the programme coordinator mainly through teleconferences and meetings held from time to time in accordance with work programme activities. • The project coordinator will coordinate, as necessary, requirements of other projects and information from the NAM/CAR implementation working group with the programme coordinator. Additional experts will be included based on tasks and specialised work to be conducted.		
Justification	With the emergence of new technologies in ATM automated systems, as well as the standardization of communication protocols, data exchange in ATS units is actually viable in different ways. Available protocols in systems such as OLDI and AIDC allow ATS units to establish automated coordination, improving operational reliability and procedural effectiveness. Likewise, the standardization in processing surveillance data in ASTERIX format allows easy radar data exchange between FIRs. These automated exchanges will result in a significant reduction of ATS incident rates and operational errors. Improving situational awareness facilitates coordination, improves efficiency and safety, and ensures that the different members of the ATM community have the same information when adopting decisions collaboratively.		
Related projects	This project is related to Programme D Project (ATN and its ground-ground and air-ground applications)		

Project Deliverables	Relationship with the regional performance-Objectives (RPO) and ASBU B0 modules	Responsible Party	Status of Implementation[1]	Date of Delivery	Comments
Level of automation existing in the CAR Region	RPO 4 and 6 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE	ICAO - Carlos Jimenez, Cuba		Completed	
Guidance material and considerations for the drafting of automation agreements/ Sample of MoU for automation between States	RPO 4 and 6 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE	Carlos Jiménez, Cuba		~~February 2015~~ Completed	Several MOU proposals are available, ~~but the consolidation of the deliverable is ongoing: August 2015~~ and a sample Letter of Agreement (LoA) for automated data exchange between FIRs was developed.
Proposals or guidelines for improving the operation and performance of flight plan data processing system, and automatic exchange of ATS messages	RPO 4 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO	Alejandro Romero COCESNA		December 2015	FPL 2012 Converters Table update delivered Guides for FPL duplicated/errors resolution/mitigation were developed.
Proposals and guidance on the use and benefits of additional/advanced automation support tools to increase aeronautical information sharing	RPO 4 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO	Bill Blake, United States		~~December 2015~~ June 2018	New date for ~~May~~ June 2018~~2016~~ is proposed due to lack of responses
Monitor the implementation of ATM automation and surveillance data exchange – Progress Report	RPO 4 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO	Alejandro Romero		Completed	
Guidelines for improving electronic ground and airborne alerts	RPO 4 and 6 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE	Carlos Miguel Jimenez, Cuba		~~December 2014~~ February 2018	New date for February 2018~~2016~~ is proposed due to lack of responses

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

Project Deliverables	Relationship with the regional performance-Objectives (RPO) and ASBU B0 modules	Responsible Party	Status of Implementation[1]	Date of Delivery	Comments
Guidelines on the operational implementation of ADS-B and data exchange	RPO 4 and 6 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE	Adriana Mattos, SITA / Michael Polchert , Bill Blake, USA		~~November 2014~~ Completed	• Initial ADS-B Implementation CONOPS available. • Development of an ADS-B Automated Data Processing capability Status Table • A guidance document on ADS-B Station Technical Specification was generated • A proposal for surveillance system Plan, including ADS-B and MLAT was delivered.
Guidance on the use of AIDC to reduce coordination errors	RPO 4 and 6 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE	Julio Cesar Mejia, Dominican Republic		~~December 2014~~ Completed	• Analysis of operational scenarios examples were developed • An implementation Action Plan Template using NAM ICD was developed. • An ICD comparison was developed in accordance to GREPECAS/17/9 conclusion
Analysis of feasibility of implementation of AIDC	RPO 4 and 6 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE	TBD		June 2017	•
Evaluation of the operational benefit of AIDC implementation in NAM/CAR resion. (including Class II and III AIDC message implementation evaluation)	RPO 4 and 6 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE	TBD		June 2017	•
State support on the trials/operational implementation of ADS-B Out	RPO 4 and 6 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE	TBD		June 2018	•
Guidance on the preparation of SIGMETs in graphic format	RPO 4, 6 and 8 of NAM/CAR RPBANIP/ RSEQ-SURF-ASUR-SNET-TBO-ACDM-FICE-AMET	Alejandro Romero, COCESNA		Completed	Graphical support can be observed at the following website: http://apps.cocesna.org/eAIM/servlet/metarview.
Resources needed	• Designation of experts for the execution of the deliverables • Implement required facilities that allow interconnection of automated systems according to the established dates in the elaborated and signed MoU, respectively.				

APPENDIX C

C1 SAM PROJECT DESCRIPTION

SAM Region	**PROJECT DESCRIPTION (DP)**	**PD N° C1**	
Programme	**Project Title**	**Starting Date**	**Ending Date**
Automation and ATM Situational Awareness *(Programme Coordinator: Onofrio Smarrelli)*	Automation *Project Coordinator: Alessander Santoro (Brazil)* *Contributing experts: Omar Gouarnalusse (Argentina), Ruben Silva (Argentina), Murilo Loureiro (Brazil), Jorge Merino (Peru), Johnny Avila (Peru), Mauricio Ferrer (Colombia) and SAM/IG ATM Automation Group*	May 2008	November 2019
Objective	Support States of the SAM Region in the implementation of automated systems, and in their regional interconnection		
Scope	The scope of the project includes the initial drafting of guidelines, trials for the identification of the automation level required at the Region's ATS units in the short and medium term, and the implementation of automation systems and their interconnection through the VSAT based South American digital network (REDDIG)		
Metrics	• Drafting of the following documents: ✓ Guidance document on automated systems requirements at ATS units (SSS) ✓ Guideline for the implementation of integrated automated systems ✓ Action plan for the interconnection of automated systems ✓ Preliminary interface control document (ICD) between systems for the interconnection of ACCs in the SAM Region ✓ Memorandum of Understanding (MoU) model for the interconnection of automated systems • Interconnection of automated systems between adjacent ACCs in the SAM Region: • Reduction in number of operational errors, including LHD 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 *Automation, industry and SAM States*, 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. 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	• Initial drafting of 15 MoU for the interconnection of automated systems 6 MoU period 2009-2013 (implemented) 9 MoU period 2013-2016 • Implementation of the interconnection of automated systems Flight plan (AIDC) 15 AIDC interconnections period 2014-2016 (Declaration of Bogota) • Asterix protocol radar data 8 radar data exchanges using Asterix protocol period 2017-2019 1 radar data exchange owner for 2013 (implemented)
Justification	• The CAR/SAM air traffic control centres have had difficulties in duly coordinating air traffic, an important factor contributing in air traffic incidents. The air traffic control automated centres' interconnection will permit a coordinated automated air traffic for the transfer of responsibilities between CAR/SAM adjacent area control centres, thus reducing the risk in aeronautical incidents generated by undue coordination activities and improving, at the same time, the planning phases for an efficient control of flights from/to corresponding Flight Information Regions (FIR). • The interconnection of automated systems would be facilitated, in view of REDDIG II (SAM VSAT regional network with support terrestrial network MPLS), which has the necessary capability to transport automated systems applications • This project contributes towards the implementation of modules B0 FICE, B0 ASUR and B0 SNET of ASBU Block 0 and the PFF SAM CNS 04, ATM 05, ATM 06, ANRF B084 (ASUR), ANRF B025 (FICE) and ANRF B0 102 (SNET) of the *Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)*
Related Projects	• ATFM • Improve ATM Situational Awareness

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 Modules	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Regional guideline document for the automation level required according to the ATM service provided in airspace and international aerodromes, assessing • operational architecture design, • characteristics and attributes for interoperability, • data bases and software FPL, CPL, CNL, RLA, etc., and • technical requirements.	PFF SAM CNS 04 PFF SAM ATM 05 PFF SAM ATM 06 ANFR B0 ASUR (84) ARFN B0 SNET (102) ANRF BO.FICE(25)	Project Coordinator and ATM Automation Group		Completed June 2011	The System and Subsystem Specifications (SSS) document has been drafted for the identification of automated requirements necessary at ATS units (ACC), and a revision process has been conducted with the support of RLA/06/901 project and SAM/IG ATM Automation Group. Document published in site http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS

[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) and ASBU Block 0 Modules	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Guideline for the integration of automated systems and corresponding action plan	PFF SAM CNS 04 PFF SAM ATM 05 PFF SAM ATM 06 ARFN B0 ASUR (84) ARFN B0 SNET (102)	Project Coordinator and ATM Automation Group		Completed October 2010 Completed May 2012	The following has been drafted: Guideline for the integration of automated systems and revision process. Action plan revision for the integration of automated systems and continuous revision. Both documents drafts with the support of RLA/06/901 project and the SAM/IG ATM Automation Group. Document published in site http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS
Preliminary interface control document (SICD) between systems for the interconnection of ACCs in the SAM Region	PFF SAM CNS 04 PFF SAM ATM 05 PFF SAM ATM 06 ANRF B0 FICE (25) ANRF B0 ASUR (84)	Programme Coordinator, Project Coordinator and ATM Automation Group		Completed October 2008 December 2016	Document ICD drafted. Document elaborated with the support of RLA/98/003 and later, RLA/06/901. Document published in site http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS The ICD document is under updating process and is expected to be completed by mid-December 2016.

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 Modules	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Guidelines for elaboration of Memorandum of Understanding (MoU) for the implementation of the automation system interconnection	PFF SAM CNS 04 ANRF B0 FICE (25) B0 ASUR (84)	Project Coordinator and ATM Automation Group		Completed October 2009	A model MoU for the interconnection of automated systems has been developed, with the support of RLA/06/901 project and SAM/IG ATM Automation Group. The MoU model is published in site http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS
Initial drafting of Memorandum of Understanding (MoU) for the interconnection of automated systems	PFF SAM CNS 04 ARNF B0 FICE(25) ANRF B0 ASUR (84)	SAM States Ruben Silva (Arg) Mauricio Ferrer (Col) Jorge Merino (Col)		April 2016	Six MoU have been drafted during the 2009-2013 period. Nine MoU would be implemented during the 2013-2016 period. No new MoU have been drafted during the 2014-2016 period (up to date)

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 Modules	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Interconnection of automated systems between adjacent ACCs	PFF SAM CNS 04 PFF SAM ATM 05 PFF SAM ATM 06 ANRF B0 FICE (25) B0 ASUR (84)	SAM States		December 2016	AIDC interconnections were implemented between: ACC Bogota – ACC Guayaquil ACC Bogota – ACC Lima ACC Lima – ACC Bogota ACC Bogota – ACC Panama ACC Ezeiza – ACC Cordoba ACC Lima – ACC Iquique ACC Cordoba – ACC Iquique ACC Amazonico – ACC Lima AIDC between ACCs Bogota and Lima are in operational phase since 31 March 2016. AIDC between ACCs Bogota-Guayaquil, Bogota-Lima, Bogota-Lima, Bogota-Panama and Cordoba-Ezeiza are in operational phase. AIDC between ACCs Lima-Iquique, Cordoba-Iquique, Amazonico-Lima are still under operational tests. For the operation of the AIDC, from 2015 to date five AIDC practical courses for controllers have been delivered in Chile, Colombia, Ecuador, Panama and Peru. Around 180 controllers were trained. A practical course on AIDC has been scheduled for October 2016 in Asuncion and Curitiba.

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 Modules	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Radar data exchange using Asterix protocol	FFPP SAM CNS04 PFF SAM ATM 05	SAM States	Pending begining	2017-2019	The implementation of the radar data exchange using Asterix Protocol 62-63 hasn't been possible yet given that the majority radar data processing systems of the Region do not allow the fusion of surveillance systems with such protocols. The implementation of interconnection of radar data using Asterix Protocol 1, 2, 34 and 48 has not been possible since some States do not allow send signal radar with these protocols, therefore the implementation of interconnection was postponed for the period 2017-2019.
Monitor implementation progress of automation activities in the SAM Region		Programme Coordinator and Project Coordinator		May 2008 – November 2016	
Resources necessary	Implement facilities required by SAM States permitting the interconnection of automated systems in accordance with the dates established in the MoUs drafted and signed to this end				

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APPENDIX D

C2 SAM PROJECT DESCRIPTION

SAM Region	**PROJECT DESCRIPTION (PD)**	**PD N° C2**	
Programme	**Project Title**	**Starting Date**	**Ending Date**
ATM Automation and Situational Awareness *(Programme Coordinator: Onofrio Smarrelli*)	Improve ATM Situational Awareness in the SAM Region *Project Coordinator: Paulo Vila (Peru)* *Contributing experts: José Rubira, Marcos Vidal and Jorge Otiniano (Peru); Javier Vittor (Argentina), Ivan Salas (Ecuador)*	October 2011	November 2016
Objective	Develop guidelines supporting the implementation of improvements in the situational awareness of ATS units in the South American Region		
Scope	Guidelines supporting the implementation of various applications, such as common traffic visualization, common meteorological conditions visualization and communications in general • Analysis of the current surveillance infrastructure and identification of necessary improvements to support en route and terminal airspaces, airspace classification, PBN and ATFM • Implementation of ADS-B, ADS-c and/or MLAT surveillance systems at selected airspaces • Minimum common electronic information and data bases required in support of decision-making process and alert systems towards an interoperable situational awareness among centralized ATFM units • Implement flight plan data process systems (new FPL format) and data communications tools among ACC´s • Implement advanced automation support tools to contribute towards the sharing of aeronautical information		
Metrics	Drafting of following documents: • Regional surveillance strategy for the implementation of systems in support of improvement of situational awareness – revised • Evaluation of the surveillance systems coverage in the SAM Region - completed • Guideline on technical/operational considerations for ADS-B implementation – completed • Guideline on technical/operational considerations for MLAT implementation - completed • Guideline on technical considerations in support of ATFM implementation – completed • Guideline for the presentation of MET products in graphic format – completed • Action plan for ADS-B implementation 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 *Improve ATM situational awareness in the SAM Region*, under management of the project coordinator. Communications among project members, as well as between the project coordinator and programme coordinator, shall be carried out through teleconferences and the Internet. • 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	• Regional surveillance strategy for the implementation of systems in support to situational awareness improvement for July 2012 (completed) • Guideline on technical/operational considerations for ADS-B implementation for October 2012 (completed) • Guideline for the drafting of SIGMET in graphic format (December 2013) (completed) • Guideline for technical/operational considerations for MLAT implementation for March 2015 (completed) • Guideline for technical considerations in support of ATFM implementation (By May 2016) • Action plan for ADS-B implementation in the SAM Region (November 2014) (completed)
Justification	• Improve situational awareness has been identified as a great support for ATM, contributing in the increase of safety and in flight efficiency • In addition, a close relationship with the other programmes and their respective projects is necessary, with the aim of collecting the operational requirements demanded by the mentioned applications and their respective tentative implementation dates • This project contributes to the implementation of modules B0 ASUR, B0 SURV, B0 NOPS and B0 AMET of the *Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)*
Related Projects	• Air Navigation Systems in Support of PBN • Automation • ATFM • ATN Ground-ground and Air-ground Applications

Project Deliverables	Relationship with Performance Based Regional Plan aligned with ASBU	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Evaluation of surveillance infrastructure and identification of surveillance systems improvements					
Evaluation of surveillance systems coverage in the SAM Region	PFF SAM CNS 04 ANRF B0 ASUR	Paulo Vila (Peru)		Completed October 2012	The evaluation of coverage was carried out in connected to the drafting activities of the Guideline on technical/operational considerations for ADS-B implementation. The results are presented as Appendix A to the Guideline and can be downloaded from site http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS
Drafting of regional plan for ADS-B and MLAT implementation					
Guideline on technical/ operational considerations for ADS-B implementation	PFF SAM CNS 04 ANRF B0 ASUR	José Rubira (Peru) Marco Vidal (Peru)		Completed October 2012	The Guideline was approved for use in the interested States of the SAM Region, by the Eleventh Workshop/Meeting of the SAM Implementation group (SAM/IG/11) held in Lima from 13 to 17 May 2013 and can be downloaded from the following website http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS
Guideline on technical/ operational considerations for MLAT implementation	PFF SAM CNS 04 ANRF B0 ASUR	Ivan Salas (Ecuador)		Completed October 2015	The Guideline was presented in the Fifteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/15) held in Lima from 11 to 15 May 2015 for initial review and was circulated to all SAM Region States. The final approval is foreseen for the Sixteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/16) to be held in Lima from 19 to 23 October 2015.

[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 aligned with ASBU	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Guideline on technical considerations in support of ATFM implementation	PFF SAM ATM 05 B0 NOPS	Pending designation		November 2016	The guideline will be supported with the CAR/SAM ATFM Manual approved through GREPECAS Conclusion 16/35.
Guideline for the presentation of MET products in graphical format	PFF SAM MET 03 ANRF B0 AMET	Jorge Otiniano (Peru)		Completed October 2014	The document guideline was delivered to the Secretariat (MET) of SAM Region for its review by the corresponding meteorology specialists. The Guideline was review by the OPMET information exchange Meeting of SAM Region (27 – 29 October 2014) and will be used as guideline for the implementation of SIGMET graphic in Argentina, Chile, Ecuador, Paraguay and Peru by the second half of 2015 sponsored by the technical cooperation regional project RLA/06/901.
Action plan for ADS-B implementation in SAM Region	ANRF B0 ASUR	Paulo Vila (Peru)		Completed November 2014	The action plan for the regional implementation of the ADS B was presented an approved in the Fourteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/14) Lima, Peru, from 10 to 14 November 2014. The document can be downloaded from the following website as part of the final report of the SAM/IG/14 (Appendix C, Agenda Item 7) http://www.icao.int/SAM/Pages/MeetingsDocumentation.aspx?m=2014-SAMIG14
Monitoring activities for the implementation of improvement to the ATM Situational Awareness in the SAM Region		Programme Coordinator and Project Coordinator		October 2011 November 2016	
Resources necessary	Experts in the carrying out of the deliverables				

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