



**Agenda Item 3: Review of the 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 AUTOMATION AND ATM SITUATIONAL AWARENESS PROJECT ACTIVITIES**

(Presented by the Secretariat)

<b>SUMMARY</b>	
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 regional targets to whom they contribute.	
<b>REFERENCES</b>	
<ul style="list-style-type: none"> <li>• Seventeenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/17) (Cochabamba, Bolivia (Plurinational State of), 21 to 25 July 2014)</li> <li>• SAM Implementation Group Meeting (SAM IG 14) Final Report (Lima, Peru, 10 to 14 November 2015)</li> <li>• SAM Implementation Group Meeting (SAM IG 15) Final Report (Lima, Peru, 11 to 15 May 2015)</li> <li>• Second NAM/CAR Air Navigation Implementation Working Group Meeting (ANI/WG/2), Puntarenas, Costa Rica, 1 to 4 June 2015</li> </ul>	
<i>Strategic Objectives:</i>	A- Safety C - Air Navigation Capacity and Efficiency E - Environmental Protection

**1. Introduction**

1.1 The GREPECAS/17 Meeting reviewed the Programme C activities implementation progress since the PPRC/2 Meeting, highlighting its objectives to support optimization of existing automation capabilities, interoperation and increased automation levels, situational awareness implementation in air traffic services (ATS) units; highlighting:

- The completion of tasks under Project C3: Implementation of the new ICAO flight plan (FPL) form
- Changes to Programme C, such as: a) in the CAR Region, merging of tasks and deliverables of Projects C1, *Interoperability of automated systems in the CAR Region*, and C2, *Improve ATM situational awareness*, into a single project entitled Project C, *Automation and improved ATM situational awareness*; and b) the addition in the project description document of a field to define Project goals
- Pursuant to Conclusion *PPRC 2/5*, follow-up of, and action taken with respect to, the recommendations of the Twelfth Air Navigation Conference (AN-Conf/12).

1.2 Similarly, the GREPECAS/17 Meeting took note that the activities and dates of Projects C had been adjusted, taking into account

- The updating of regional implementation plans (SAM RPBIP and NAM/CAR RPBANIP)
- The establishment of the Bogota and Port-of-Spain Declarations
- The restructuring of the CAR implementation groups into the NAM/CAR Air Navigation Implementation Working Group (ANI/WG)

1.3 Finally, the GREPECAS/17 Meeting took note of the deliverables achieved by each Project, the relevant completed activities and the pending activities to complete.

## 2. Discussion

2.1 Project activities have been 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 (NACC/WG and ANI/WG) and the SAM Implementation Group (SAM IG) mechanism. The progress of the projects of automation and improvement of situational awareness of CAR and SAM regions from GREPECAS/17 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 Considering the project scope for 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 and the absence and due to the lack of responses/ contributions for some deliverables; some activities have been proposed to be adjusted as detailed in **Appendix B**.

2.3 Despite some delays, significant progress in the planned deliverables have been achieved:

- FPL 2012 Converters Table update delivered
- Guides for FPL duplicated/errors resolution/mitigation were developed.
- An implementation Action Plan Template using NAM ICD was developed.
- Several AIDC MOU proposals are developed and reviewed, but the consolidation of the deliverable is ongoing: August 2015
- An ICD comparison was developed in accordance to GREPECAS/17/9 conclusion
- Analysis of operational scenarios examples were developed for the comprehensive and effective implementation of the appropriate AIDC ICD
- Initial ADS-B Implementation Operational Concept (CONOPS) developed
- 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.

2.4 This Project coordinates its activities and deliverables with Project D of the CAR Region.

2.5 Regarding the RPBANIP targets, particularly the ASBU modules ASUR, SNET, FICE, the progress is still being assessed with the support of the ANI/WG in their success criteria, having only available the AIDC implementation Phase I (FPL messages- CPL and LAM):

AIDC Implementation <small>(Port of Spain target)</small>	81.82% ACCs NAM/CAR	50% of FIRs within which all applicable ACCs have implemented at least one interface to use AIDC/OLDI with a neighbouring ACC by December 2016
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## SAM Region

### *Project C1 - Automation*

2.6 From the activities accomplished by this Project, the preoperational AIDC implementation between Lima ACC and Guayaquil ACC, Guayaquil ACC and Bogota ACC and Bogota ACC and Lima ACC are highlighted. Similarly, Controllers from the ACCs of Bogota, Guayaquil, Lima, Panama and Santiago were trained with hands-on AIDC courses. The total number of trained controllers was 160.

2.7 In this way a 20% of the total scheduled *Bogota Declaration* targeted AIDC implementations (15) was achieved. The main accomplished activities are detailed in **Appendix A** to this paper. During GREPECAS/17 meeting progress in AIDC trials was reported, but no AIDC implementation.

2.8 With respect to the activities related to the implementation of the new MoU for new system interconnections implementation, there has not been any progress respectively since GREPECAS/17, but this has not impede the progress on interconnection tests implementation, as well as the operational implementation of any of these. Therefore, the Project considered that elaboration of new MoUs will be only made for interested States. The States' commitment on system interconnections implementation is stated on the *Bogota Declaration*.

*Proyecto C2 – Mejoras a la comprensión situacional ATM en la Región SAM*

2.9 Regarding the activities conducted under this project, the drafting of the *Guideline on Technical/Operational considerations for the implementation of MLAT* and the *Action plan for the ADS-B implementation in SAM Region* should be noted.

2.10 The *Guideline on Technical/Operational considerations for the implementation of MLAT* was presented in the SAM/IG/15 Meeting and was distributed to all the SAM Region States for its review. The guide was elaborated by a specialist from Ecuador, result from his experience in an MLAT installation in Ecuador. This guide aims to provide basic information on general matters on aeronautical surveillance systems for the Air Traffic Control (ATC), particularly, the Multilateration system (MLAT) and considerations for its implementation. The guide consists of three parts, the first one presents a summary on the surveillance topic, the second describes the MLAT system characteristics and the third one presents technical and operational considerations for the multilateration system implementation.

2.11 The corresponding activities to this project are currently the elaboration of guides that support the improvements 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. During GREPECAS/17 no progress in the drafting of guidance material was reported.

2.12 Taking into account that the project developed an action plan for the ADS-B implementation, a new project for the ADS-B implementation in the SAM Region will be developed and will be presented at the next meeting of the CRPP.

2.13 **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 Program 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

### C1 SAM Project

#### Implementation of automated systems interconnection

The implementation of automated systems interconnection between adjacent ACCs consists of the exchange of radar and flight data information (AIDC). Due to the difficulties encountered to implement the interconnection of radar data, such as the proper management of the radar information since much of this included civil and military information, the use of common communications protocols and the technical capacity for radar integration in most ACCs, being necessary the support of the manufacturer, initially it was considered only the implantation of the AIDC.

In this regard, the Coordinator of the programme of automation and ATM situational awareness in connection with the Coordinator of the ATM automation project and ATM automation group, during the SAM/IG/12 meeting considered that the interconnection AIDC did not represent a problem for States in terms of meeting implantation dates, rescheduling the activities of implementation of automated systems to 2016 with only the AIDC.

In this context, the SAM Region States that have installed the AIDC, had committed through the Declaration of Bogota for the implementation of 15 AIDC interconnections by end of 2016.

Considering the high incidence of coordination errors between the SAM Region ACCs on the Pacific coast and taking into account that the implementation of the AIDC messages exchange between these centers would mitigate the coordination errors, the project considered the implementation of the AIDC between ACC Santiago - ACC Lima, ACC Lima – ACC Guayaquil, ACC Guayaquil - ACC Bogota, ACC Bogota - ACC Lima and ACC Bogota - ACC Panama as a priority. In this regard during the SAM/IG/14 meeting the project established an action plan for the implementation of the above-mentioned interconnections with the support of the technical cooperation project RLA/06/901. The action plan is presented as Annex of this Appendix, and was included in the GANT of C1 SAM Project.

Since GREPECAS/17 meeting to date, the AIDC interconnection between ACC Lima – AAC Guayaquil, ACC Lima – ACC Bogota, ACC Guayaquil – ACC Bogota was accomplished. At this time the AIDC between these ACCs is in pre-operational phase and the migration to the operational phase has been set for August 3, 2015.

For the operation of the AIDC and thanks to the support of project RLA/06/901, practical AIDC courses have been delivered in Chile, Peru, Ecuador, Colombia and Panama. These AIDC practical courses had duration of one week in each State and 160 controllers were trained.

For the coordination of the AIDC implementation activities between the aforementioned AACs, from March 2015 the project has been carrying out teleconferences twice a month. Chart of operational agreements has been amended for those States that have the AIDC in pre operational phase.

In this way the project considers that to date there has been a significant progress in the implementation of the AIDC, achieving 20% of all of the AIDC interconnections. For the remaining period of the second half of 2015, is expected to have AIDC in operational phase between Bogotá and Panama and Chile Peru whose preliminary tests and training have been completed.

To comply with the requirements of the Declaration of Bogota, it is essential that the aeronautical authorities of the SAM Region States involved in the implementation of the AIDC systems interconnection, enable their designated staff for the implementation of this activity, especially focal points, to carry out their duties within the time specified in the working plans as well as provide the required resources.

Regarding the advantages of the AIDC implementation in the reduction of coordination errors, no results has been obtained yet. The first results are expected by the end of 2015. The measurement used has been the number of LHD reported.

It should be noted that as a result of the practical training to controllers, they have took note on the usefulness of this service for the notification, coordination and transfer of flight between adjacent ACC and its contribution to the safety increasing.

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## ANNEX TO APPENDIX A

## PLAN OF ACTIVITIES FOR INITIAL AIDC IMPLEMENTATION

	Start	End	Responsible party	Status
<b>1. Establishment of initial activities for completing the technical implementation of AIDC</b>	<b>10/10/2014</b>	<b>16/10/2014</b>	<b>ICAO</b>	<b>Completed</b>
<p>1.1 Based on the results of AIDC tests conducted from February 2014 to June 2014, the technical documentation of the automated systems installed in the Region, and the SAM AIDC implementation guide, develop:</p> <p>1.1.1 Plan of activities to complete technical feasibility tests for AIDC interconnection between:</p> <p style="padding-left: 20px;">Santiago ACC - Lima ACC</p> <p style="padding-left: 20px;">Guayaquil ACC - Lima ACC</p> <p style="padding-left: 20px;">Bogota ACC - Guayaquil ACC</p> <p>1.1.2 Contents of AIDC course for ATS controllers and programmers of AIDC automated system databases, to be conducted in Chile, Colombia, Ecuador and Peru.</p>	10/10	16/10	ICAO	<p>The initial plan of activities for AIDC implementation is scheduled for 2015. The plan of activities contemplates the conduction of AIDC courses for air traffic controllers working at ACCs and the operational implementation of AIDC between adjacent ACCs.</p> <p>These activities will be conducted in Chile, Colombia, Ecuador and Peru.</p> <p>Interconnection tests between the Lima and Bogota ACCs were added to the list shown in paragraph 1.1.1.</p>
<b>2. Review of activities at the SAM/IG/14 meeting</b>	<b>09/10</b>	<b>13/11</b>	<b>ICAO and SAM/IG</b>	<b>Completed</b> The SAM/14 reviewed and approved the plan of activities for AIDC implementation
2.1 Submission of the plan of activities and contents of the AIDC course at the SAM/IG/14 meeting	09/10	13/11	ICAO	
2.2 Review and approval for submission at the Eighth Coordination Meeting of Project RLA/06/901.	09/10	13/11	SAM/IG	
<b>3. Approval of activities by the RCC/8 meeting</b>	<b>25/02/15</b>	<b>27/02/15</b>	<b>RLA/06/901 member States</b>	<b>Completed</b> The RCC/8 meeting held in

	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Status</b>
3.1 Submission of activities, with their respective cost, for approval.	25/02/15	27/02/15	RLA/06/901 member States	Lima on 25-27 February 2015 approved the activities for initial implementation of AIDC interconnection in Chile, Colombia, Ecuador and Peru.
<b>4. Search and selection of experts</b>	<b>24/11/14</b>	<b>28/01/15</b>	<b>ICAO</b>	<b>Completed</b>
4.1 Search and selection of 4 experts from SAM States participating in Project RLA/06/901, with experience in the installation, operation and programming of AIDC databases, to perform the activities listed in item 1.	24/11/14	28/01/15	ICAO	For the performance of the initial activities, three SAM experts with experience in database programming and operation of ACC automated systems were selected: <b>Rubén Silva of Argentina, Mauricio Ferrer of Colombia, and Jorge Merino of Peru.</b>
<b>5. Missions to complete AIDC interconnection between States that started tests during the first semester of 2014</b>	<b>06/04/15</b>	<b>01/05/15</b>	<b>3 automation experts ICAO</b>	<b>Completed</b> Missions were conducted for training purposes and to complete tests for AIDC interconnection and operation <b>Chile 6/4 to 10/4 2015</b> <b>Peru 13/4 to 17/4 2015</b> <b>Ecuador 20/4 to 24/4 2015</b> <b>Colombia 27/4 to 1/5/2015</b>
5.1 Mission to Santiago de Chile	13/04/15	17/04/15	3 automation experts ICAO	<b>Completed</b> Implementation of AIDC activities at the Santiago ACC <ul style="list-style-type: none"> <li>• AIDC practical course</li> <li>• AIDC interconnection tests</li> </ul>

	Start	End	Responsible party	Status
				between: <i>Santiago ACC and Lima ACC</i>
5.1.1 Complete AIDC technical implementation between the Santiago and Lima ACCs	13/04/15	17/04/15	3 automation experts ICAO	Two-way communication was established in the AIDC interconnection tests between the Thales Topssky system of the Santiago ACC and the INDRA Aircor 2100 of the Lima ACC. For the operational interconnection, certain actions need to be taken as listed in Appendix B to this working paper.  The practical course on AIDC and database programming was conducted, providing training to 16 controllers of the Santiago ACC and 2 aeronautical technicians.
5.1.2 Conduct AIDC course for ATS personnel of the Santiago ACC	13/04/15	17/04/15		
5.2 Mission to Lima:	13/04/15	17/04/15	3 automation experts	<b>Completed</b> Implementation of AIDC activities in the Lima ACC <ul style="list-style-type: none"> <li>• AIDC practical course</li> <li>• AIDC interconnection tests between:                             <ul style="list-style-type: none"> <li><i>Lima ACC - Santiago ACC</i></li> <li><i>Lima ACC - Guayaquil ACC</i></li> <li><i>Lima ACC - Bogota ACC</i></li> </ul> </li> </ul>
5.2.1 Conduct AIDC course for ATS personnel of the Lima ACC	13/04/15	17/04/15	3 Automation experts	The practical course on AIDC and database programming

	Start	End	Responsible party	Status
			ICAO	was conducted, providing training to 44 controllers of the Lima ACC.
5.2.2 Complete AIDC tests between the Lima ACC and the Guayaquil ACC	13/04/15	17/04/15		AIDC tests between the Lima and Guayaquil ACCs were successfully conducted.
5.2.3 Complete AIDC tests between the Lima ACC and the Bogota ACC	13/04/15	17/04/15		AIDC tests between the Lima and Bogota ACCs were successfully conducted.
5.3 Mission to Guayaquil	20/04/15	24/04/15	3 Automation experts of the SAM Region	<b>Completed</b> Implementation of AIDC activities at the Guayaquil ACC <ul style="list-style-type: none"> <li>• Practical course on AIDC</li> <li>• AIDC interconnection tests and pre-operational implementation:</li> </ul> Guayaquil ACC - Lima ACC Guayaquil ACC- Bogota ACC
5.3.1 Complete AIDC technical implementation between the Guayaquil ACC and the Lima ACC	20/04/15	24/04/15	3 automation experts of the SAM Region	AIDC technical interconnection was completed, currently in the pre-operational phase.
5.3.2 Complete AIDC technical implementation between the Guayaquil ACC and the Bogota ACC	20/04/15	24/04/15		AIDC technical interconnection was completed, currently in the pre-operational phase
5.3.3 Conduct AIDC course for ATS personnel of the Guayaquil ACC	20/04/15	24/04/15		The practical course on AIDC and database programming was conducted, providing training to 31 controllers of the Guayaquil ACC.

	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Status</b>
5.4 <i>Mission to Bogota</i>	27/04/15	01/05/15	3 automation experts	<b>Completed</b> Implementation of AIDC activities in the Bogota ACC <ul style="list-style-type: none"> <li>• Practical course on AIDC</li> <li>• AIDC interconnection tests and pre-operational implementation:</li> </ul> <i>Guayaquil ACC - Lima ACC</i> <i>Guayaquil ACC - Bogota ACC</i>
5.4.1 Complete AIDC technical implementation between the Bogota ACC and the Guayaquil ACC	27/04/15	01/05/15	3 automation experts of the SAM Region	The AIDC technical interconnection was completed, currently in pre-operational phase
5.4.2 Complete AIDC technical implementation between the Bogota ACC and the Lima ACC	27/04/15	01/05/15		The AIDC technical interconnection was completed, currently in pre-operational phase
5.4.3 Conduct AIDC course for ATS personnel of the Bogota ACC	13/04/15	17/04/15		The practical course on AIDC and database programming was conducted, providing training to 35 controllers of the Bogota ACC.
<b>6. First meeting of the AIDC operational implementation working group during the SAMIG/15 meeting</b>	<b>11/05/15</b>	<b>15/05/15</b>	<b>RLA/06/90 member States</b>	
6.1 It is proposed that, as a matter of priority, the SAM/IG/15 meeting do the follow-up of AIDC implementation. Accordingly, the AIDC operational implementation working group will hold its first meeting.	11/05/15	15/05/15	RLA/06/901 member States	<b>Completed</b> As a result of AIDC technical implementation, the SAM/IG/15 established a group of activities to migrate from the pre-operational phase to the operational between the ACC Bogota, Guayaquil and

	Start	End	Responsible party	Status
				Lima. Additionally the AIDC messages to be used were defined.
<b>7- AIDC operational implementation</b>	<b>18/05/15</b>	<b>31/12/15</b>	Involved States	
7.1 Definition of the parameters of the AIDC database for the to AID operational interconnection between Colombia, Ecuador and Peru	25/05/15	29/5715	Involved States	
7.2 Amend letter of operational agreement to include the AIDC for the coordination between the ACC Lima with AAC Bogota, ACC Bogota with ACC Guayaquil and ACC Lima with ACC Guayaquil	15/06/15	30/06/15	Involved States	
7.3 Teleconferences to coordinate and follow-up the migration from the AIDC pre-operational phase to the operational for Colombia, Ecuador and Peru		03/06/15 12/06/15 24/06/15 15/07/15 15/08/15 16/09/15 02/10/15	Involved States ICAO	
7.4 Complete courses for the ACC Lima and Guayaquil, Bogotá ATS staff as well as staff ARO/AIS	18/05/15	30/09/15	Involved States	
7.5 Start of AIDC operational implementation  Guayaquil ACC - Lima ACC  Bogota ACC - Guayaquil ACC  Lima ACC - Bogota ACC  Lima ACC – Santiago ACC*	18/05/15	31/12/15  03/08/15  03/08/15  03/08/15  31/12/15	States involved	Updating of letter of operational agreement, to include AIDC messages to be used. Establishment of a pre-operational period, completing training for the rest of ATS personnel. Operational implementation. *AIDC operational

	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Status</b>
				implementation between Chile and Peru to take place between Antofagasta and the Lima ACCs once the automated system in Antofagasta is operative.
<b>8. Other AIDC implementations</b>  <b>Bogota ACC - Panama ACC</b> <b>Ezeiza ACC - Santiago ACC</b> <b>Ezeiza ACC - Montevideo ACC</b> <b>Resistencia ACC - Asunción ACC</b>	<b>18/05/15</b>	<b>30/06/16</b>	States involved	<p>AIDC course – Panama, 22 to 26 June 2015.</p> <p>AIDC interconnection tests between Bogota and Panama, June 2015. Pre-operational phase 29 June to 30 September.</p> <p>AIDC tests between Ezeiza and Santiago, May-June 2015.</p> <p>AIDC tests between Ezeiza and Montevideo August 2015. Pre-operational September-November 2015. Operational December 2015.</p> <p>AIDC course – Paraguay, April 2016.</p> <p>AIDC tests Ezeiza Asuncion June 2016.</p> <p>AIDC tests between Resistencia and Asunción – June 2016.</p>
<b>9. Workshop on implementation of ATM automation, ADS B, and multilateration</b>	<b>21/09/15</b>	<b>24/09/15</b>	ICAO	CAR/SAM workshop The implementation of inter-

	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Status</b>
				regional AIDC interconnections will be analysed at this workshop (1 scholarship per State is required).
<b>10. Second meeting of the AIDC operational implementation working group during SAMIG/16</b>	<b>19/10/15</b>	<b>23/10/15</b>	ICAO	
10.1 It is proposed, as a matter of priority, the SAM/IG/16 meeting do the follow-up of AIDC implementation. Accordingly, the second meeting of the AIDC operational implementation working group will be held.	<b>19/10/15</b>	<b>23/10/15</b>	ICAO	Follow-up of operational implementation and programming of activities for operational implementation in 2016.

**PROJECT C**

**AUTOMATION AND IMPROVED ATM SITUATIONAL AWARENESS IN THE CAR REGION**

CAR Region	PROJECT DESCRIPTION	DPN° C	
<i>Programme</i>	Title of the Project	Start	End
<p align="center">AUTOMATION AND ATM SITUATIONAL AWARENESS</p> <p align="center">(ICAO programme coordinator: Julio Siu)</p>	<p align="center"><b>AUTOMATION AND IMPROVED ATM SITUATIONAL AWARENESS IN THE CAR REGION</b></p> <p>Project coordinator: Carlos M. Jimenez (Cuba) Alejandro Romero (COCESNA)</p> <p>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</p>	<p align="center">October 2011</p>	<p align="center">May 2016</p>
<p align="center"><b>Objectives</b></p>	<p>Based on the of the NAM/CAR Regional Performance-Based Air Navigation Implementation Plan (RPBANIP) regional performance objectives:</p> <ol style="list-style-type: none"> <li>1. Support NAM/CAR States with implementation of automated systems and interconnection at a regional level</li> <li>2. Support implementation of situational awareness improvements at CAR Region ATS units</li> </ol>		
<p align="center"><b>Scope</b></p>	<p>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.</p>		
<p align="center"><b>Metrics</b></p>	<ul style="list-style-type: none"> <li>• Number of States/ANSPs participating in regional automation tests</li> <li>• Number of States/ANSPs implementing ATC automation functionalities between systems</li> <li>• 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</li> <li>• Number of States/ANSPs reporting a reduction of incidents resulting from implementing improvements in electronic ground and air alerts</li> <li>• Number of States/ANSPs conducting ADS-B data or multilateration trials using the guides developed</li> </ul>		
<p align="center"><b>Goals</b></p>	<p>This Project is expected to support States with operational improvement resulting from the implementation of ATM automation systems:</p> <ul style="list-style-type: none"> <li>• NAM/CAR RPBANIP ASBU-ASUR Targets</li> <li>• NAM/CAR RPBANIP ASBU-AMET SIGMET Targets</li> <li>• NAM/CAR RPBANIP ASBU-SNET Targets</li> <li>• NAM/CAR RPBANIP ASBU-FICE AIDC Target</li> </ul>		

CAR Region	PROJECT DESCRIPTION		DPN° C	
<i>Programme</i>	Title of the Project		Start	End
<b>Strategy</b>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>			
<b>Justification</b>	<p>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.</p> <p>Likewise, the standardization in processing surveillance data in ASTERIX format allows easy radar data exchange between FIRs.</p> <p>These automated exchanges will result in a significant reduction of ATS incident rates and operational errors.</p> <p>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.</p>			
<b>Related projects</b>	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 <sup>1</sup>	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	Green	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	Yellow	February 2015	Several MOU proposals are available, but the consolidation of the deliverable is ongoing: August 2015
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	Green	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	Yellow	December 2015	New date for May 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	Green	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	Yellow	December 2014	New date for February 2016 is proposed due to lack of responses

<sup>1</sup> 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 <sup>1</sup>	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	<ul style="list-style-type: none"> <li>Initial ADS-B Implementation CONOPS available.</li> <li>Development of an ADS-B Automated Data Processing capability Status Table</li> <li>A guidance document on ADS-B Station Technical Specification was generated</li> <li>A proposal for surveillance system Plan, including ADS-B and MLAT was delivered.</li> </ul>
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	<ul style="list-style-type: none"> <li>Analysis of operational scenarios examples were developed</li> <li>An implementation Action Plan Template using NAM ICD was developed.</li> <li>An ICD comparison was developed in accordance to GREPECAS/17/9 conclusion</li> </ul>
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: <a href="http://apps.cocesna.org/eAIM/servlet/metarview">http://apps.cocesna.org/eAIM/servlet/metarview</a> .
<b>Resources needed</b>	<ul style="list-style-type: none"> <li>Designation of experts for the execution of the deliverables</li> <li>Implement required facilities that allow interconnection of automated systems according to the established dates in the elaborated and signed MoU, respectively.</li> </ul>				

## 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  <i>Project Coordinator: Alessander Santoro (Brazil)</i> <i>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</i>	May 2008	November 2016
<b>Objective</b>	Support States of the SAM Region in the implementation of automated systems, and in their regional interconnection		
<b>Scope</b>	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)		
<b>Metrics</b>	<ul style="list-style-type: none"> <li>• Drafting of the following documents: <ul style="list-style-type: none"> <li>✓ Guidance document on automated systems requirements at ATS units (SSS)</li> <li>✓ Guideline for the implementation of integrated automated systems</li> <li>✓ Action plan for the interconnection of automated systems</li> <li>✓ Preliminary interface control document (ICD) between systems for the interconnection of ACCs in the SAM Region</li> <li>✓ Memorandum of Understanding (MoU) model for the interconnection of automated systems</li> </ul> </li> <li>• Interconnection of automated systems between adjacent ACCs in the SAM Region:</li> <li>• Reduction in number of operational errors, including LHD in the SAM Region</li> </ul>		
<b>Strategy</b>	<ul style="list-style-type: none"> <li>• All tasks will be conducted by experts nominated by States and organizations of the SAM Region members of the Project <i>Automation, industry and SAM States</i>, 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</li> <li>• 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</li> </ul>		

<b>goals</b>	<ul style="list-style-type: none"><li>• Initial drafting of 15 MoU for the interconnection of automated systems 6 MoU period 2009-2013 (implemented) 9 MoU period 2013-2016</li><li>• Implementation of the interconnection of automated systems Flight plan (AIDC) 15 AIDC interconnections period 2014-2016 (Declaration of Bogota)</li><li>• Asterix protocol radar data 8 radar data exchanges using Asterix protocol period 2011-2016 1 radar data exchange owner for 2013 (implemented)</li></ul>
<b>Justification</b>	<ul style="list-style-type: none"><li>• 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).</li><li>• 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</li><li>• 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 <i>Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)</i></li></ul>
<b>Related Projects</b>	<ul style="list-style-type: none"><li>• ATFM</li><li>• Improve ATM Situational Awareness</li></ul>

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 Modules	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
Regional guideline document for the automation level required according to the ATM service provided in airspace and international aerodromes, assessing <ul style="list-style-type: none"> <li>operational architecture design,</li> <li>characteristics and attributes for interoperability,</li> <li>data bases and software FPL, CPL, CNL, RLA, etc., and</li> <li>technical requirements.</li> </ul>	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 <a href="http://www.icao.int/SAM/Pages/eDocuments/Display.aspx?area=CNS">http://www.icao.int/SAM/Pages/eDocuments/Display.aspx?area=CNS</a>

<sup>1</sup> **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 <sup>1</sup>	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 <a href="http://www.icao.int/SAM/Pages/eDocuments/Display.aspx?area=CNS">http://www.icao.int/SAM/Pages/eDocuments/Display.aspx?area=CNS</a>

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 Modules	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
<p>Preliminary interface control document (SICD) between systems for the interconnection of ACCs in the SAM Region</p>	<p>PFF SAM CNS 04 PFF SAM ATM 05 PFF SAM ATM 06 ANRF B0 FICE (25) ANRF B0 ASUR (84)</p>	<p>Programme Coordinator, Project Coordinator and ATM Automation Group</p>		<p>Completed October 2008  December 2015</p>	<p>Document ICD drafted. Document elaborated with the support of RLA/98/003 and later, RLA/06/901. Document published in site <a href="http://www.icao.int/SAM/Pages/eDocuments/Display.aspx?area=CNS">http://www.icao.int/SAM/Pages/eDocuments/Display.aspx?area=CNS</a> The ICD document is under updating process and is expected to be completed by mid-December 2015.</p>
<p>Guidelines for elaboration of Memorandum of Understanding (MoU) for the implementation of the automation system interconnection</p>	<p>PFF SAM CNS 04 ANRF B0 FICE (25) B0 ASUR (84)</p>	<p>Project Coordinator and ATM Automation Group</p>		<p>Completed October 2009</p>	<p>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 <a href="http://www.icao.int/SAM/Pages/eDocuments/Display.aspx?area=CNS">http://www.icao.int/SAM/Pages/eDocuments/Display.aspx?area=CNS</a></p>

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 Modules	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
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 2014-2015 period (up to date)
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  AIDC between ACCs above, are under pre-operational phase until 3 August 2015, when preoperational phase is expected.  For the AIDC Operation, during 2015 five AIDC practical courses for controllers have been delivered in Chile, Colombia, Ecuador, Panama and Peru. Around 180 controllers were trained. Successful AIDC interconnection tests were conducted between the AAC Lima and AAC Santiago. To complete operational test, some updating are pending in the automation System of Santiago which is expected to be completed in July 2015.

Project Deliverables	Relationship with Performance Based Regional Plan (PFF) and ASBU Block 0 Modules	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
Monitor implementation progress of automation activities in the SAM Region		Programme Coordinator and Project Coordinator		May 2008 – June 2016	<p>AIDC operational interconnection between ACC Bogota and ACC Panama, ACC Arica and ACC Lima and ACC Cordoba with ACC Santiago are expected to be implemented by the second half of 2015.</p> <p>By 2016 it is expected to implement the 9 AIDC interconnection to complete the amount of AIDC interconnection set in the Declaration of Bogota.</p>
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 <i>(Programme Coordinator: Onofrio Smarrelli)</i>	<p>Improve ATM Situational Awareness in the SAM Region</p> <p><i>Project Coordinator: Paulo Vila (Peru)</i></p> <p><i>Contributing experts: José Rubira, Marcos Vidal and Jorge Otiniano (Peru); Javier Vittor (Argentina), Ivan Salas (Ecuador)</i></p>	October 2011	May 2016
<b>Objective</b>	Develop guidelines supporting the implementation of improvements in the situational awareness of ATS units in the South American Region		
<b>Scope</b>	<p>Guidelines supporting the implementation of various applications, such as common traffic visualization, common meteorological conditions visualization and communications in general</p> <ul style="list-style-type: none"> <li>• Analysis of the current surveillance infrastructure and identification of necessary improvements to support en route and terminal airspaces, airspace classification, PBN and ATFM</li> <li>• Implementation of ADS-B, ADS-c and/or MLAT surveillance systems at selected airspaces</li> <li>• 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</li> <li>• Implement flight plan data process systems (new FPL format) and data communications tools among ACC's</li> <li>• Implement advanced automation support tools to contribute towards the sharing of aeronautical information</li> </ul>		
<b>Metrics</b>	<p>Drafting of following documents:</p> <ul style="list-style-type: none"> <li>• Regional surveillance strategy for the implementation of systems in support of improvement of situational awareness – revised</li> <li>• Evaluation of the surveillance systems coverage in the SAM Region - completed</li> <li>• Guideline on technical/operational considerations for ADS-B implementation – completed</li> <li>• Guideline on technical/operational considerations for MLAT implementation - completed</li> <li>• Guideline on technical considerations in support of ATFM implementation – completed</li> <li>• Guideline for the presentation of MET products in graphic format – completed</li> <li>• Action plan for ADS-B implementation in the SAM Region</li> </ul>		

<b>Strategy</b>	<ul style="list-style-type: none"> <li>• All tasks will be conducted by experts nominated by States and organizations of the SAM Region members of the Project <i>Improve ATM situational awareness in the SAM Region</i>, 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.</li> <li>• 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</li> </ul>
<b>Goals</b>	<ul style="list-style-type: none"> <li>• Regional surveillance strategy for the implementation of systems in support to situational awareness improvement for July 2012 (completed)</li> <li>• Guideline on technical/operational considerations for ADS-B implementation for October 2012 (completed)</li> <li>• Guideline for the drafting of SIGMET in graphic format (December 2013) (completed)</li> <li>• Guideline for technical/operational considerations for MLAT implementation for March 2015 (completed)</li> <li>• Guideline for technical considerations in support of ATFM implementation (By May 2016)</li> <li>• Action plan for ADS-B implementation in the SAM Region (November 2014) (completed)</li> </ul>
<b>Justification</b>	<ul style="list-style-type: none"> <li>• Improve situational awareness has been identified as a great support for ATM, contributing in the increase of safety and in flight efficiency</li> <li>• 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</li> <li>• This project contributes to the implementation of modules B0 ASUR, B0 SURV, B0 NOPS and B0 AMET of the <i>Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)</i></li> </ul>
<b>Related Projects</b>	<ul style="list-style-type: none"> <li>• Air Navigation Systems in Support of PBN</li> <li>• Automation</li> <li>• ATFM</li> <li>• ATN Ground-ground and Air-ground Applications</li> </ul>

Project Deliverables	Relationship with Performance Based Regional Plan aligned with ASBU	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
<i>Evaluation of surveillance infrastructure and identification of surveillance systems improvements</i>					
Evaluation of surveillance systems coverage in the SAM Region	PFF SAM CNS 04 ANRF B0 ASUR	Paulo Vila (Peru)		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 <a href="http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS">http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS</a>
<i>Drafting of regional plan for ADS-B and MLAT implementation</i>					
Guideline on technical/operational considerations for ADS-B implementation	PFF SAM CNS 04  ANRF  B0 ASUR	José Rubira (Peru) Marco Vidal (Peru)		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 <a href="http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS">http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS</a>
Guideline on technical/operational considerations for MLAT implementation	PFF SAM CNS 04  ANRF  B0 ASUR	Ivan Salas (Ecuador)		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.

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Project Deliverables	Relationship with Performance Based Regional Plan aligned with ASBU	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
Guideline on technical considerations in support of ATFM implementation	PFF SAM ATM 05  B0 NOPS	Pending designation		May 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)		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- <a href="http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS">http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS</a>
Action plan for ADS-B implementation in SAM Region	ANRF B0 ASUR	Paulo Vila (Peru)		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 website
Resources necessary	Experts in the carrying out of the deliverables				