Agenda Item 5: Operational implementation of new ATM automated systems and integration of the existing systems

Follow-up to the implementation of AIDC interconnection in the SAM Region

(Presented by the Secretariat)

SUMMARY

This working paper presents information on the progress made in the implementation of AIDC interconnection, as an activity of the GREPECAS ATM automation project, and an implementation priority for the Bogota Declaration.

REFERENCES

- Final report of the Eighth Meeting of the Coordination Committee of Project RLA/06/901 (Lima, Peru, 25-27 February 2015)
- Report of the Fourteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/14) (Lima, Peru, 10-14 November 2014)

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

1 Introduction

1.1 The SAM/IG14 meeting reviewed a plan of activities for the implementation of the AIDC interconnection in the SAM Region, starting with some States on the Pacific coast (Chile, Colombia, Ecuador and Peru), and considered that it should be submitted to the approval of the Eighth Coordination Meeting of Project RLA/06/901 (RCC/8). Accordingly, it formulated conclusion *SAM/IG/14-16 Approval of the 2015 Plan of Activities for AIDC implementation*.

1.2 The Eighth Meeting of the Coordination Committee of Project RLA/06/901, upon analysing the 2015 plan of activities, approved the resources required for the conduction of AIDC activities foreseen for 2015 (Final report of SAM/IG/14, Appendix B to Agenda Item 7).

2 Discussion

2.1 The approval by the RCC/8 meeting of AIDC activities to be conducted from 6 April to 1 May 2015, was the starting point for initial AIDC implementation activities, consisting of practical courses for air traffic controllers on AIDC operation and database programming in automated systems for AIDC, and implementation of the AIDC interconnection between the following ACCs:

Bogotá - Lima
Bogotá - Guayaquil
Guayaquil - Lima
Lima – Santiago

2.2 AIDC activities conducted from 6 April to 1 May 2015 were possible thanks to the work of three ATM automation experts from Argentina, Colombia and Peru, with broad experience in the programming of ACC automated system databases and in AIDC operation in their respective countries.

2.3 As a result of training activities, practical courses on AIDC were conducted in Chile, Colombia, Ecuador and Peru, providing training to a total of 129 air controllers.

2.4 Course participants received theoretical information on AIDC, ICAO documents, the ASIA/PAC AIDC ICD, the SAM AIDC implementation guide, and manufacturers' manuals. The participants also conducted practical exercises on AIDC operations in the automated systems installed at the Santiago, Bogotá, Guayaquil, and Lima ACCs, and exercises on database configuration for AIDC.

2.5 In order for course participants to take advantage of the AIDC practical operational exercises, they were divided in groups of 10 people. **Appendix A** to this working paper contains the schedule, activities and content of the AIDC course that was conducted.

2.6 In addition to training activities, the automation experts, with the support of the local technical and operational personnel, successfully completed the AIDC interconnection tests between the Lima and Guayaquil ACCs, between the Bogota and Guayaquil ACCs, between the Bogota and Lima ACCs, and between the Santiago and Lima ACCs.

2.7 AIDC tests between the aforementioned locations started on the first half of 2014, obtaining partial results with one-way AIDC operation. The conclusions derived from these initial tests and the local tests conducted between 6 April and 1 May resulted in successful completion of AIDC tests.

2.8 During AIDC tests, the minimum set of AIDC messages contemplated in the SAM AIDC implementation guide was used. The AIDC interconnection was implemented through the existing AMHS and AFTN circuits, using the new South American digital network, REDDIG II. More information on AIDC activities and on the recommendations emanating from the tests performed is shown in **Appendix B** to this working paper.

2.9 Based on the positive results of AIDC tests, AIDC is being applied between the ACCs listed in paragraph 2.6 on a pre-operational basis, except for the Santiago and Lima ACCs, which require completion of some of the actions described in Appendix B.

2.10 The analysis of AIDC operational implementation is considered to be a priority for this SAM/IG Meeting. Accordingly, the RCC/8 agreed that one of the two fellowships assigned to Project RLA/06/901 member States for the SAM/IG/14 meeting should be assigned to a State expert in ATM automated system programming and operation. In this regard, it is expected that this Meeting will define the AIDC operational phase for those AIDC interconnections that are still in the pre-operational phase, defining whether migration will be fully automated or semi-automated (automatic and manual AIDC), which set of AIDC messages of the minimum set of AIDC messages contemplated in the SAM AIDC implementation guide should be used, AIDC message activation times and parameters, and other related aspects.

2.11 The aforementioned analysis should be conducted by a group of ATM automation experts and ATM operational personnel. **Appendix C** to this paper contains the timetable of activities for AIDC implementation, in which the AIDC operational phase between the ACCs listed in paragraph 2.6 is scheduled between May and December 2015.

2.12 In support of the work of the ad-hoc group for the definition of implementation requirements for the AIDC operational phase, **Appendix D** contains an analysis of AIDC technical and operational requirements, carried out by automation experts based on the results of the missions and the SAM AIDC implementation guide.

2.13 With the AIDC operational implementation between adjacent ACCs of Peru, Colombia, and Ecuador, an additional 20% of the 15 AIDC interconnections contemplated in the Bogota Declaration is achieved.

2.14 The timetable of AIDC implementation activities in the SAM Region shown in Appendix C contemplates the implementation of new AIDC interconnections between Bogota ACC and Panama ACC, between Ezeiza ACC and Santiago ACC, and between the Montevideo and Resistencia ACCs and the Asunción ACC, in the period between May 2015 and June 2016.

2.15 The updated list of focal points for coordinating AIDC activities is shown again in **Appendix E** to this working paper.

3 Suggested action

3.1 The Meeting is invited to:

a) Take note of the information presented herein;

b) analyse the results of AIDC activities described in section 2 and the corresponding appendices;

c) update the list of focal points shown in Appendix E to this working paper;

d) analyse the timetable of activities for AIDC implementation shown in Appendix C to this working paper;

e) establish an ad-hoc group to define AIDC operational requirements; and

f) discuss other related aspects it may deem appropriate.

APPENDIX A

AGENDA OF THE COURSE

Time	Day 1 *Group 1 (DATABASE)*	Day 2 *Group 1 (DATABASE)*	Day 3 *Group 1 (CONTROLLERS)*	Day 4 *Group 2 (CONTROLLERS)*	Day 5 *Group 3 (CONTROLLERS)*
09:00 to 10:30	*Registration of participants* **Opening of the course** Introduction to AIDC	Practice – AIDC database configuration	Chs. 10 and 11 and Appendix 6 to Doc 4444 Regional AIDC ICDs (ASIA PAC and SAM) SAM AIDC implementation guide (Operational part)	Practice – AIDC operation	Practice – AIDC operation
Coffee break					
11:00 to 12:30	Chs. 10 and 11 and Appendix 6 to Doc 4444 Regional AIDC ICDs (ASIA PAC and SAM) SAM AIDC implementation guide (Operational part)	Practice – AIDC database configuration	Practice – AIDC operation	Practice – AIDC operation	**Closing of the course**
Lunch break					
13:30 a 15:00	AIDC in AIRCON 2100 AIDC database configuration	Practice – AIDC database configuration	Practice – AIDC operation	Practice – AIDC operation	

APPENDIX B

DESCRIPTION OF AIDC ACTIVITIES IN CHILE, PERU, ECUADOR, AND COLOMBIA

MISSION TO CHILE FROM 6 TO 10 APRIL 2015

On 6-10 April 2015, the Practical Course on ATS Interfacility Data Communication (AIDC) Operations was conducted at the premises of the Santiago ACC for air traffic controllers. The course was conducted by Mr. Rubén Silva of Argentina, with the support of Messrs. Mauricio Ferrer of Colombia and Jorge Merino of Peru.

Training was provided to 16 air traffic controllers and 2 aeronautical technicians on the use of AIDC for coordination between control centres using data link, and to the administrators of automated systems on database configuration. The list of participants is **attached** to this Appendix.

Results of AIDC tests between SCEL and SPIM

The automated systems (AIDC) of the SPIM and SCEL ACCs were successfully connected through the AFTN circuit between the two locations, using the new REDDIG II network as the means of communication. The following AFTN addresses were used to establish communication between the two locations:

- SCELZRZY (Santiago ACC)
- SPIMAIDC (Lima ACC)

The automated systems that were interconnected were the THALES TOPSKY installed at the Santiago ACC and the INDRA Aircon 2100 installed at the Lima ACC.

The AIDC coordination tests conducted in the SPIM-SCEL direction were successful in general terms, since messages arrive complete and are accepted and processed by the TOPSKY system in Santiago de Chile. The following difficulties were observed:

1. The Aircon 2100 system in Lima does not include FPL Box 18 in the ABI message. Consequently, when the FPL does not exist in the addressee and is created based on the ABI, the FPL in the TOPSKY system must be manually corrected by the controller, inserting the data corresponding to aircraft equipage in Box 18 (PBN, NAV), so that it may be processed by the system.

2. There were cases in which the FPL was transmitted with an incomplete route beyond the point following COP in the Lima FIR. The ABI message thus transmitted is processed and creates the FPL in the TOPSKY system. However, it goes to the erroneous message queue and requires manual intervention of the controller for FPL processing.

AIDC coordination tests in the SCEL-SPIM direction were not successful. It was found that the TOPSKY system in Santiago de Chile has the following issues concerning AIDC:

1. When the routes defined in box 15 of the FPL do not explicitly contain the corresponding COP, the ABI message is transmitted with a format error (error in box 15), where the name of the COP and the corresponding route appear with no spacing in the text of the message.

2. *The* CRC generated by this system is not compatible with the other systems (does not use the XModem method). This generates rejection (LRM) by the Aircon 2100 system in Lima due to invalid CRC (error code 61). Consequently, messages are not processed.

3. As to the reception of AIDC messages, the TOPSKY system generates a massive message rejection problem (LRM) due to message sequence error (error code 65) when, for some reason, system hot reset is required and the numeric sequence of messages is interrupted and restarted. This prevents subsequent AIDC coordination, requiring a cold start of the TOPSKY system to solve the problem.

4. The FPL is not activated with the reception of an EST message or with the transmission of the corresponding ACP. FPL activation occurs with the reception of a TOC message.

5. The transmission of ACP messages is automatic, with no possibility of configuring it for manual operation. It is recommended that the controller generate ACP messages manually through the AIDC dialogue.

6. The TOPSKY system makes it very difficult for the controller to view pending coordination and respond to AIDC messages.

Recommendations following AIDC tests between SCEL and SPIM

1. ABI messages should contain information on FPL field 18, since some automated systems like the Thales TOPSKY validate the FPLs that have been created on the basis of the ABI message taking into account the data contained in this field (for instance, aircraft equipage resulting from the new structure of the flight plan effective since 2012).

2. Automated systems should stop generating LRMs resulting from message sequence number error (error codes 63, 64, and 65). These LRMs were eliminated in the PAN NAT/APAC ICD v1.0 of September 2014.

3. The ARO/AIS offices of the region must transmit the FPLs with the complete and correct route, from beginning to end, in order to avoid processing issues in the automated systems of adjacent control centres and beyond, as applicable.

ANNEX

LIST OF PARTICIPANTS – AIDC COURSE - SANTIAGO DE CHILE

Technical area:

1. Mr. Pedro Pastrian
2. Mr. Christian Vergara

Operational area (ATCOs)

3. Mr. Hector Ibarra
4. Mr Gustavo Caceres
5. Mr. Jorge Morgado
6. Mr. Patricio Murua
7. Mr. Christian Larrondo
8. Mr. Felipe Bañados
9. Mr. Rigoberto Pacheco
10. Mr. Enrique Valenzuela
11. Mr. Eduardo Meneses
12. Mr. Manuel Alvarez
13. Mr. Carlos Araya
14. Mr. Luis Jerez
15. Mrs. Ursula Garrido
16. Mrs. Marcela Vasquez

Instructor

17. Rubén Silva

Supporting instructor

18. Mauricio Ferrer
19. Jorge Merino

MISSION TO PERU – 13 TO 17 APRIL 2015

On 13-17 April 2015, the Practical Course on ATS Interfacility Data Communication (AIDC) Operations was conducted at the premises of the Lima ACC for air traffic controllers. The course was conducted by Mr. Rubén Silva of Argentina, with the support of Messrs. Mauricio Ferrer of Colombia and Jorge Merino of Peru.

Training was provided to 44 air traffic controllers on the use of AIDC for coordination between control centres using data link, and to the administrators of automated systems on database configuration. The list of participants is **attached** to this Appendix.

Results of AIDC tests

The systems of SPIM / SCEL / SEGU / SKBO were successfully connected using the following AIDC addresses:

- SCELZRZY (Santiago ACC)
- SPIMAIDC (Lima ACC)
- SEFGAIDC (Guayaquil ACC)
- SKEDAIDC (Bogota ACC)

AIDC interaction between Lima-Guayaquil and Lima-Bogota was achieved using the existing AMHS circuits between the aforementioned locations through REDDIG II. The interconnected automated systems are Indra AIRCON 2100.

Recommendations of the AIDC Mission to Peru

1. The training provided to air traffic controllers will serve as guidance on the use of AIDC for coordination between automated control centres.

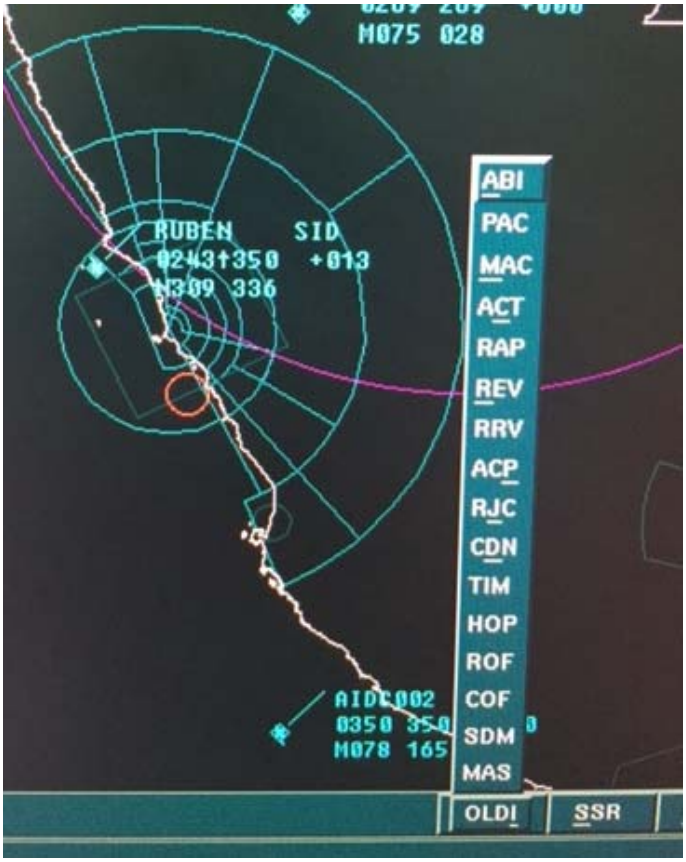
2. Database administrators must follow the recommendations made during the training for proper configuration of their systems.

3. ABI messages should contain information in the FPL field 18, since some automated systems validate FPLs that have been created based on the ABI message taking into account the information contained in this field (for instance, aircraft equipage resulting from the new flight plan structure effective since 2012).

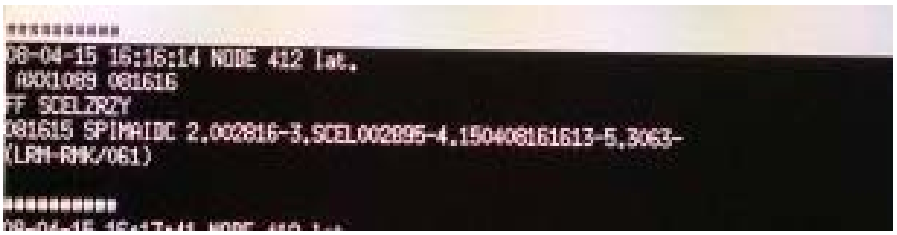
4. Automated systems should stop generating LRMs resulting from message sequence number error (error codes 63, 64, and 65). These LRMs were eliminated in the PAN NAT/APAC ICD v1.0 of September 2014.

5. The AIRCON 2100 system in Lima has a physical configuration (console distribution) whereby the executive controller only has an SDD terminal and the planner only has an FDD terminal in the same UCS. This particular configuration generates a work overload for the executive controller, since AIDC coordination, just like other activities, cannot be done from the planner/assistant position.

6. The AIRCON 2100 simulator version of Lima cannot emulate an AIDC coordination environment; it can only exchange OLDI messages. This limits the possibility of using it to train personnel in the use of AIDC.



7. It has been noted that when AIDC messages are routed via Caracas, the OHI field is deleted. Consequently, these messages are received at destination without the corresponding AIDC header. Accordingly, the receiving system generates LRMs, preventing automatic coordination.



8. The ARO/AIS offices of the region must transmit the FPLs with the complete and correct route, from beginning to end, in order to avoid processing issues in the automated systems of adjacent control centres and beyond, as applicable.

9. The direct connection with Bogota was achieved on the last day of the mission, which made it difficult to conduct some of the tests. However, it was possible to verify the connection and the dialogue that now exists between the two control centres.

ANNEX
LIST OF PARTICIPANTS - AIDC COURSE - LIMA

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22. Kuan Céspedes, Mario Javier
23. Lago Sánchez, Gino Estuardo
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28. Meza Monteblanco, Jorge Víctor
29. Pérez Echevarría, Manuel Eduardo
30. Ramírez Flores, Willy Collins
31. Robles Luna, Daniel Alfredo
32. Rojas Prado, Luis Omar
33. Saavedra Robles, Carlos Alberto
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37. Sato Azabache, Hernán Raúl
38. Sifuentes Flores, Alberto
39. Silva Chumpitazi, Gina María
40. Tiznado Caballero, Verónica Emperatriz
41. Urquiaga Primo, Paola Helena
42. Velazco Pozzuoli, Guillermo Eduardo
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46. Mauricio Ferrer
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MISSION TO ECUADOR - 20 TO 24 APRIL 2015

On 20-24 April 2015, the Practical Course on ATS Interfacility Data Communication (AIDC) Operations was conducted at the premises of the Guayaquil ACC for air traffic controllers. The course was conducted by Mr. Rubén Silva of Argentina, with the support of Messrs. Mauricio Ferrer of Colombia and Jorge Merino of Peru.

Training was provided to 31 air traffic controllers on the use of AIDC for coordination between control centres using data link, and to the administrators of automated systems on database configuration. The list of participants is **attached** to this Appendix.

Results of AIDC tests

1. The systems of SPIM / SEGU / SKBO were successfully connected using the following AIDC addresses:

    - SPIMAIDC (Lima ACC)
    - SEFGAIDC (Guayaquil ACC)
    - SKEDAIDC (Bogota ACC)

2. The Guayaquil AIRCON 2100 database was configured in terms of time, distance, and coordination point (COPs) parameters, with a view to continuing with the pre-operational tests between this ACC and the Lima and Bogota ACCs.

3. Proper AIDC communication was verified in both directions between the SEGU control centre and the adjacent SPIM and SKBO centres.

4. The AIDC interaction between Guayaquil and Bogota was through the AFTN circuit between the two locations, using the REDDIG II. The interconnected automated systems are Indra AIRCON 2100.

Recommendations of the AIDC mission to Ecuador

1. ABI messages should contain information in the FPL field 18, since some automated systems validate the FPLs that have been created based on the ABI message taking into account the information contained in this field (for instance, aircraft equipage resulting from the new flight plan structure effective since 2012).

2. Automated systems should stop generating LRMs resulting from message sequence number error (error codes 63, 64, and 65). These LRMs were eliminated in the PAN NAT/APAC ICD v1.0 of September 2014.

3. The ARO/AIS offices of the region must transmit the FPLs with the complete and correct route, from beginning to end, in order to avoid processing issues in the automated systems of adjacent control centres and beyond, as applicable.

ANNEX

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12. León Franco, Luis
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17. Muñoz Mosquera, Dennis José
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19. Ordoñez Castro, Jorge
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33. Mauricio Ferrer
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MISSION TO COLOMBIA - 27 APRIL TO 1 MAY 2015

From 27 April to 1 May 2015, the Practical Course on ATS Interfacility Data Communication (AIDC) Operations was conducted at the premises of the Bogota ACC for air traffic controllers. The course was conducted by Mr. Rubén Silva of Argentina, with the support of Mr. Mauricio Ferrer of Colombia.

The training was provided to 35 air traffic controllers on the use of AIDC for coordination between control centres using data link, and to the administrators of automated systems on database configuration. The list of participants is **attached** to this Appendix.

Results of AIDC tests

1. The system of SKBO was successfully connected with SEGU and SPIM. The following AFTN addresses were used:

    - SPIMAIDC (Lima ACC)
    - SEFGAIDC (Guayaquil ACC)
    - SKEDAIDC (Bogota ACC)

2. In addition to the tests with Ecuador and Peru, tests with Panama were also conducted, in which failures were observed in the SKBO/MPTO connection. It was noted that this failure was caused by the REDDIG II - MEVA III integration, which routed messages via MPTO/KATL/SVCS/SKBO. As already stated, the problems in the OHI field are generated by Caracas. This will be solved once the REDDIG II MEVA III interconnection is operative.

Recommendations of the AIDC Mission to Colombia

1. ABI messages should contain information on FPL field 18, since some automated systems validate the FPLs that have been created based on the ABI message taking into account the data contained in this field and Amendment 1 to Appendix 2 to Doc 4444.

2. Automated systems should stop generating LRMs resulting from message sequence number error (error codes 63, 64, and 65). These LRMs were eliminated in the PAN NAT/APAC ICD v1.0 of September 2014.

3. It has been noted that when AIDC messages are routed via Caracas, the OHI field is deleted. Consequently, these messages are received at destination without the corresponding AIDC header. Accordingly, the receiving system generates LRMs, preventing automatic coordination.

4. The ARO/AIS offices of the region must transmit the FPLs with the complete and correct route, from beginning to end, in order to avoid processing issues in the automated systems of adjacent control centres and beyond, as applicable.

5. It was noted that Colombia had a series of V-SAT stations that should be re-established through bilateral COLOMBIA-ECUADOR and COLOMBIA-PANAMA agreements, in order to have a backup system of its own in case of failure of the main ones.

ANNEX

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APPENDIX C

PLAN OF ACTIVITIES FOR INITIAL AIDC IMPLEMENTATION

	Start	End	Responsible party	Status
1. **Establishment of initial activities for completing the technical implementation of AIDC**	**10/10/2014**	**16/10/2014**	**ICAO**	**Completed** 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. These activities will be conducted in Chile, Colombia, Ecuador and Peru. Interconnection tests between the Lima and Bogota ACCs were added to the list shown in paragraph 1.1.1.
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: 1.1.1 Plan of activities to complete technical feasibility tests for AIDC interconnection between: Santiago ACC - Lima ACC Guayaquil ACC - Lima ACC Bogota ACC - Guayaquil ACC 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.	10/10	16/10	ICAO	
2. Review of activities at the SAM/IG/14 meeting	**09/10**	**13/11**	**ICAO and SAM/IG**	**Completed** 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	

	Start	End	Responsible party	Status
3. Approval of activities by the RCC/8 meeting	**25/02/15**	**27/02/15**	**RLA/06/901 member States**	**Completed** The RCC/8 meeting held in Lima on 25-27 February 2015 approved the activities for initial implementation of AIDC interconnection in Chile, Colombia, Ecuador and Peru.
3.1 Submission of activities, with their respective cost, for approval.	25/02/15	27/02/15	RLA/06/901 member States	
4. Search and selection of experts	**24/11/14**	**28/01/15**	**ICAO**	**Completed** For the performance of the initial activities, three SAM experts with experience in database programming and operation of ACC automated systems were selected: **Rubén Silva of Argentina, Mauricio Ferrer of Colombia, and Jorge Merino of Peru**.
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	30/01/15	ICAO	
5. Missions to complete AIDC interconnection between States that started tests during the first semester of 2014	**06/04/15**	**01/05/15**	**3 automation experts ICAO**	**Completed** Missions were conducted for training purposes and to complete tests for AIDC interconnection and operation **Chile 6/4 to 10/4 2015 Peru 13/4 to 17/4 2015 Ecuador 20/4 to 24/4 2015 Colombia 27/4 to 1/5/2015**
5.1 Mission to Santiago de Chile	13/04/15	17/04/15	3 automation experts ICAO	**Completed** Implementation of AIDC activities at the Santiago ACC

	Start	End	Responsible party	Status
				• AIDC practical course • AIDC interconnection tests between: *Santiago ACC and Lima ACC*
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 Aircon 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	**Completed** Implementation of AIDC activities in the Lima ACC • AIDC practical course • AIDC interconnection tests between: *Lima ACC - Santiago ACC* *Lima ACC - Guayaquil ACC* *Lima ACC - Bogota ACC*

	Start	End	Responsible party	Status
5.2.1 Conduct AIDC course for ATS personnel of the Lima ACC	13/04/15	17/04/15	3 Automation experts ICAO	The practical course on AIDC and database programming 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	**Completed** Implementation of AIDC activities at the Guayaquil ACC • Practical course on AIDC • AIDC interconnection tests and pre-operational implementation: 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
5.3.2 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

	Start	End	Responsible party	Status
				Guayaquil ACC.
5.4 ***Mission to Bogota***	**27/04/15**	**01/05/15**	**3 automation experts**	**Completed** Implementation of AIDC activities in the Bogota ACC • Practical course on AIDC • AIDC interconnection tests and pre-operational implementation: *Guayaquil ACC - Lima ACC* *Guayaquil ACC - Bogota ACC*
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
5.6.2 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.
6. First meeting of the AIDC operational implementation working group during the SAMIG/15 meeting	**11/05/15**	**15/05/15**	**RLA/06/90 member States**	
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	**In progress** As a result of AIDC technical implementation, the Meeting will draft a regional AIDC operational implementation

	Start	End	Responsible party	Status
				plan, defining operating modality and messages to be used, in accordance with the SAM AIDC guide. One scholarship per State is required for personnel responsible for AIDC operational implementation in the States.
7- AIDC operational implementation	**18/05/15**	**31/12/15**	States involved	**In progress**
7.1 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	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 implementation between Chile and Peru to take place between Antofagasta and the Lima ACCs once the automated system in Antofagasta is operative.

	Start	End	Responsible party	Status
8. Other AIDC implementations **Bogota ACC - Panama ACC** **Ezeiza ACC - Santiago ACC** **Ezeiza ACC - Montevideo ACC** **Resistencia ACC - Asunción ACC**	**18/5/2015**	**30/06/16**	States involved	AIDC course – Panama, June 2015. AIDC interconnection tests between Bogota and Panama, May-June 2015. AIDC tests between Ezeiza and Santiago, May-June 2015. AIDC tests between Ezeiza and Montevideo, November 2015. AIDC course – Paraguay, April 2016. AIDC tests between Resistencia and Asunción – June 2016.
9. Workshop on implementation of ATM automation, ADS B, and multilateration	**21/09/15**	**24/09/15**	ICAO	CAR/SAM workshop The implementation of inter-regional AIDC interconnections will be analysed at this workshop (1 scholarship per State is required).
10. Second meeting of the AIDC operational implementation working group during SAMIG/16	**19/10/15**	**23/10/15**	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.	**19/10/15**	**23/10/15**	ICAO	Follow-up of operational implementation and programming of activities for operational implementation in

	Start	End	Responsible party	Status
				2016.

APPENDIX D

ANALYSIS OF AIDC TECHNICAL AND OPERATIONAL REQUIREMENTS

Part 1. BACKGROUND

1.1 Conclusion GREPECAS/15/36.

1.2 AIDC course in Montevideo, Uruguay (December 2013).

1.3 Regional coordination teleconferences for AIDC implementation in the SAM Region (2013-2015).

1.4 Conclusion GREPECAS/17/9 and proposal of adoption of a global ICD based on joint NAT/APAC inter-regional work (July 2014).

1.5 Decision AIDC/TF/2/3 to compare existing ICDs in order to arrive at a global consolidated ICD through an ICAO document.

1.6 Technical/operational assistance missions and AIDC courses conducted at the Santiago, Lima, Guayaquil, and Bogota ACCs (April-May 2015).

Part 2. REFERENCE DOCUMENTS

2.1 *Document 4444 ATM/501 – Air Traffic Management – Fourteenth Edition*

2.2 *Guide for AIDC Implementation through the Interconnection of Adjacent Automated Centres – v7.0 – April 2013.*

2.3 *Aircon2100 (Indra) – Manual de Usuario AIDC – Edición 01 – Mayo 2013.*

2.4 *Pan Regional (NAT and APAC) Interface Control Document for ATS Interfacility Data Communications (PAN AIDC ICD) – v1.0 – September 2014.*

Part 3. ANALYSIS

3.1 It has been noted that the automated systems of the region involved in this project are capable of using AIDC as a means of coordination. However, there are still some discrepancies among manufacturers, and different versions within the same manufacturer. Depending on each particular case, these discrepancies may hinder AIDC interconnection between automated systems of countries with different systems.

3.2 It has been deemed necessary for the man-machine interface of automated control centres to be as friendly as possible, so that the use of AIDC as primary means of coordination may facilitate the task of ATS personnel, reducing workload and the occurrence of operational errors.

3.3 According to the AIDC User Manual of Indra, a manufacturer of automated systems used in most countries of the region, the internal architecture of AIDC is mainly based on the APAC ICD v.3.0 (September 2007).

3.4 Indra's Aircon2100 system includes the following AIDC messages: ABI, PAC, MAC, EST, CPL, CDN, ACP, REJ, TOC, AOC, LAM, and LRM.

Part 4. TECHNICAL AND OPERATIONAL REQUIREMENTS

4.1 The internal architecture of automated systems should be based on the PAN AIDC ICD (NAT/APAC) v.1.0, for everything related to AIDC, in the absence of a more updated global or regional ICD.

4.2 Automated control centres should have an appropriate architecture and ergonomic characteristics that allow ATS personnel (executive and planner ATCO) to work in an organised manner.

4.3 The ARO/AIS offices of the region shall transmit FPLs with the complete route, from beginning to end, in order to avoid processing problems in adjacent control centres.

4.4 ABI messages should contain the information of FPL field 18 (NAT/APAC ICD), since some automated systems validate the FPLs that have been created based on an ABI message taking into account the data contained in this field. Likewise, EMG (Emergency) and MIS (Miscellaneous) messages contemplated in the PAN AIDC ICD (NAT/APAC) use the RMK field of box 18 as means of transport.

4.5 It is recommended that automated systems stop generating LRMs resulting from message sequence number error (error codes 63, 64, and 65), since they are of no use for processing AIDC messages.

4.6 The method for calculating the CRC contained in the AIDC message header should be CRC-CCITT (XModem), in order to avoid interoperability problems between systems from different manufacturers.

4.7 All AFTN and AMHS messaging applications of the region should guarantee message contents integrity, including the OHI (Optional Header Information) section, with the respective ODFs (Optional Data Field), since this section contains the header of AIDC messages, which is indispensable for correct processing.

4.8 Automated systems should process all the messages listed in the PAN NAT/APAC ICD v1.0.

4.9 The minimum set of messages that should be used in the region is shown in the following table:

Mandatory messages	
Message	**Meaning**
ABI	Advanced Boundary Information
CPL	Current Flight Plan
EST	Coordination Estimate
PAC	Preliminary Activate
MAC	Coordination Cancellation
CDN	Coordination Negotiation
ACP	Acceptance
REJ	Rejection
TOC	Transfer of Control
AOC	Acceptance of Control
LAM	Logical Acknowledgement Message
LRM	Logical Rejection Message

4.10 In a subsequent implementation stage, automated systems should add the following messages to the minimum set of messages:

Messages available for optional use	
Message	**Meaning**
PCM	Profile Confirmation Message
PCA	Profile Confirmation Acceptance
TRU	Track Update
EMG	Emergency
MIS	Miscellaneous
ASM	Application Status Monitor
FAN	FANS Application Message
FCN	FANS Completion Notification
ADS	Surveillance ADS-C Data Transfer

APPENDIX E

NATIONAL FOCAL POINTS
IMPLEMENTATION OF INTERCONNEXION OF AUTOMATIZATION SYSTEMS

STATE	ADMINISTRATION	NAME	POST	TELEFHONE NUMBER	E-MAIL ADDRESS
ARGENTINA	DGSTA	Rubén Siva	Especialista ATM sistemas automatizados		ruben@assistcomp.com.ar
		Mario Correa	Jefe sistemas automatizados ATS	(54 11) 4317-6015	mario_correa@yahoo.com.ar
	ANAC	Javier Vittor	Especialista CNS	(54 11) 4480-2362 (54 911) 6894-0692	javiervittor@gmail.com
BOLIVIA					
BRASIL	DECEA	Alexander Santoro	Especialista CNS		santoroaas@decea.gov.br
		Murilo Loureiro	Asesor sistemas automatizados		murilo.loureiro@gmail.com
COLOMBIA	UAEAC	Mauricio Ferrer	Especialista ATM sistemas automatizados		mauricio.ferrer@aerocivil.gov.co
		Mario Rosas	Jefe sección radar	(57 31) 7656-7203	mario.rosas@aerocivil.gov.co
CHILE	DGAC	Pedro Pastrian	Especialista radar y sistemas automatizados	(56 2) 836-4005 (56 2) 644-8345	ppastrian@dgac.gob.cl
		Christian Vergara	Especialista comunicaciones	(56 2) 836-4005 (56 2) 644-8345	cvergara@dgac.gob.cl
		Osvaldo Alvarado Oñate	Controlador Tránsito Aéreo Ofc. Operaciones ACCS	(56 2) 91581853 (56 2) 28364018	oalvaradoo@dgac.gob.cl
ECUADOR	DAC	Raul Avellan	Especialista CNS coordinador sistema AMHS	(593 4) 269-2829 (593 9) 9530-2735	raul.avellan@aviacioncivil.gob.ec
		Jorge Zuñiga	Programación FDP y coordinaciones		jorzu40@hotmail.com

STATE	ADMINISTRATION	NAME	POST	TELEFHONE NUMBER	E-MAIL ADDRESS
GUYANA					
GUYANA FR.					
PANAMA	Autoridad Aeronáutica Civil (AAC)	Mario Antonio Facey Howard	Especialista radar y sistemas automatizados	(507) 501-9865	mfacey@aeronautica.gob.pa
PARAGUAY	DINAC	David Torres	Jefe de Sección, Encargado del Sistema ATM ARCON2100	(595) 9812-31575	dr.torres33@gmail.com
		Diego Ramón Aldana Fernández	Supervisor ACC/APP	(595) 21 645-707	diegoaldana@gmail.com
		Enrique Alfredo Sánchez	Supervisor ATS	(595) 9948-80924	esanchez69@gmail.com
PERÚ	CORPAC	Johnny Ávila	Jefe sección radar y sistemas automatizados		javila@corpac.gob.pe
		Jorge Eduardo Merino Rodríguez	Especialista ATM Controlador de Tránsito Aéreo	(51 1) 414-1000	jmerino@corpac.gob.pe jemr69@yahoo.com
		Carlos Infante	Especialista ATM Controlador de Tránsito Aéreo		cinfante@corpac.gob.pe
SURINAM					
URUGUAY	DINACIA	Antonio Lupacchino	Especialista CNS sistemas automatizados		alupacch@yahoo.com.ar