



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

Follow-up to the interconnection of automated systems

(Presented by the Secretariat)

SUMMARY	
This working paper presents information on the progress made in the interconnection of automated systems in the SAM Region.	
REFERENCES:	
<ul style="list-style-type: none"> • Twelfth Workshop/Meeting of the SAM Implementation Group (SAM/IG/12) - Regional Project RLA/06/901 (Lima, Peru, 14-18 October 2013); • Thirteenth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/13 4-6 December 2014); • Seminar/Workshop on technical and operational aspects for the implementation and operation of automated ATC systems in the SAM Region (Sao Jose Dos Campos, Brazil, 24-28 February 2014); and • Summary of teleconferences for the interconnection of automated systems (Ecuador, Peru (11 March 2014)), (Argentina, Brazil, Chile, and Paraguay (12 March 2014)) and (Colombia, Panamá). 	
<i>ICAO strategic objectives:</i>	<i>A – Safety; and B – Air navigation capacity and efficiency</i>

1. Background

1.1 The SAM/IG/12 meeting reviewed the results of the mission of SAM automation experts to the States that had signed Memoranda of Understanding (MoUs) for the interconnection of automated systems (Argentina, Chile, Peru, and Uruguay), which was conducted from 5 to 16 August 2013. In this regard, the meeting considered that the States had no problem with complying with the dates for the automatic transfer of flight plans, and considered that several AIDC interconnections or messages contemplated in Document 4444 might become operational by the end of 2013.

1.2 Regarding the use of protocols 62 and 63 for the exchange of radar data as recommended in the *Regional plan for the interconnection of automated systems*, the SAM/IG/12 meeting took note that the ATECH automated system installed in all the ACCs of Brazil and in the Maiquetía ACC of Venezuela would not consider kinematic trace data from adjacent control centres (AC), except in those cases in which priority sensors (radars, ADS-B, MLAT) are not available.

1.3 In this sense, the representative of INDRA informed the SAM/IG/12 meeting that its automated systems were capable of receiving surveillance data in the ASTERIX 62 protocol. However, the company did not recommend merging surveillance sensors and traces from alternate centres due to the delays that exist.

1.4 Taking into account the position of Brazil whereby radar data is sent using the ASTERIX protocol Cat 62 and 63, and the position of States whereby the INDRA system of not merging data of surveillance sensors with AC traces is applied, the SAM/IG/12 meeting concluded that the MoUs for the interconnection between Brazil and the States that use INDRA ATC centres (Argentina, Peru, and Uruguay) should be revised to limit their scope to the exchange of flight plan data (AIDC), which is one of the data exchange alternatives foreseen in the *CAR/SAM Interconnection Plan*, and that the exchange of radar data would be discussed at a later date to be defined by the parties.

2. Discussion

2.1 In order to follow-up on the activities for the interconnection of automated systems, the latter are described below:

Training events

2.2 In order to provide detailed information on ASTERIX 62, 63, and 65 and AIDC functionality to the States of the Region involved in the interconnection of automated systems, the automation working group analysed at the SAM/IG/12 meeting the possibility of conducting a course on the use of the ASTERIX protocols and AIDC (Sao José dos Campos, Brazil, 24-28 February 2014) addressed to technical and operational personnel, and a seminar/workshop on automated systems for ATS personnel (Lima, Peru, 18-22 August 2014).

2.3 With the support of DECEA and ATECH of Brazil and of project RLA/06/901, a seminar/workshop on technical and operational aspects for the implementation and operation of automated ATC systems in the SAM Region was held (Sao José dos Campos, Brazil, 24-28 February 2014), mainly to address the use of the ASTERIX 62, 63, and 65 protocols and AIDC.

2.4 The event was attended by 42 delegates of 8 SAM States (Argentina, Bolivia, Brazil, Chile, Panama, Paraguay, Peru, and Uruguay) and two representatives of the industry (ARINC and ATECH).

2.5 Important conclusions were formulated at the event, as shown in the **Appendix** to this working paper, mainly: that the ASTERIX 62 protocol could be merged with other protocols, such as ASTERIX 1, 2, 34, and 48, and that the resulting product could be used for control purposes; all automated systems installed in the ACCs of Brazil perform this function (ATECH's Sagitario system); the recommendation to use a minimum AIDC message set for coordination and transfer purposes; updating of existing MoUs; and coordination of new AIDC interconnections.

2.6 In this regard, the Meeting will update the six (6) MoUs currently in place, taking into account the changes made, such as the designation of new focal points, new technical approaches, and the updating of implementation dates.

2.7 Likewise, an AIDC course was conducted in Montevideo, Uruguay, on 9-13 December 2013 for air traffic controllers and database programmers. The event was held with the support of the Aeronautical Administration of Argentina (which provided an expert to give the course), the Aeronautical Administration of Uruguay (which offered the venue), and Regional Project RLA/06/901. The course was attended by 42 participants of 6 SAM States. The participants were instructed on how to configure the AIDC system database, and controllers were able to practice with AIDC exercises in a simulated environment.

AIDC interconnection tests

2.8 Regional implementation activities included AIDC tests conducted between Ecuador and Peru in February 2014, in which AIDC information from Peru arrived to the Guayaquil ACC, but AIDC messages from the Guayaquil ACC did not arrive to the Lima ACC. In this regard, Ecuador informed its AIDC provider (INDRA) about the problem and is awaiting actions by INDRA to continue the tests. It is expected that the Meeting will receive information on the progress made in the AIDC interconnection between Ecuador and Peru.

2.9 Furthermore, at the teleconference held on 12 March 2014, Argentina, Brazil, Chile, and Paraguay coordinated the conduction of AIDC tests between the Ezeiza and Santiago ACCs on 17-21 March 2014; between the Ezeiza and Asunción ACCs on 24-28 March 2014; and between the Curitiba and Asunción ACCs on 7-11 April 2014. The States involved are expected to provide information to the Meeting.

2.10 Given the recent modernisation of automated systems at the new Panama ACC, AIDC tests were scheduled for 5 May 2014. In this regard, focal points were designated in both States for pre-test coordination.

Commitment to regional implementation during the 2014-2016 period

2.11 The RAAC/13 meeting, through the Declaration of Bogota (Conclusion RAAC/13-8 – *Implementation of air navigation and safety priorities*), approved the implementation of air navigation and safety priorities for the period 2014-2016, assigning high priority to the interconnection of automated systems (AIDC). In this sense, the Declaration states that all 15 AIDC interconnections must be implemented by 2016 (see **Attachment A** to the Appendix to this working paper).

3. Suggested action

3.1 The Meeting is invited to:

- a) take note of the information provided in this working paper;
- b) analyse the information contained in section 2 and in the Appendix to this working paper, especially the conclusions of the Seminar/Workshop on the Technical and Operational Aspects for the Implementation and Operation of automated ATC systems in the SAM Region;
- c) update the 6 MoUs for the interconnection of automated systems established to date, and start coordinating the drafting of new MoUs;
- d) submit the results of AIDC implementation tests conducted to date; and
- e) discuss any other related matter it may deem appropriate.

APPENDIX

CONCLUSIONS FORMULATED AT THE SEMINAR/WORKSHOP ON TECHNICAL AND OPERATIONAL ASPECTS FOR THE IMPLEMENTATION AND OPERATION OF ATC AUTOMATED SYSTEMS IN THE SAM REGION (Sao José dos Campos, Brazil, 24 to 28 February 2014)

General considerations on the interconnection of automated systems

1. When implementing automated at ATS units, SAM States should take under consideration the regional document drafted to this end, uploaded in the ICAO SAM website <http://www.icao.int/sam/pages/edocumentsdisplay.aspx?area=cns>: Preliminary document containing automated systems requirements (SSS).
2. For the interconnection of automated systems in the SAM Region, States should consider the following documentation as support material, uploaded in the ICAO SAM website <http://www.icao.int/sam/pages/edocumentsdisplay.aspx?area=cns>:
 - a) Plan for the regional interconnection of automated systems at the ACC;
 - b) SICD document;
 - c) Memorandum of Understanding (MoU) for the interconenction of automated systems between two States having adjacent ACCs; and
 - d) Guide for AIDC implementation through the interconnection of adjacent automated centres.
3. States should inform of the changes made to the automated systems, with the aim of keeping the SICD document duly updated.
4. Draft MoU between parties involved, before starting with the interconnection of automated systems.
5. States should participate in the regional automation events programmed by ICAO.
6. Update the MoU established to date, introducing changes product of:
 - a) Updating the implementation dates in accordance with the priorities established in the Bogota Declaration;
 - b) Naming of new focal points; and
 - c) New technical/operational considerations.
7. The updating of the already established MoUs (6) will be carried out at SAM/IG/13 meeting (Lima, Peru, 21-25 April 2014).
8. Comply with the interconnection of automated systems goals, in accordance with the commitment made by the directors general of civil aviation through the Bogota Declaration (see **Attachment A**).

Surveillance systems considerations regarding interconnection of automated systems

9. ASTERIX 62 can be joined in a multisensor tracking or mosaic with radar traces transmitted with ASTERIX 1, 2, 34 and 48 protocols, and use it as radar control within the area of responsibility (implemented in the ATECH automated systems, Model Sagitario, at the Atlántico, Brasilia, Curitiba, Manaus and Recife ACCs).
10. No calibration is required for the radar processor receiving the ASTERIX 62 protocol, under the premise that all control centres are under a unique time reference system (GPS).
11. With the aim of verifying the joining of the ASTERIX 62 protocol with other ASTERIX protocol (1.2.34 y 48), a teleconference will be conducted on the second week of May 2014 between the Brazil and Chile focal points, to coordinate the holding of trials. ASTERIX 65 protocol will also be tested.
12. The ICAO SAM Regional Office counts with focal points to coordinate the interconnection of automated systems with the following States: Argentina, Brazil, Chile, Ecuador, Peru, Uruguay and Venezuela. It is required that the remaining States having automated systems installed report on the names of the people to act as focal points to coordinate the required interconnections.
13. Establish a solution for the Exchange of radar data between States having difficulties in their implementation, particularly in the Exchange and processing of radar data using the ASTERIX 62 and ASTERIX 1, 2, 34 y 48 protocols.
14. The use of the 63 protocol is optional and would be used under agreement of the parties involved.

Communications systems considerations regarding interconnection of automated systems

15. Establish operational agreements defining the AIDC messages to be used within the minimum package of AIDC messages established in the Region, and take them under consideration in the respective operational letters of agreement.
16. That States of the Region having AIDC in their automated systems coordinate the holding of trials with adjacent States. In this regard, the holding of AIDC tests between the Curitiba ACC and Ezeiza ACC, Curitiba ACC and Santiago ACC and the Asunción ACC with the Curitiba ACC and Ezeiza ACC was considered upon.
17. A teleconference will be conducted on 12 March 2014 (already carried out) to establish the initial implementation coordinations for AIDC interconnection between Argentina-Brazil, Argentina-Paraguay, Brazil-Chile and Brazil-Paraguay.
18. Towards an integration between countries, the flight plan data processors can be provided by various providers (companies), but the data processing must possess the intelligence necessary to process what is compulsory and what is optional, without any type of rejection. The guide published by the ICAO SAM Regional Office, *Guide for AIDC implementation through the interconnection of adjacent automated centres*, defines what is compulsory and what is optional (see **Attachment B** – Minimum set of AIDC messages considered in the SAM Region).

19. The messages selected for the AIDC should be part of the operational document of agreement for the coordination and transfer of messages.
20. In an integration of two control centres from two States, account should be taken on the possibility of having different equipment in their AIDC systems.
21. The discussions pertaining to the States' equipment should be addressed mainly to meet the operational needs of the control centres.
22. In this respect, were there to be differences in the States equipment systems, these should be discussed upon with their respective providers and operational managers.
23. For the normal coordination of AIDC, the ABI, CPL, CDN, ACP and LAN messages have been considered as of priority within the minimum set of messages in the SAM AIDC guide.
24. For a coordination where the transfer levels are kept to a determined fixed level, a process can be used with the ABI, EST and ACP messages.
25. For the transfer, the messages to use are the TOC, LAM and AOC.
26. In the event of not receiving an AIDC message, the coordination will be carried out via ATS speech circuit. Before the start-up of the AIDC, it is necessary that ATS staff receive the appropriate training and that they practice for a period maximum of two months, for their adaptation to automated operations.

ATTACHMENT A

INTERCONNECTION OF AUTOMATED SYSTEMS – DATES OF IMPLEMENTATION

State/ Estado	AIDC and Radar Data Interconnection Requirements/ Requerimientos de Interconexión AIDC y Datos Radar	MoU Date of Implementation/ Fecha Implantación MoU	AIDC and Radar Data Interconnection Date/ Fecha Interconexión AIDC y Datos Radar	Remarks/ Observaciones
Argentina	Bolivia	TBD	TBD	Bolivia has no automated systems/ Bolivia no cuenta con sistemas automatizados
	Brasil	2009	Aug 2014	Radar data exchange pending definition/ Pendiente definición intercambio datos radar
	Chile	2010	Jul 2014	Radar data exchange will be gradually implemented/ Se implantará el intercambio de datos radar en forma gradual
	Paraguay	May 2014	Dec 2014	
	Uruguay	2009	Jun 2014	
Bolivia	Brasil	TBD	TBD	Bolivia has no automated systems/ Bolivia no cuenta con sistemas automatizados
	Chile	TBD	TBD	
	Paraguay	TBD	TBD	
	Peru	TBD	TBD	
Brazil/Brasil	Colombia	Oct 2014	Jul 2015	
	Guyana	TBD	TBD	Define requirement/ Definir requerimiento
	French Guiana (France)	TBD	TBD	Define requirement/ Definir requerimiento
	Paraguay	Oct 2014	Mar 2015	
	Peru	2012	Sep 2014	Radar data exchange pending definition/ Pendiente definición intercambio datos radar
	Suriname	TBD	TBD	Define requirement/ Definir requerimiento
	Uruguay	2009	Aug 2014	Radar data exchange pending definition/ Pendiente definición intercambio datos radar
	Venezuela	2011	Dic 2013	
Chile	Peru	Jun 2014	Mar 2015	
Colombia	Ecuador	May 2014	Dic 2014	
	Panamá	May 2014	Dic 2014	
	Peru	Oct 2014	Jul 2015	
	Venezuela	Dec 2014	Dic 2015	

State/ Estado	AIDC and Radar Data Interconnection Requirements/ Requerimientos de Interconexión AIDC y Datos Radar	MoU Date of Implementation/ Fecha Implantación MoU	AIDC and Radar Data Interconnection Date/ Fecha Interconexión AIDC y Datos Radar	Remarks/ Observaciones
Ecuador	Peru	Oct 2013	Jun 2014	
French Guiana (France)/ Guyana Francesa (Francia)	Surinam	TBD	TBD	Define requirement/ Definir requerimiento
Guyana	Surinam	TBD	TBD	Define requirement/ Definir requerimiento
	Venezuela	TBD	TBD	Define requirement/ Definir requerimiento

ATTACHMENT B**MINIMUM SET OF AIDC MESSAGES CONSIDERED IN THE SAM REGION**

CATEGORY	MESSAGE	NAME	DESCRIPTION
Pre-departure flight coordination	FPL	Flight plan presented	Flight plan, as presented by the ATS unit
	ABI	Reporting	The reporting messages will be transmitted in advance to the ATS units
Active flight coordination	CPL	Flight plan updated	Flight plan including the changes resulting from incorporating authorizations
	EST	Estimate	Time foreseen by the point of transfer or boundary point
	CDN	Negotiation	Proposal to amend the coordination conditions
	ACP	Acceptance	Acceptance of the proposed coordination or amendment
	REJ	Rejection	Coordination rejected
Control transfer	TOC	Transfer	The controller from the transfer unit has instructed the flight to establish a communication with the controller at the acceptance unit
	AOC	Transfer acceptance	The flight has established communication with the accepting controller
Logical	LAM	Logical recognizance	Acceptance of the application
	LRM	Logical rejection	Rejection of the application

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