



Agenda Item 6: Operational implementation of new ATM automated systems and integration of the existing ones

FOLLOW-UP ON THE IMPLEMENTATION OF AUTOMATED SYSTEMS

(Presented by the Secretariat)

| SUMMARY | |
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| This working paper presents information on the status of the interconnection of automated systems in the SAM Region, and the goals of the operational implementation of the interconnection in the short term. | |
| References | |
| <ul style="list-style-type: none">• Report of the Eleventh workshop/meeting of the SAM Implementation Group (SAM/IG/11) (Lima, Peru, 13-17 May 2013); and• Report of automation missions (5-9 August 2013) | |
| ICAO Strategic Objectives | <i>A – Safety; and C – Environmental protection and sustainable development of air transport</i> |

1. **Introduction**

1.1 The tenth workshop/meeting of the SAM Implementation Group (Lima, Peru, 1-5 October 2012), when analysing the status of implementation of the interconnection of automated systems (exchange of radar data and automatic transfer of flight plans), established some actions in addition to the regional plan for the interconnection of automated systems between adjacent ACCs.

1.2 The additional actions are intended to foster the interconnection of automated systems contemplated in the memoranda of understanding (MoUs) prepared and signed by some States of the Region.

1.3 The MoUs associated to these actions are the following:

- a) Argentina-Brazil;
- b) Argentina-Chile;
- c) Argentina-Uruguay;
- d) Brazil-Peru;
- e) Brazil-Uruguay; and
- f) Brazil-Venezuela.

1.4 The following actions were considered:

- a) Prepare a questionnaire on requirements for the interconnection of automated systems;
- b) Circulate the questionnaire to all the States of the Region that have established an MoU for the interconnection of automated systems, for its completion;
- c) Carry out missions to the States that have signed MoUs for the interconnection of automated systems in order to identify obstacles to the completion of interconnection tasks and, as a result of these missions, present a detailed plan for the start-up of the interconnection; and
- d) Missions will be conducted by two experts in ATM and CNS automation, accompanied by the industry and ICAO (South American Regional Office).

1.5 Missions to the States started on 5 August 2013 and were completed on 16 August 2013. The following States were visited: Argentina, Chile, Peru, and Uruguay.

2. Discussion

Results of the automation missions

Brazil-Peru interconnection

2.1 As a result of the revision of the questionnaire, the analysis of the collected documentation, and local trials conducted by the Automation Group, the implementation of the exchange of radar data and the transfer of flight plans under the MoU between Brazil and Peru has been rescheduled until the end of the first quarter of 2014. The main reason for the delay is that the new automated system to be installed at the Manaus ACC (Sagitario) will be commissioned at the end of 2013.

2.2 Before the operational implementation foreseen for the end of the first quarter of 2014, it has been deemed advisable to test the ASTERIX 62 and 63 protocols recommended for the exchange of radar data in the regional plan for the interconnection of automated systems.

2.3 For the exchange of radar data between Brazil and Peru, Brazil can only send radar data to Peru using the ASTERIX 62 and 63 protocols, and can receive radar information from Peru using the ASTERIX 62 and 63 protocols, and also with the ASTERIX 1, 2, 34, and 48 protocols.

2.4 The ASTERIX 62 and 63 protocols are recommended for full automation between automated centres in accordance with the regional action plan for the interconnection of automated systems, which is posted on the SAM Regional Office website, together with other important information on automation: http://www.icao.int/SAM/Pages/ES/eDocumentsDisplay_ES.aspx?area=CNS.

2.5 During the mission of the Automation Group to Peru (CORPAC facilities, Lima-Callao/Jorge Chávez airport), it was noted that the automated system installed at the new ACC of Lima (INDRA AIRCON 2100) is capable of receiving and processing the ASTERIX 62 and 63 protocols. Transmission to another ACC using the 62 and 63 protocols is not allowed.

2.6 In order to verify the capability of the AIRCON 2100 system installed in Peru to receive and process the ASTERIX 62 and 63 protocols, trials between the ACCs of Lima and Manaus were scheduled for the week of 2-6 September 2013. In this sense, points of contact were established in Peru and Brazil to coordinate the trials. The trials could not be completed because a router had to be installed in Lima and a circuit had to be established through the REDDIG. It is expected that the States concerned will inform the Meeting on progress with the trials.

Ecuador-Peru and Chile-Peru interconnection

2.7 According to the regional plan for the interconnection of automated systems, the Lima ACC would require an interconnection with the Guayaquil ACC (Ecuador) and the Santiago ACC (Chile). Following the teleconference held with the aeronautical administrations of Chile and Peru, it was felt that the interconnection between Chile and Peru would be analysed next year because of the modernisation process being carried out in Chile. Consequently, it was agreed that this issue would be analysed upon completion of the modernisation process in Chile.

2.8 As to the interconnection of automated systems between Ecuador and Peru, a teleconference *via* web was held to coordinate the establishment of an MoU, to be presented at the SAM IG/12 meeting.

2.9 The first activity contemplated in the MoU to be carried out would be the AIDC trials between the Guayaquil and Lima ACCs. The trials will be easier to conduct because the automated systems are of the same make and model. It was felt that these trials could be carried out in November 2013.

2.10 For this trial, AIDC information would be sent through the AMHS link that exists between Ecuador and Peru. To support AIDC trials, the States could follow the provisions of the AIDC Guide presented at the SAM/IG/11 meeting and approved for the Region (the AIDC Guide was sent to all the States of the Region through letter LT 12/3.54 – SA302 dated 10 June 2013). No comments were received from the States, so the Guide was considered as approved, and is posted on the website of the ICAO South American Regional Office:

http://www.lima.icao.int/eDocuments/eDoc_Content.asp?wLanguage=S&wArea=CNS#

Argentina-Chile interconnection

2.11 Regarding the MoU between Chile and Argentina, Chile informed that it would first start interconnecting the Puerto Montt radar and would subsequently exchange the remaining radars contemplated in the MoU.

2.12 Before sending radar data from Puerto Montt to Argentina, Chile would first convert the radar data to the ASTERIX protocol and filter the radar information. To this end, Chile will acquire a convertor, which is foreseen to be installed in early 2014.

2.13 On the side of Argentina, the radars contemplated in the MoU were ready to send to Chile. For the interconnection of automated systems between the Comodoro Rivadavia and Puerto Montt ACCs, Argentina would have the Bariloche radar available, as contemplated in the MoU, in addition to two secondary radars in Esquel and Rio Gallegos, which are not contemplated in the MoU.

2.14 In order to view the Puerto Montt radars in Comodoro Rivadavia, a screen would be installed, since the Comodoro ACC does not have an automated system installed.

2.15 On the side of Argentina, the automated systems that have been installed (Ezeiza and Córdoba ACCs) still cannot transmit the ASTERIX 62 and 63 protocols. Consequently, for the exchange of radar data in the short term, the ASTERIX 1 and 2 or 34 and 48 protocols would be used.

2.16 The automated system installed in Puerto Montt (radar data processor) is capable of accepting additional radars.

2.17 The transmission of radar data from Argentina to Chile will take place in early October 2013, since Chile is currently moving the REDDIG station, a task that is expected to be completed by the end of September 2013.

2.18 Chile would initially transmit from the Puerto Montt radar to Argentina, once the installation of the convertor has been completed, foreseen for early 2014. The installation and operation of new automated systems in the ACCs of Puerto Montt, Comodoro Rivadavia, and Mendoza is foreseen for the end of the first half of 2014. Radar data interconnection between the ACCs of Comodoro Rivadavia and Puerto Montt, and between the ACCs of Santiago and Mendoza, would initially take place using the ASTERIX 62 protocol.

2.19 The automated systems in the Santiago and Ezeiza ACCs have AIDC, so trials were scheduled between these systems. For the time being, trials cannot be carried out between the Comodoro and Puerto Montt ACCs since the Comodoro Rivadavia ACC does not have an automated system.

2.20 It was felt that, in order to verify the compatibility of the Santiago and Ezeiza AIDCs, trials would be carried out between the operational parties through the exchange of selected AIDC messages. The AIDC information would be sent through the AMHS.

2.21 It is expected that the delegates of Argentina and Chile will inform the Meeting about the progress made in the activities coordinated as a result of the mission.

Argentina-Brazil interconnection

2.22 Regarding the interconnection of automated systems between Argentina-Brazil (Curitiba ACC in Brazil, Resistencia ACC in Argentina), it was felt that the operational interconnection for the exchange of radar data using protocols 62 and 63 and the automatic transfer of flight plans using AIDC would be operational on the first months of the second semester of 2014.

2.23 This new delay in the interconnection of automated systems between the Curitiba and Resistencia ACCs is mainly due to the fact that the Resistencia ACC does not have an automated system installed, which is foreseen for mid 2014. Likewise, the Curitiba ACC will have a new automated system (Sagitario) by the end of 2013, with ASTERIX 62 and 63, and AIDC capability.

2.24 In order to proceed with the activities foreseen for the interconnection between Argentina and Brazil, Argentina informed that it had the secondary radars of Corrientes, Posadas, and Sáenz Peña. In this regard, Argentina was ready to send information from the aforementioned radars to Brazil. Brazil stated that it would have no problem to receive the radar information for analysis and integration into the current radar data processing system in Curitiba.

2.25 It is expected that the delegates of Argentina and Brazil will inform the Meeting about the status of implementation of the interconnection.

Argentina-Uruguay interconnection

2.26 Regarding the interconnection of automated systems between Argentina-Uruguay (Montevideo ACC and Ezeiza ACC), it was felt that this implementation could take place in the short term and operations could start in late 2013, or the first quarter of 2014 at the latest.

2.27 To date, the radar data of Durazno (Uruguay) is available at the Ezeiza ACC (Argentina) and the radar data of Quilmes (Argentina) is available in Montevideo (Uruguay), but it is not integrated into the radar data processing system, since it did not offer any useful operational information to the Montevideo ACC despite being contemplated in the MoU signed between Argentina and Chile for the interconnection of automated systems.

2.28 In this regard, following coordination between the aeronautical administrations of Argentina and Uruguay, it was felt that the Paraná radar in Argentina was useful for the Montevideo ACC.

2.29 During the mission, Argentina informed that the radar in Paraná was ready to send data in IP format to Uruguay through the REDDIG.

2.30 Uruguay is in the process of installing a new radar in Carrasco, which is expected to be operational by the end of 2013. Therefore, information from this radar would be sent to Argentina through the REDDIG by the first semester of 2014.

2.31 Regarding the implementation of AIDC, it could take place any time, since both the Montevideo and the Ezeiza ACCs have the same automated system (AIRCON 2100) and their flight plan processors are capable of processing AIDC.

2.32 It is expected that the delegates of Argentina and Uruguay will inform the SAM/IG Meeting about the progress made with the interconnection.

Brazil-Uruguay interconnection

2.33 The interconnection of automated systems between Brazil and Uruguay was initially contemplated in September 2009, and an MoU was established for the interconnection of radar data starting in June 2010 and AIDC operation starting in June 2011.

2.34 The process of modernisation of automated systems in the Curitiba and Montevideo ACCs delayed the implementation of the exchange of radar data and the automated transfer of flight plans.

2.35 The modernisation and commissioning of the automated system at the Montevideo ACC took place in late 2012, and the operation of the new automated system at the Curitiba ACC (replacement of the ATECH X 4000 system with the ATECH Sagitario) is foreseen for late 2013.

2.36 In this regard, the new date for completing the interconnection of automated systems between Brazil and Uruguay has been set for the first half of 2014. For the exchange of radar data, Brazil will use the ASTERIX 62 and 63 protocols (as foreseen in the regional plan for the interconnection of automated systems). Therefore, the automated system of the Montevideo ACC must be capable of receiving and accepting the ASTERIX 62 and 63 protocols. In case the automated system at the Montevideo ACC cannot transmit the ASTERIX 62 and 63 protocols, the radar data to be exchanged with Brazil (radars of Carrasco and Durazno) can be exchanged using the ASTERIX 1, 2 34 or 48 protocols.

2.37 The technical personnel of Uruguay asked INDRA about the capability of the AIRCON 2100 to receive, process, and transmit radar data using the ASTERIX 62 and 63 protocols. In this regard, INDRA will provide an answer by the end of the first week of October 2013.

2.38 Since both systems will contain the AIDC, the automated exchange of flight plans will be carried out using that application. It is expected that the delegates of Brazil and Uruguay will report on the status of implementation to the Meeting.

Brazil-Venezuela

2.39 Operational trials were conducted on 29 July to 2 August 2013 between the Maiquetía and Manaus ACCs. The trials were successful, and it was possible to exchange radar data and flight plans between the two ACCs. In this sense, Brazil and Venezuela will start coordinating the commissioning of the interconnection. It is expected that the delegates of Brazil and Venezuela will inform the Meeting on the status of operational implementation.

AIDC course for controllers and database managers

2.40 Following the automation missions and the requirement of the controllers, it was felt that an AIDC course should be provided for controllers and automated system database managers. In this regard, since Argentina had had a good experience with the AIDC interconnection between automated centres, consideration was given to holding a 5-day course on automation in Montevideo, Uruguay, conducted by an automation expert from Argentina.

2.41 Project RLA/06/01 would cover travel expenses to Uruguay and per diems for the instructor. The course will be conducted in Montevideo, on 4-8 November 2013. Through letter LN 3/24.1-SA466 dated 17 September 2013, the ICAO Regional Office invited all member States of Project RLA/06/901 to participate in the course.

Training events scheduled for 2014

2.42 In order to assist States in the implementation of automation activities, two *events* have been scheduled for 2014, one course on the interconnection of automated systems using the ASTERIX protocols and AIDC for technical and operational personnel, and a seminar/workshop on automated systems for ATS personnel.

2.43 The course on the interconnection of automated systems would be held in San Jose Dos Campos, Brazil, during the last week of February 2014, with the support of ATECH. The seminar/workshop on automation for ATS personnel would be held in Lima, Peru, in mid July 2014.

2.44 If the Meeting agrees to conduct these events, they will be submitted to the consideration of the seventh meeting of the Coordination Committee of Project RLA/03/901 (Lima, Peru, 27-29 November 2013) for its approval.

Status of implementation of the remaining interconnections foreseen in the SAM Region

2.45 **Appendix A** to this working paper contains a table showing the interconnection requirements for the SAM Region. It shows that **the goal for the end of 2015 is the implementation of 15 interconnections**. The implementation breakdown for the 2013-2015 period is as follows: 1 in 2013, 8 in 2014, and 6 in 2015.

2.46 For the States that have not yet implemented automated systems in their ACCs (La Paz, Bolivia), no date has been estimated for the interconnection of automated systems. Likewise, there are countries in the Region that need to analyse the requirement for the implementation of automated systems, and review the operational requirement.

3. **Suggested action**

3.1 The Meeting is invited to:

- a) take note of the information presented herein;
- b) analyse the information contained in section 2 and in Appendix A to this working paper, present the status of implementation, and review implementation goals; and
- c) discuss any other issue related to this topic.

APPENDIX A / APENDICE A

INTERCONNECTION OF AUTOMATED SYSTEMS /
INTERCONEXIÓN SISTEMAS AUTOMATIZADOS

| 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 | MoU implemented/ MoU implantado |
| | Chile | 2010 | Jul 2014 | MoU implemented/ MoU implantado |
| | Paraguay | May 2014 | Dec 2014 | |
| | Uruguay | 2009 | Jun 2014 | MoU implemented/ MoU implantado |
| Bolivia | Argentina | TBD | TBD | Bolivia has no automated systems/ Bolivia no cuenta con sistemas automatizados |
| | Brasil | TBD | TBD | |
| | Chile | TBD | TBD | |
| | Paraguay | TBD | TBD | |
| | Peru | TBD | TBD | |
| Brazil/Brasil | Argentina | 2009 | Aug 2014 | MoU implemented/ MoU implantado |
| | Bolivia | TBD | TBD | Bolivia has no automated systems/ Bolivia no cuenta con sistemas automatizados |
| | 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 | MoU implemented/ MoU implantado |
| | Suriname | TBD | TBD | Definir requerimiento |
| | Uruguay | 2009 | Aug 2014 | MoU implemented/ MoU implantado |
| | Venezuela | 2011 | Dic 2013 | MoU implemented/ MoU implantado |
| Chile | Argentina | 2010 | Jul 2014 | MoU implemented/ MoU implantado |
| | Peru | Jun 2014 | Mar 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 |
|--|---|--|---|---|
| Colombia | Brazil | Oct 2014 | Jul 2015 | |
| | Ecuador | May 2014 | Dic 2014 | |
| | Panamá | May 2014 | Dic 2014 | |
| | Peru | Oct 2014 | Jul 2015 | |
| | Venezuela | Dec 2014 | Dic 2015 | |
| Ecuador | Colombia | May 2014 | Dic 2014 | |
| | Peru | Oct 2013 | Jun 2014 | |
| French Guiana (France)/ Guyana Francesa (Francia) | Brasil | TBD | TBD | Define requirement/ Definir requerimiento |
| | Surinam | TBD | TBD | Define requirement/ Definir requerimiento |
| Guyana | Brazil | TBD | TBD | Define requirement/ Definir requerimiento |
| | Surinam | TBD | TBD | Define requirement/ Definir requerimiento |
| | Venezuela | TBD | TBD | Define requirement/ Definir requerimiento |
| Panama | Colombia | May 2014 | Dec 2014 | |
| Paraguay | Argentina | May 2014 | Dec 2014 | |
| | Bolivia | TBD | TBD | Bolivia has no automated systems/ Bolivia no cuenta con sistemas automatizados |
| | Brasil | Oct 2014 | Mar 2015 | |
| Peru | Bolivia | TBD | TBD | Bolivia has no automated systems/ Bolivia no cuenta con sistemas automatizados |
| | Colombia | Oct 2014 | Jul 2015 | |
| | Chile | Jun 2014 | Mar 2015 | |
| | Ecuador | Oct 2013 | Jun 2014 | |
| Surinam | Brasil | TBD | TBD | |
| | French Guiana (France) | TBD | TBD | |
| | Guyana | TBD | TBD | |
| Uruguay | Argentina | 2009 | Jun 2014 | |
| | Brasil | 2009 | Aug 2014 | MoU implemented/ MoU implantado |
| Venezuela | Brasil | 2011 | Dec 2013 | MoU implemented/ MoU implantado |
| | Colombia | Dec 2014 | Dec 2015 | |