



Agenda Item 3: Report on activities carried out since the last meeting of the Coordination Committee

FOLLOW-UP TO ACTION TAKEN BY THE DGCA OF CHILE REGARDING THE ACARS, CPDLC, AND ADS-C SERVICES PROVIDED BY SITA THROUGH THE REDDIG II NETWORK

(Presented by Chile)

SUMMARY

This working paper describes the action taken by the DGCA of Chile in relation to the ACARS services provided by SITA through the REDDIG II network.

REFERENCES:

- 1.1 SAM Performance-based air navigation system implementation plan, v 1.4, ICAO
- 1.2 Final report – RLA/03/901 SAM/IG/14
- 1.3 Final report – RLA/03/901 RCC/18
- 1.4 Final report – RLA/03/901 SAM/IG/15
- 1.5 Final report – RLA/03/901 SAM/IG/16
- 1.6 Final report – RLA/03/901 RCC/19
- 1.7 WP/21 – RLA/03/901 SAM/IG/17
- 1.8 WP/06 – RLA/03/901 SAM/IG/18

ICAO strategic objectives:

A – Safety

B – Air navigation capacity and efficiency

1. Background

1.1 At the SAM/IG/14 meeting held in Lima, Peru, on 10-14 November 2014, SITA, through WP/19, proposed South American ANSPs and the ICAO SAM Office to consider and agree on the use of the ATC systems of the REDDIG ANSPs in order to access the SITA ACARS processor in Brazil (Rio de Janeiro), with a view to communicating with the aircraft of their users through the SITA ACARS, using the connection to the ACARS processor in Montreal as backup.

1.2 The RCC/18 meeting held in Lima, Peru, on 2-4 March 2015, studied the proposal presented by SITA on access by air navigation service providers (ANSPs) to the SITA data link service through the REDDIG.

1.2.1 The Meeting considered that the proposal presented by SITA was useful for those States that had data link services with SITA, especially Chile and French Guiana, since these States had to hire communication providers to access the SITA network, thus increasing the cost of the data link service.

1.2.2 In this regard, the Meeting considered that, as a first step to access the SITA data link service through REDDIG II, tests would be conducted for a period of three months in one of the States

mentioned in the previous paragraph. In this regard, taking into account the current status of the data link service in these States, the Meeting considered that the tests should take place in Chile.

1.2.3 SITA informed the Meeting that it would provide full technical support, free of charge, to the aeronautical administration of Chile during the test period. In this sense, the Meeting agreed that Chile would study the possibility of conducting the tests and report to the ICAO Regional Office by 15 April 2015, and, if approved, tests would start in July 2015. In this regard, the Meeting formulated the following conclusion:

Conclusion RCC 18/2 “Tests to access the SITA data link service through the REDDIG II by ANSPs.”

In order to analyse the technical feasibility of access to the SITA data service through REDDIG II by the air navigation service providers (ANSPs) for a period of three months:

- a) That the Aeronautical Administration of Chile analyse the feasibility of carrying out tests, considering that no additional cost will be charged by SITA and that they would receive all the technical support from SITA and the REDDIG Administration and will report the results of the analysis to the ICAO South American Regional Office by April 15.
- b) The Secretariat will provide information regarding possible costs to be assumed by Chile for the testing period through REDDIG II, no later than 30 March 2015.
- c) In case testing by Chile is feasible, tests will begin in July 2015.

1.3 On 8 October 2015, trials and demonstrations started as follows:

Day 1: Thursday 8 October

12:00 – 15:00 GMT Installation and setup of equipment in Chile

- 1.a. Installation of a new router and cables between REDDIG and the DGCA of Chile;
- 1.b. Configuration of the network at the DGCA, Recife, and SITA
- 1.c. Connectivity test (Telnet) to check connections

Day 2: Tuesday 20 October

11:00 – 13:00 GMT Installation and setup of equipment in Recife

- 2.a. Installation of a new router and cables between REDDIG and PREC in Recife
- 2.b. Configuration of the network at the DGCA, Recife, and SITA
- 2.c. Connectivity test (Telnet) to check connections

14:00 – 16:00 GMT Traffic migration

Configuration of the server for use of the YUL processor through REDDIG
Configuration of the server for use of the GIG processor through REDDIG
Observation of traffic through REDDIG to GIG

Day 3: Wednesday 21 October

11:00 – 13:00 GMT Decision on the duration of testing and network backup connection

- 4.1. The DGCA informed on the duration of the test
- 4.2. Add CPDLC traffic configuration in the YUL processor through OBS
- 4.3. Observation of traffic

Day 4: Thursday 22 October

17:00 – 18:00 GMT Completion of backup testing between REDDIG and OBS transmissions

- 5.1. Configuration of the SITA processor for backup purposes
- 5.2. Check the backup solution

1.4 The RCC/19 meeting held in Lima, Peru, on 7-9 March 2016, pursuant to Conclusion RCC/18-2 “*Tests on access to the SITA data link service through the REDDIG II by ANSPs*”, considered that the tests for accessing data link information of the Oceanic ACC of Chile through the REDDIG II to the REDDIG II node in Recife and then through the SITA network to the new processing centre in Rio had been successful.

1.4.1 The Meeting considered that, despite the positive test results, these tests should continue until the first week of May 2016, to better study the performance of the data link service in REDDIG. The final results of this extended testing period would be initially presented during a teleconference to be held on the first week of May 2016 with the participation of all REDDIG II member States and SITA.

1.4.2 The Meeting took note of a network configuration design developed by SITA for operational use by any ANSP willing to connect to SITA using its REDDIG II node as point of access, thus ensuring the use of a more economical dedicated ATC network. The diagram is shown in Appendix O.

1.4.3 In this regard, the Meeting considered that, in order to conduct a detailed review of the network configuration shown in Appendix O, REDDIG II members had to be informed about the final results of the tests in Chile, and about the cost/benefit study conducted by Chile and SITA using REDDIG II to carry the data link service.

1.4.4 The SITA representative noted that the results would be presented at the SAM/IG/17 meeting to be held in Lima, Peru, on 9-13 May 2016. Since the SAM/IG meeting was only for SAM States, it was agreed that a teleconference would be carried out the week prior to the SAM/IG/17 meeting to inform Trinidad & Tobago about the results and possibly make recommendations.

1.5 At the SAM/IG/17-NE/21 meeting held in Lima, Peru, on 9-13 May 2016, SITA presented a detailed report with a summary of the tests

Summary of the testing report - Appendix O

1.5.1 In South America, SITA and some ANSPs have signed commercial agreements for the provision of data link services in their respective FIRs. Cost estimations take into consideration, among other factors, the number of ICAO addresses to be served, managed FANS service, including operational support, monthly performance reports, etc., as well as the type of IP connectivity solution implementation requirement defined by the ANSP (single IP or XoT circuit, mission-critical circuit MCS, including backup circuit features).

1.5.2 The cost of the ANSP-SITA connectivity solution varies depending on the generic IP telecommunication networks, which were not specifically designed to support ATC air-ground communications.

1.5.3 In the working paper presented at the RCC/8 meeting held in 2015, SITA gave an example of data link traffic load in the Atlantic ACC (SBAO) to show that the use of an ANSP to access the SITA data link processor through REDDIG would have a very low impact on REDDIG. However, a full check of the traffic load to the DGCA of Chile would correspond to the DGCA, while traffic to the network during the period would have to be checked by REDDIG. At present, only global traffic can be verified in each REDDIG node, but the possibility for the network operator to discriminate traffic in the future by use or service is under study.

1.5.4 Therefore, based on the technical requirements and test results obtained so far, SITA has developed a final connectivity solution to be implemented in case the DGCA or any other ANSP chooses to access the SITA data link processor in Rio through the REDDIG.

1.5.5 Furthermore, based on tests conducted specifically on the configuration of the final operational solution proposed, SITA can confirm that the SITA commercial model to be adopted in case an ANSP chooses to connect to SITA through the REDDIG will not entail **any connectivity charges to the ANSP**, and the only possible charges to the ANSP would come from the REDDIG service provider for the additional use of the network for that specific service/application.

1.5.6 In the case of the DGCA of Chile, note should be taken of the current costs of the SITA contract, which include high-availability connectivity services with dual/diversified access to the SITA network managed through OBS links, compared to the implementation of the operational connectivity solution with the same requirements, through REDDIG.

1.5.7 The SITA ACARS processor is located at the Rio de Janeiro international airport (GIG), which has no point of access to the REDDIG. Consequently, the tests conducted with the DGCA of Chile required the installation of a connection with the REDDIG point of access through DECEA in Recife. To avoid this intermediate network, SITA would ask ICAO and the REDDIG community to consider allowing SITA to pay for the establishment of a direct point of access to REDDIG at the GIG airport, thus giving REDDIG users direct access to the SITA network.

1.6 **Summary of the Teleconference for the implementation of the SITA data link through REDDIG II (21 June 2016 from 8:00 to 8:45 Lima local time)**

1.7 On 21 June 2016 at 9:00 Lima local time, a teleconference was held as requested by the ICAO Regional Office, to inform the focal points of REDDIG member States, especially Trinidad & Tobago, about aspects related to the implementation of the SITA data link service at the Oceanic ACC of Chile through REDDIG II and the internal communication network of Brazil to reach the SITA data processing centre in Rio de Janeiro.

1.7.1 The SITA connection through REDDIG is currently disconnected, since the test period is over. Tests were completely satisfactory from the technical and operational point of view, confirming the feasibility of supporting SITA services through the server in Rio de Janeiro.

1.7.2 Measurements made by Eng. Luis Alejos, the REDDIG Administrator, showed that there was a **0.5%** increase in bandwidth consumption at the node in Chile and **1%** at the Recife node.

1.7.3 With the participation of several States, the REDDIG Administration and SITA addressed several issues:

1.7.3.1 SITA maintains its proposal of a dual connection, adding a link through the Brasilia node, to address the need for increased availability.

1.7.3.2 SITA was requested to install a router between the VITRO server (DGCA) and REDDIG, since the service was provided by SITA and not by REDDIG, according to the responsibilities and management arrangements of the connection, which must not be assumed by the REDDIG Administration. SITA must take on the oversight of the connection together with the DGCA.

1.7.3.3 The question was asked whether Recife and Brasilia would be operating as main and backup, or in a dual manner.

1.8 **As a follow-up to the analysis of the REDDIG II connection setup for the transport of SITA data link services (Conclusion SAM/IG/17/02) made at the teleconference of 21 June 2016, SITA prepared the following information:**

1.8.1 Will nodes be operating simultaneously or as backup?

- SITA recommends to keep both links active simultaneously, but to have a primary site connected to the GIG processor and a secondary site connected to YUL.
- The decision to use the primary or secondary links will be made in the application (ANSP ATS server).
- Since both MATIP connections will remain active, the transfer time from one link to the other will be faster (about 30 seconds).
- The MATIP link management heartbeat is about 50 bytes per minute.
- It is possible to have a second site in another country instead of having 2 sites in Brazil (more robust, recommended). Please, inform.
- The number of routers at SITA sites will be same as that provided by REDDIG and, according to the drawing sent by REDDIG, there will be only one piece of equipment available. Having one router will not affect availability, since SITA will have 2 separate nodes.

1.8.2 Who will be responsible for the equipment at the ANSP?

- The proposal of giving ANSP access to the SITA network through REDDIG is based on:
 - 1) The use of the dedicated ATC ground network owned by the SAM ANSP; and
 - 2) The reduction of costs, such as third party last-mile costs that SITA must transfer to the ANSP, would be cancelled. If States choose to have a router managed by SITA within the ANSP, SITA would probably have to consider reflecting the cost of these routers in its commercial agreement with each ANSP.
- Furthermore, if an ANSP wishes to migrate to REDDIG and also has a SITA router, we will have to check if OBS allows us to install the router within the ANSP, even without having company transmission and the associated cost (not recommended).

- SITA recommends 2 ANSP routers to avoid a single point of failure.

1.8.3 Updated drawings and configuration - **Appendix C.**

- The attached PDF files contain the configuration of 2 SITA nodes in Brazil (it is possible to change a site to another country) connected to the REDDIG; and
 - 1) At present, one ANSP router connected to REDDIG as available network.
 - 2) Two ANSP routers connected to REDDIG in accordance with the recommended configuration (more robust).

1.9 **Summary of Teleconference for the implementation of the SITA data link through REDDIG II (24 August 2017 from 8:00 to 8:45 Lima local time)**

1.9.1 On 24 August 2017 from 8:00 to 8:45 Lima local time, a teleconference was held at the request of the DGCA of Chile to clarify aspects related to the implementation of the SITA data link service at the Oceanico ACC of Chile through REDDIG II and the internal communication network of Brazil to get to the SITA data processing centre in Rio de Janeiro. The teleconference was attended by:

DECEA Brazil, DGCA of Chile, ICAO, REDDIG Administrator, and CNS Officer.

1.9.2 The circuit configuration used for testing would not be the same when implementing the operational configuration. In this sense, pursuant to conclusion SAM/IG/17/02: Analysis of the REDDIG II connection configuration for the transport of SITA data link services, a teleconference was held on 21 June 2016 among REDDIG member States, the REDDIG Administration and SITA regarding the final connection diagrams contained in Appendix C.

1.9.3 The Fifth Technical Operational Meeting of REDDIG II took note of the standardisation of the native IP service connection to REDDIG. Taking as an example the implementation at the SCCEL station in Chile, the general connection diagram for native IP services was presented, as shown in Appendix C to this summary. Although the diagram only shows one router and switch, a dual configuration is required (main and auxiliary).

1.9.4 This configuration of the data link service in Chile must be applied at the REDDIG II nodes of Santiago, Recife, and Brasilia. All IP circuits entering the REDDIG II should go through these routers.

1.9.5 The cost that REDDIG II will charge Chile for the transport of this data link service will cover traffic associated to this service at the Santiago node and traffic associated to this service going through Recife and Brasilia. The cost of this service will be provided after completing tests of the final SITA configuration. During the data link test period between October 2015 and mid 2016, the increase in bandwidth consumption has been almost negligible.

1.9.6 During the teleconference, the question was asked if DECEA would charge for the use of the internal communication network of Brazil to reach the SITA data link processor in Rio de Janeiro. In this regard, it was noted that the internal communication network of Brazil was managed by SITA and the cost of using this network should be presented by SITA to the Civil Aviation Administration of Chile; DECEA had no responsibility in this regard and would not charge for any costs.

1.9.7 As to the next steps, it was noted that the implementation of the SITA data link service through REDDIG II should be completed by October 2017. Likewise, prior to the final implementation of the circuit configuration, it was important to hold teleconferences among the focal points of Chile, the REDDIG Administrator and SITA.

1.10 **Summary of the Teleconference on the implementation of SITA data links through REDDIG II (26 September 2018 from 9:00 to 10:00 Lima local time)**

1.10.1 A new teleconference was held to provide updated information on the activities for the connection of SITA CPDLC and ADS-C services at the Oceanico control centre of Chile through REDDIG. It was highlighted that the process involved in this initiative had taken a long time and that many of those who had participated at the beginning of the meetings and testing were no longer there to see this task completed. For this reason, the process was reviewed and a summary of pending activities prepared.

1.10.2 Emphasis was placed on the need to define the responsibilities for connection management, through the installation of a SITA router at the ANSP so as not to overload NCC activities.

1.10.3 Regarding the cost for the nodes of Brazil (Recife and Brasilia) of using bandwidth to send CPDLC and ADS-C messages from SITA to the node of Santiago de Chile, the Administrations of both countries need to sign a document, which can be a formal letter of agreement.

1.10.4 The bandwidths used by the SITA service at the nodes of Santiago, Recife and Brasilia shall be individualised and quantified by the REDDIG Administrator, and then valued and included in the annual expenditures of Chile as bandwidth utilisation. All States hiring SITA services through REDDIG must apply this model.

2. **Issues to be defined and analysed**

2.1 Validation of the configuration proposed by SITA, with dual ANSP router.

2.2 Validation of the proposal of the ANSP of Chile and ICAO, whereby SITA would install a router (or two) between the ANSP routers and the CDPLC and ADS-C server.

2.3 Formalise, through a letter of agreement, the transfer of amounts collected for satellite bandwidth utilisation between Chile and Brazil.

2.4 Implications of adding more ANSPs to SITA services on the DECEA network of Brazil and on the REDDIG bandwidth in the Brasilia and Recife nodes.

3. **Suggested action**

3.1 **The Meeting is invited to:**

- a) take note of the information contained in this working paper;
- b) take note of the information concerning the conduction of tests by the ANSP of Chile to access the SITA ACARS service through REDDIG II, and the technical and administrative requirements reported by the DGCA of Chile, Brazil, ICAO and SITA.

- c) urge States, in light of the results obtained in the tests and demonstrations, to use the technology offered by automatic dependent surveillance (ADS), through REDDIG, in order to optimise the use of SAM airspace and enhance safety levels.