



**Agenda Item 4: Work plan for 2015**

**ANSP REDDIG Access to SITA Data Link**

(Presented by SITA)

<b>SUMMARY</b>	
<p>Following to the Conclusion SAM/IG/14-4 convenient at the SAM/IG/4 Meeting held in Lima, Peru, in November, 2014, this working paper presents an overview on the implementation of ANSP access through the REDDIG II to the SITA data link service</p>	
<b>References</b>	
<ul style="list-style-type: none"> <li>• Performance-Based Air Navigation System Implementation Plan for the SAM Region, version 1.4, ICAO</li> <li>• Final Report - RLA/03/901 Fourteenth workshop/meeting of the SAM Implementation Group (SAM/IG/14)</li> </ul>	
<b>ICAO Strategic Objective:</b>	<p><i>A - Safety</i> <i>B - Air navigation capacity and efficiency</i></p>

**1. SAM ANPS using SITA ATS AIRCOM**

1.1 Currently SITA ATS AIRCOM service supports several SAM ANSP datalink services such as FANS 1/A in Brazil (DECEA), Uruguay (DINACIA), Chile (DGAC), French Guyana (DSNA), Argentina (DGCTA) and also in Central America (COCESNA).

State	ANSP	FIR	ATC DKL status	ATC System supplier
Argentina	DGCTA	SAEZ, SACV	Pre-Operational	INDRA
Brazil	DECEA	SBAO	Operational	ATECH
Chile	DGAC	SCEZ	Operational	THALES
Uruguay	DINACIA	SUEO	Pre-Operational	INDRA
French Guyenne	DSNA	SOOO	Operational	ADACEL
Central America	COCESNA	MHTG	Pre-operational	INDRA

Table 1 – SAM ANSP Data link status

1.2 Depending on each ANSP requirement, a connectivity solution to enable ANSP access to SITA AIRCOM through IP service was put in place, being most of them dependent on generic telecom network supplier.

1.3 The SITA provided IP service has the same interfaces and technology as other generic telecom networks and was not designed specifically to support ATC or air-ground communications. This generic IP network service capability should be the same as is provided by the SAM REDDIG network and the SITA defined “MATIP” envelope for identifying ACARS messages when sent over IP networks.

ANSP	ATS datalink service	Connectivity solution	IP provider
Argentina DGCTA	FANS 1/A	Single IHW connection between SITA and DGCTA technical premises in EZEIZA allow physical interconnection	NO
Brasil DECEA	FANS 1/A	2 IP access points (MCS model)	YES
Chile DGAC	FANS 1/A	Single IP access point (Single IP circuit being replaced by MCS solution)	YES
French Guyana DSNA	FANS 1/A	IP access points (MCS model)	YES
Central America COCESNA	FANS 1/A	2 XoT access points (MCS model, being replaced by pure IP)	YES
Uruguay DINACIA	FANS 1/A	Single IP access point	YES

Table 2 – Current SAM ANSP connectivity to SITA ATS AIRCOM

1.4 SITA and ANSP signed commercial agreements for data link service provision in their respective FIRs. The costs estimation take into consideration, among other factors, the amount of ICAO addresses to be served, managed service including operational support, monthly performance reports, etc as well the type of the IP connectivity solution implementation requirement defined by the ANSP (single IP or XoT circuit, or MCS including circuit backup features).

1.5 The IP generic service once supplied by third party such as local telecom companies can present different price information and due confidential commercial clauses with those suppliers and also with ANSP these information cannot be publicly disclosed however, in general it is reasonable to say that IP monthly costs for a SAM ANSP are in the range of U\$ 3,000 apart of including one time installation and disconnection charges.

1.6 As for network traffic, based on traffic statistics generated to ACC Atlantico in January 2015, it is possible to demonstrate the following load usage of the IP network:

ANSP Total traffic:	(Acars Blocks)
Brazil FANS traffic	<b>125.262</b>
Then:	
Total kbits in Jan15 =	<b>125.262</b>
Seconds/month =	2592000
Kbits/sec =	0,048326389 or <b>0,05Kbits/sec</b>

1 Acars Block = 1Kbit  
 1 Block = 125 caracters (in average)  
 1 Character= 8 bits

Therefore,  $125 \times 8 = 1000 \text{ bits} = 1 \text{ kbit}$

## 2. SITA AIRCOM Data link Service infrastructure in Brazil

2.1 In 2012, in order to meet the requirements of DECEA for VHF data link in Brazil, SITA added an ACARS processor in Rio de Janeiro to manage the ACARS service via new VHF stations deployed all across Brazil. The ACARS processor in Brazil can be accessed by DECEA servers through two distinct points of access: Rio de Janeiro and Recife.

2.2 The ACARS processor in Brazil manages the all datalink traffic generated in Brazilian airspace, including airlines operational communications (AOC) and ATS traffic to/from DECEA ATS Data link systems such as ADS-CPDLC, D-ATIS, D-VOLMET and DCL.

2.3 DECEA requirements to SITA demanded a datalink processor with same operational characteristics of SITA ACARS processors installed in Montreal and Singapore as it is meant to support airline operations and ATS services.

2.4 The entire network consists of 53 VHF ground stations, containing both ACARS and VDLM2 radios which shall be fully delivered by end of 2015. The project also includes an ATN routing capability that will support the DECEA plans to transition to ATN in the future.

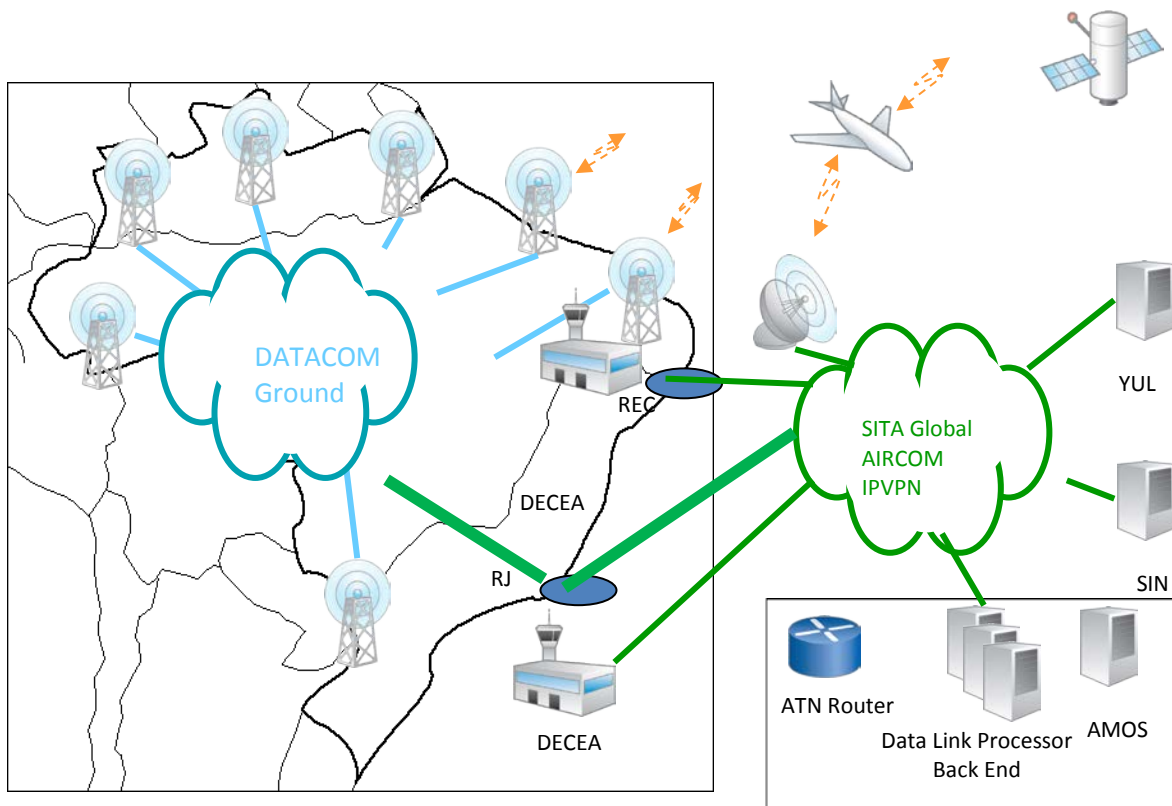


Figure 1 – SITA AIRCOM infrastructure in Brazil

## 3. REDDIG Access to ACARS

3.1 SITA proposes the South American ANSPs and the ICAO SAM office evaluate and agree on the ANSP system use of the REDDIG network to access the SITA Brazil ACARS processor to communicate via the SITA ACARS service with its user aircraft, instead of the current SITA provided connections to the ACARS processors in Montreal and Singapore.

3.2 In the last SAM IG meeting, SITA offered to present a detailed traffic analysis in order to get proper sizing to meet current and projected traffic loads, since SAM ANSP provide SITA with respective ACARS traffic projections. Although, no data was received, SITA is confident that, based on available data for the existing operational FIRs, that proposed interconnection will not overload REDDIG network operation.

3.3 The SITA proposed ANSP use of REDDIG to access the SITA ACARS service would replace the current SITA provided IP network access through generic telecom providers and would have the following benefits:

- ANSPs would benefit from using a highly reliable and secure network designed for ATC purposes to access the data link service which is becoming more critical to ATC operations
- ANSPs would get increased value from the REDDIG network by saving the charges from SITA for the current SITA provided ground network access links to SITA ACARS service
- ANSP transition from using the current SITA provided links to using the REDDIG IP links should require no change to the ANSP system interfaces.

The technical details of the protocols needing to be used are defined in the attachment.

#### 4. **Suggested Action**

4.1 The Meeting is invited to:

Agree on SAM ANSP access using REDDIG to SITA ACARS processor in Brazil as primary or alternative path to SITA AIRCOM Service, to focus on the following aspects:

- 1) Discuss and agree on a comprehensive framework, specific terms and conditions between SITA and REDDIG committee;
- 2) Agree on step-by-step approach implementation of the agreement, by starting with a single ANSP trial access in order to verify all requirements (security, performance, etc) for both SITA and REDDIG networks are met; and
- 3) Include SITA as member of REDDIG Coordination Committee.

-----

## ATTACHMENT A

### 1. ANSP SITA AIRCOM Interface Specification

This attachment defines the current SAM ANSP FANS-1/A systems interface over the SITA IP service to the SITA ACARS processors in Montreal and Singapore that would need to be maintained over REDDIG IP interface to the Brazil ACARS processor.

#### 1.1 Main elements:

The main elements involved in the IP direct access to AIRCOM Datalink Services are:

- ANSP's host (ATC system),
- ANSP's IP communication and security infrastructure (ANSP LAN),
- Global SITA IP Network (SITA WAN: ServiceNet),
- AIRCOM Datalink Services dedicated infrastructure elements,
  - ✓ The "AIRCOM" ServiceNet community,
  - ✓ IP communication and security infrastructure (ACSNet),
  - ✓ ACARS data link processor system..

#### 1.2 ACARS Ground Message format

The **AEEC 620** Data link Ground System Standard and Interface Specification for ACARS-Based ATS messages such as FANS-1/A ADS-C and CPDLC messages specify that between ground systems and air-ground message processors ACARS messages are to be encapsulated in IATA Standard Message Text format messages, which in SITA terminology are known as **Type B messages**.

#### 1.3 Access protocol

Air Navigation Service Provider (ANSP) application system(s) connected to SITA via IP exchange ACARS Type B messages using these protocols defined by the airline industry to enable the transport of legacy format airline messages over IP networks:

- BATAP (Type B Application to Application Protocol) – which confirms message delivery
- MATIP (Mapping of Airline Messaging Traffic over IP).

The ANSP systems optimize access availability by simultaneously maintaining a MATIP session to the SITA Datalink processor system located in Montreal and to the SITA Datalink processor system located in Singapore via each active physical connection. A customer system must be ready to accept traffic from any of these two MATIP paths at anytime. The ANSP system may send traffic to any of the available MATIP path at any time. If an ANSP has multiple systems, e.g. on-line and backup system, each system must adhere to these rules.

BATAP standard was originally developed by SITA in 1985 and subsequently superseded by an IATA standard in 1995.

BATAP ensures:

- Store and forward guaranteed delivery of Type B\* messages via an imbedded message acknowledgment mechanism, referred to in BATAP standard as

“protection.” (This solves the problem that TCP/IP byte stream does not ensure data protection (no store and forward),

- Flow control management.

MATIP is compatible with any TCP/IP routing equipment and was standardized in 1998 as RFC2351, being adopted by the majority of Type B users as means to exchange messages over IP network.

MATIP ensures:

- End to end session management (Open, maintain, close.)
- Message encapsulation over the TCP/IP stream. This solves the problem that TCP/IP byte stream does not have knowledge of where a Type B message begins and ends.
- Data integrity via session establishment parameters and message boundaries.
- MATIP

#### 1.4 IP Connectivity

The access to AIRCOM Datalink Services is available on the SITA global ServiceNet IP network ‘aircom’ community accessing the SITA dedicated IP AIRCOM production infrastructure (ACSNet). The ‘aircom’ community is a many-to-one community created inside the IP Core Network (ICN) where many customers can communicate only with SITA provided Datalink access servers.

SITA usually highly recommends that ANSP implement “mission critical” IP ServiceNet connectivity (2 routers using VRRP or HSRP) to access the ‘aircom’ community. This connectivity service is known as MCS (Mission Critical Site) solution and can be provided over any telecom network providing the generic Internet Protocol (IP). The minimum required bandwidth capacity for IP connection is 64K.

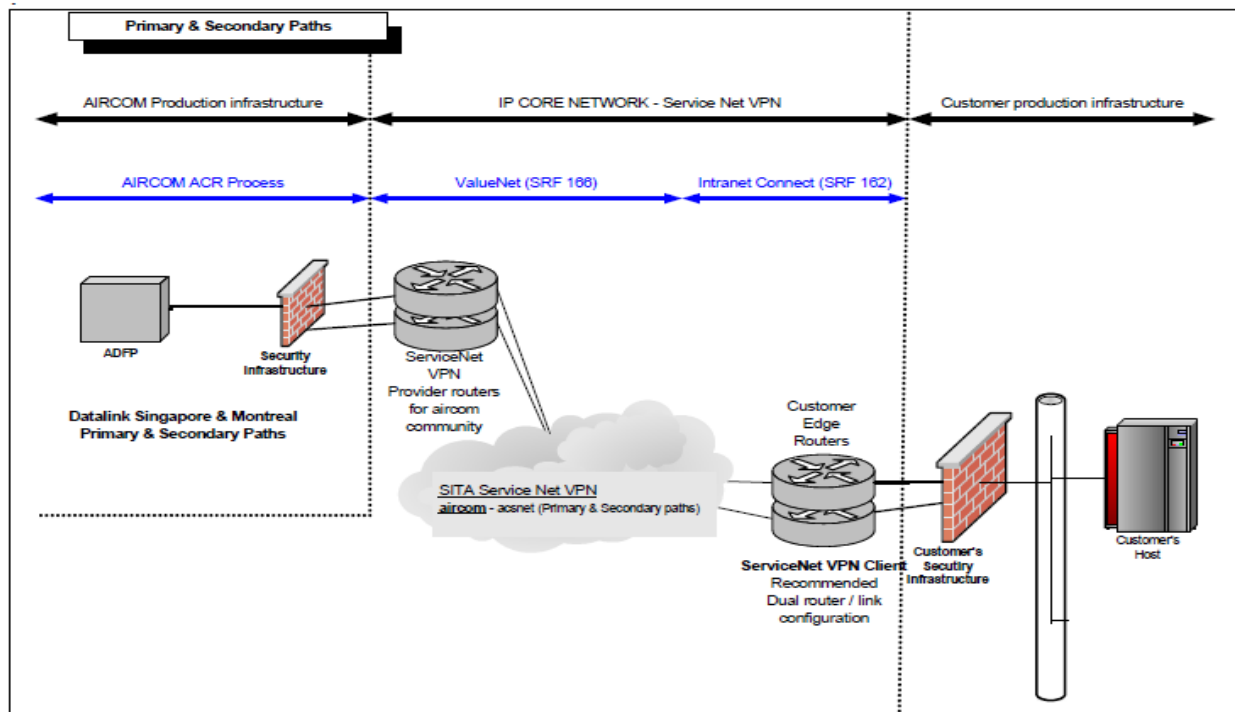


Figure 1 - Standard ANSP network infrastructure

1.5 Security aspects

ANSP should implement and maintain the necessary infrastructure to ensure a secure access to the SITA ServiceNet ‘**ACSNet**’ also known as ‘**aircom**’ VPN network and community.

SITA has a subscription / registration process and a qualification process in order for a customer to get access to the Datalink services via IP.

SITA only grants access to the Datalink services via IP connectivity to only well identified, qualified, authorized, and properly configured customer systems.

SITA shall bar the access to the AIRCOM Datalink service to any unknown remote party, reserving the right to immediately bar any incoming traffic and refuse any connection containing information not compliant with SITA qualification process. SITA does not respond on purpose to ‘ping’ or ‘traceroute’ requests on the public service addresses.

To avoid unwanted access to SITA IP Datalink Service access points, ANSP users are requested to keep the Datalink Service IP addresses confidential.

SITA IP infrastructure is based on a multi-layered secured architecture designed according to the industry standards.

-----