



Agenda Item 6: Assessment of operational requirements in order to determine the implementation of communications, navigation, and surveillance (CNS) capabilities improvement for en-route and terminal area operations

ANSP REDDIG Access to SITA Data Link

(Presented by SITA)

SUMMARY	
This working paper is intended to present SITA proposal to the States use REDDIG to access the SITA AIRCOM data link network, to improve compliance with the resilience requirement for ATC data link services being implemented in the SAM region.	
REFERENCE	
<ul style="list-style-type: none"> - Performance-Based Air Navigation System Implementation Plan for the SAM Region, version 1.4, ICAO. - Final Report - RLA/03/901 Seventeenth Meeting of the Coordination Committee (RCC/17) 	
ICAO Strategic Objectives:	<ul style="list-style-type: none"> <i>A - Safety</i> <i>B - Air navigation capacity and efficiency</i>

1. Introduction

1.1 Air Navigation Service Providers of most South America countries have implemented or plan to implement ATC systems that use ACARS data link communications with aircraft, specially on remote oceanic areas.

1.2 The ATC systems use ACARS (Aircraft Communications Addressing and Reporting System) protocol for both Future Air Navigation System (FANS) applications (Controller Pilot Data Link Comms / Automatic Dependent Surveillance Contract) and simpler pre-FANS applications that include Departure Clearance and Digital ATIS.

1.3 The ANSP FANS systems communicate with aircraft via ACARS communications networks of which one is provided by SITA and used by the majority of South American airlines and Air Navigation Service providers already operating FANS in the region. The SITA ACARS network uses air ground radio links via VHF ground stations and the satellites of Inmarsat and Iridium constellations.

1.4 The ANSP FANS systems need to access the ACARS service via a central ACARS Processor which handles the specialized air-ground data link protocol via the VHF and satellite ground stations and over the radio links with the aircraft ACARS systems.

1.5 SITA operates global ACARS processors in Montreal and Singapore but to meet the requirements of DECEA for VHF data link in Brazil in 2012, 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 ATS servers through two distinct points of access: Rio de Janeiro and Recife.

1.6 The Figure 1 presents the high level diagram of SITA AIRCOM infrastructure including VHF, VDL Mode 2, satellite constellations (INMARSAT and IRIDIUM), ground network and ACARS processors in Montreal and Singapore.

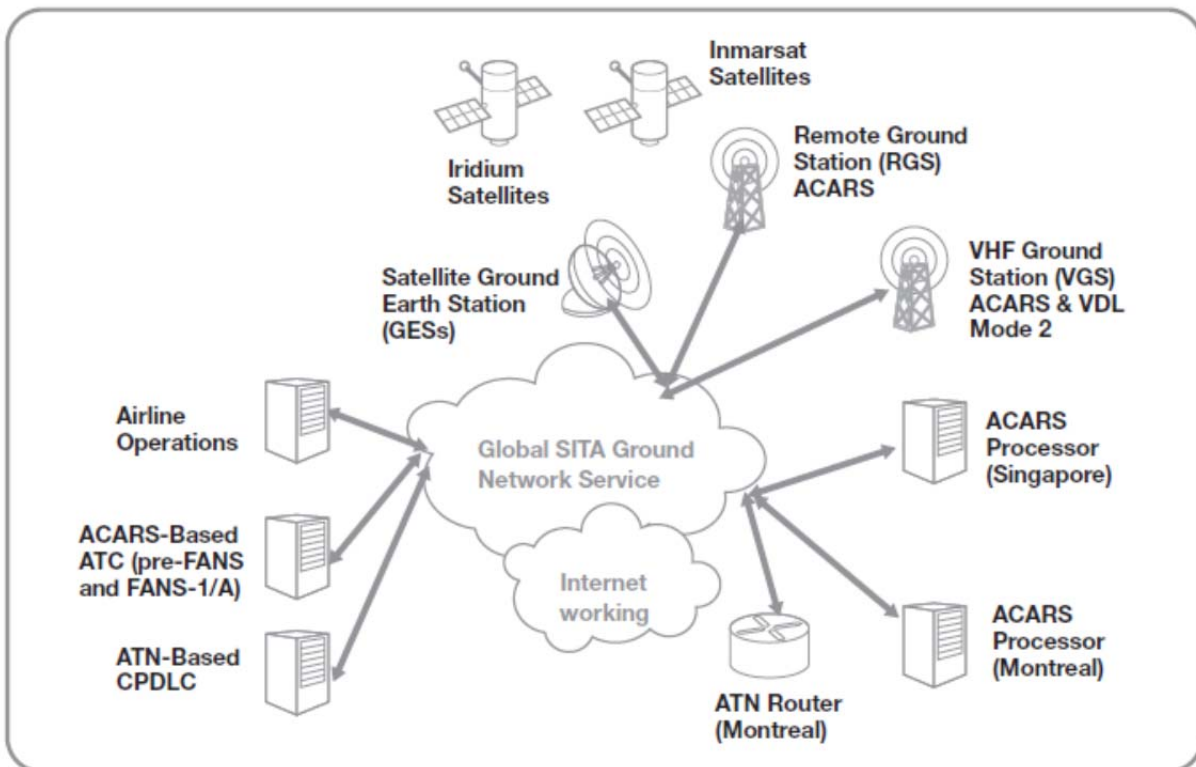


Figure 1- SITA AIRCOM infrastructure

2. Analysis

ANSP Access to SITA ACARS

2.1 The reason that ANSP systems using ACARS communications cannot connect directly to the radio stations used and instead to need to connect via a central ACARS processor is that it handles the following functions:

- ACARS air-ground messaging protocol defined in AEEC Specification 620
- ACARS radio link protocol defined in AEEC Specification 618.

2.2 The ANSP systems exchange messages with the ACARS processor using in AEEC Specification 620 defined formats. The ATC data link system vendors including SITA, Thales and Indra have all implemented these ACARS formats.

2.3 The ATC data link systems can exchange these messages with the ACARS processor over any telecom network providing the generic Internet Protocol (IP). The SAM ANSPs currently access the SITA ACARS processor using a SITA provided generic IP service.

2.4 The SITA provided IP service 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.

2.5 Currently to comply with high availability requirement for ATS datalink service implementation, SITA recommends ANSP to deploy dedicated dual IP/VPN physical connections to SITA AIRCOM network and the minimum required bandwidth capacity for the IP connection is 64K.

2.6 The ANSP system use of IP for ACARS access has replaced the historically used but now obsolete X.25 protocol. However some ANSP systems have not yet been upgraded from X.25 interfaces to IP and for them SITA offers the CISCO standard X.25 over TCP/IP interface as a transition solution.

SAM ANPS REDDIG Access to ACARS

2.7 The South American ANSPs, through the ICAO SAM office, have implemented a regional telecom network called REDDIG, which they use for the exchange of aeronautical information and other data each ANSP decides to share with its neighboring ANSPs.

2.8 The purpose of the REDDIG network is to enable ANSP exchange of Aeronautical Information Service data, non confidential surveillance data and future access to potential regional systems such as an Aeronautical Information Service Data Base and an Air Traffic Flow Management System.

2.9 Currently REDDIG has three nodes in Brazil at following sites Manaus, Recife and Curitiba. A forth node will be deployed in Brasilia in 2015.

2.10 The ANSP implementation of ATC systems using ACARS data link opens up an interest for the ANSPs to add to the REDDIG users the access to ACARS services. The ACARS message traffic amount is low and should not pose any capacity issues for the REDDIG network design.

2.11 SITA proposes the South American ANSPs and the ICAO SAM office evaluate 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.

Benefits

2.12 The SITA proposed ANSP use of REDDIG to access the SITA ACARS service would replace the current SITA provided ground network access 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.

Recommendations

2.13 SITA recommends the South American ANSPs and the ICAO SAM Office consider that:

- SITA's deployment to meet DECEA requirements of an ACARS processor in Brazil means there is a SITA ACARS processor that can be reached by a REDDIG network through Recife node.
- Subject to specific terms and conditions to be detailed with ICAO SAM office, the other ANSPs with REDDIG access could use the Recife REDDIG access point to communicate with the SITA ACARS processor regionally.
- SITA will support any ANSP wishing to trial the use of REDDIG to access the SITA ACARS service and will work with the REDDIG service provider to establish the access, considering all requirements related to both networks.
- SITA is ready to prepare and provide SAM States and ICAO SAM office a traffic analysis to ensure get proper sizing to meet current and projected traffic loads and to validate that do not project overloading REDDIG. In order to do that, SITA recommends that all the ANSP provide the ICAO office with their current and future estimated ACARS traffic for planning purposes.

3. Suggested Action

The Meeting is invited to:

- a) Take note of the information contained in this working paper;
- b) consider the possibility to include this subject in the next REDDIG coordination meeting agenda in order to enable SITA to present further technical detailing of the proposal, present a traffic load analysis as well explore the possible agreement mechanism; and
- c) discuss any other matters it may deem appropriate.

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