

ELEVENTH AIR NAVIGATION CONFERENCE

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**Agenda Item 7 Aeronautical air-ground and air-to-air
: communications**

**UPGRADE AND ENHANCEMENT OF THE BRAZILIAN VHF
DATALINK COMMUNICATIONS SERVICES — DATACOM
SYSTEM**

(Presented by Brazil)

SUMMARY

This information paper presents the directives adopted by the Brazilian Department of Air Space Control (DECEA) to upgrade and enhance the Brazilian VHF Datalink Communications System, called DATACOM, and its impact on the on-going Brazilian CNS/ATM transition plan.

1. INTRODUCTION

1.1 The Aeronautical Telecommunications Network (ATN), which will support the CNS/ATM, foresees the use of VHF, satellite, Mode S and HF subnetworks. The Brazilian strategy of VHF subnetwork implementation was developed using the Aircraft Communication Addressing and Reporting System (ACARS) and will be updated as necessary with new technologies.

1.2 The Brazilian Administration, before taking the decision to implement its own network, studied different options, and in 1995 signed a contract with "Société Internationale de Télécommunications Aéronautiques" (SITA) to implement the DATACOM System.

1.3 By that time, the two main directives established by DECEA to improve air-ground communications by using existing ACARS technology were:

- a) to be the only datalink communication service provider in the Brazilian airspace, primarily to enable the exchange of air traffic services and related data between aircraft under their control and their datalink enabled Air Traffic Management Systems given DECEA's primary mission of flight protection; and

- b) to be the first step in the Brazilian transition to ATN, creating value through a real datalink communication experience and paving the way towards a full ATN environment, in a consistent and solid manner.

1.4 DECEA intends to modernize the DATACOM system by improving current hardware and software technology that will allow DATACOM to support new datalink communications technologies and underpin Brazil's position as an active player in the process of development of CNS/ATM systems for the Region.

2. **SYSTEM DESCRIPTION**

2.1 The DATACOM is a system based on real-time air-ground digital communications and aims to reduce the amount of voice communication through automatic data transmission.

2.2 The system is able to establish air-ground aeronautical communication in the 131,550 MHz frequency between the ground users and aircraft equipped with datalink flying over the Brazilian airspace. The users are Air Traffic Control Facilities and airlines.

2.3 The DATACOM allows the exchange of Air Traffic Service (ATS), Aeronautical Operational Control (AOC) and Administrative Aeronautical Communication (AAC) messages between the ground users and aircraft through VHF media and ground network facilities.

2.4 The system is based on a centralized architecture consisting of the following elements:

- a) VHF communication stations;
- b) a Datalink Central Processor; and
- c) a data communication network.

2.5 The VHF communication stations (RGS) receive data from the aircraft flying over the coverage area (Downlink Messages) and send them to the Datalink Central Processor.

2.6 The RGS stations receive data from the Datalink Central Processor (Uplink Message) and send them to the aircraft flying over its coverage area. The Central Processor also manages all data flow between aircraft and ground users' hosts.

2.7 The data communication network exchange downlink and uplink messages between the Central Processor and RGS, and also between the Central Processor and ground users. The links between the network elements are based on X-25 protocol.

2.8 The messages between aircraft and the Central Processor follow the AEEC 618 specification for a character protocol. The messages between the Central Processor and the ground users follow AEEC 620 specification.

3. CURRENT STATUS

3.1 The DATACOM has been in operation since 1998. Currently the system has 19 RGS stations in Porto Alegre, Curitiba, São Paulo, Rio de Janeiro, Belo Horizonte, Brasília, Recife, Manaus, Boa vista, Santarém, Belém, Fortaleza, Fernando de Noronha, Salvador, Porto Seguro, Foz do Iguaçu, Bom Jesus da Lapa, Alta Floresta and Campo Grande. The Appendix illustrates the actual and planning coverage.

3.2 The internetworking link with the AIRCOM provider (SITA) allows airlines that are AIRCOM client, to use VHF datalink service over Brazilian airspace.

3.3 At present time there are more than 25 airlines using DATACOM services, generating more than 200,000 Kbits per month.

4. DATACOM MODERNIZATION OVERVIEW

4.1 In order to pursue existing directives to provide to the aeronautical community modern means of communication, DECEA will upgrade and enhance DATACOM system, with SITA technological support. This modernization project will provide DATACOM system with:

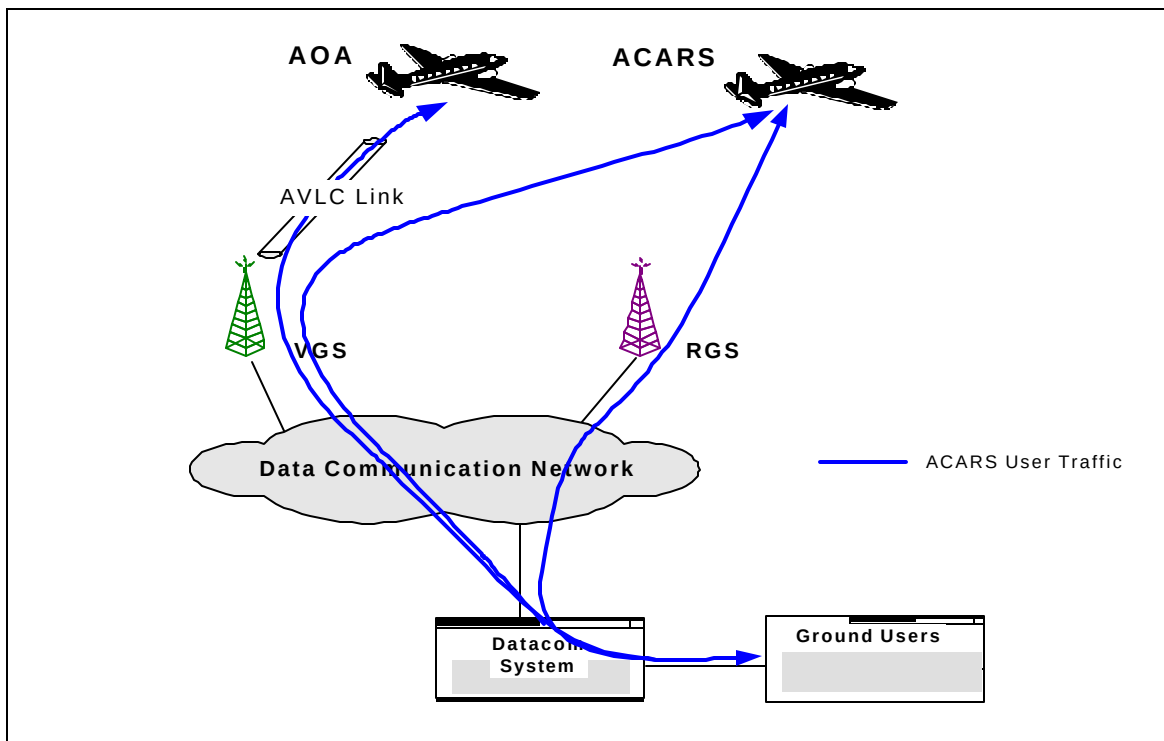
- a) an upgrade to the existing software (Stratus XA2000 - based) to support VDL-2/AOA;
- b) end-systems supporting the Departure Clearance and Digital-ATIS air traffic services applications; and
- c) VHF Ground Stations (VGS) supporting VDL Mode-2, VDL Mode 2/AOA and ACARS communications.

4.2 The software upgrade on the Datalink Central Processor will allow the existing DATACOM System to:

- a) interface with the VDL-2 Ground Stations;
- b) support communications using AVLK (Aviation VHF Link Control Protocol) over ACARS (AOA); and
- c) continue to support ACARS processing.

4.3 Remote Ground Stations using VDL Mode 2 technology will replace current ACARS stations, optimizing datalink traffic in those sites already subject to saturation levels.

4.4 The software upgrade in conjunction with the use of a VGS will support communication as follows:



ACARS/AOA Support

4.5 The ATS datalink services will be implemented at São Paulo (Guarulhos) and Rio de Janeiro (Galeão) International Airports, through end-systems solutions that will enable DECEA to send ATC Clearances and meteorological information to datalink-equipped aircraft via datalink networks such as, the Brazilian DATACOM System and the SITA AIRCOM System (considering the Internetworking Agreement in place between both entities).
