



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

ACTIVITIES CARRIED OUT BY BRAZIL TO UPGRADE THE DATA-LINK SYSTEM

(Note presented by Brazil)

SUMMARY

This information paper aims to introduce participants to the status of the modernization of the Brazilian Data-Link system for the provision of the Aeronautical Mobile Service.
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References:

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| <ul style="list-style-type: none">• Documents for the concession of Data-Link Brazil.• Technical Proposal for the Deployment of the New System.• Doc 9694 "Manual of Air Traffic Services Data-Link Applications."• FANS 1-A "Operations Manual." |
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1. Introduction

1.1 Data-Link is a ground-air communications system in the frequency band of the Aeronautical Mobile Service, which provides data transmission for operational and administrative purposes.

1.2 The Brazilian Data-Link System for providing the Aeronautical Mobile Service (AMS) was introduced in the 1990s and will be upgraded.

1.3 The process for granting the operation of the Aeronautical Mobile Service ended in December 2010 in the category of air-ground data message exchange which is involved in the modernization of the currently installed system. Service provider SITA won the bidding process which will be valid for twenty years.

1.4 The modernization includes the installation of VDL-2 stations throughout Brazil and increased coverage under the current system.

2. Analysis

2.1 Figure 1 shows the importance of the Data-Link System in the exchange of ground-air messages in all flight phases from takeoff to landing.

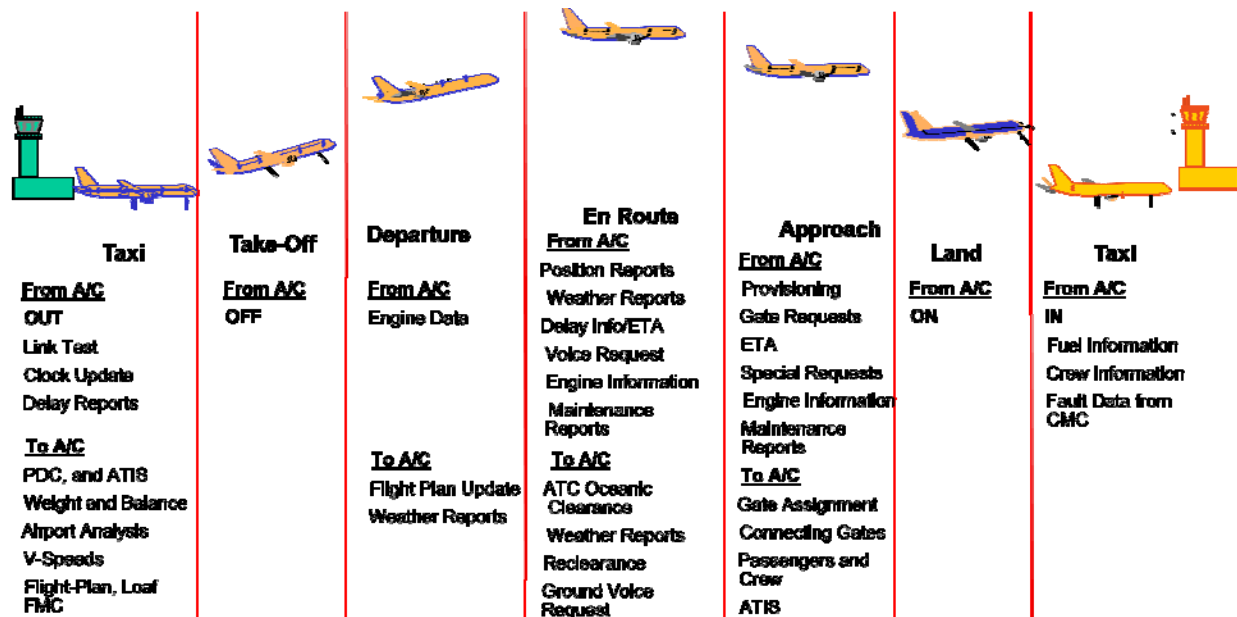


Figure 1: AMS Communications in all flight phases

2.2 All messages of interest from airlines (AOA and AOC) and ATS to be transmitted between the air traffic control centers and aircraft in flight will go through the Data-Link system deployed and maintained by the Concessionaire.

2.3 The Concessionaire must also guarantee the interconnectivity with other international service providers, for the transit of ATS messages.

2.4 The following items are part of the Data-Link System:

- Remote radio communication stations that provide coverage under the Basic Project for the Concession.
- A message router system (called "Data-Link" Processor) and interconnections of the system with remote radio communication stations.
- Interconnections between the Data-Link Processor and foreign message router systems for ATS purposes.
- Interconnections between the Data-Link Processor and user systems of the Concedent (issuer of the concession) through an IP network,
- Access Points of the Concedent's network (in Rio de Janeiro and Brasilia) to the Concessionaire's network, and to the associated mobility and safety management structure.

2.5 In terms of infrastructure, Figure 2 illustrates the equipment that must be installed by the Concessionaire.

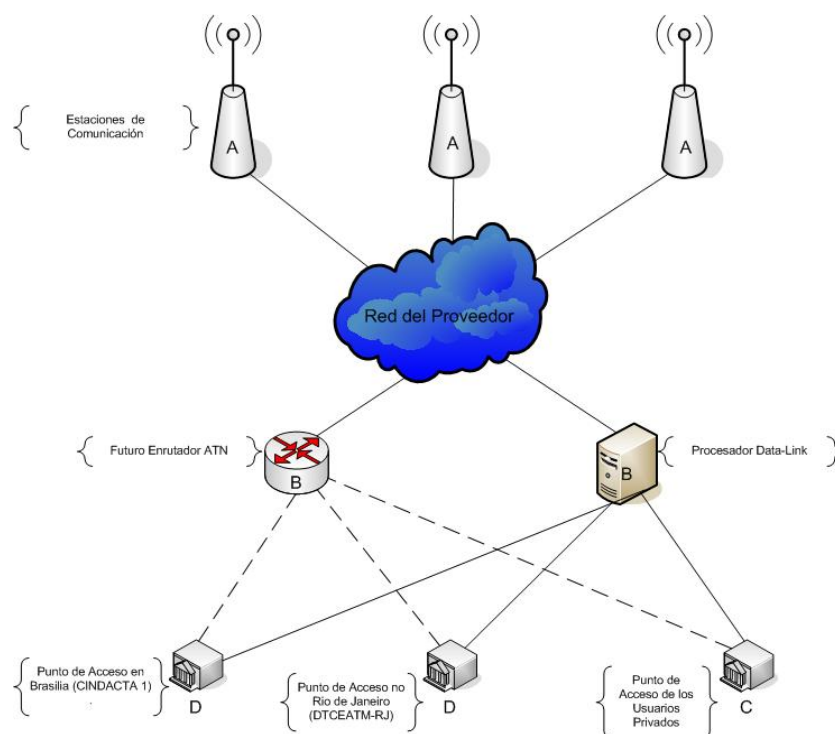


Figure 2: Architecture of the Future Data-Link System

2.6 The following comments apply to the interfaces in Figure 2:

- Interfaces A of Figure 2 represent the remote communication stations that must have equipment and frequencies available for transmission of messages via ACARS/MSK, AOA and ATN/IP, the last two with the use of VDL-2.
- Interfaces B of Figure 2 show that while all applications have Pre-FANS and FANS 1-A the remote stations must connect to the Data-Link Processor via ACARS and AOA.
- Over time, deployments of ATN/IP applications transmitted by VDL-2 equipment are foreseen. An ATN/IP router will be installed, which will replace the Data-Link Processor, when said applications are available.
- Interfaces D represent the interconnection of the Concessionaire domain with selected points in Rio de Janeiro and Brasília owned by the Concedent for the exchange of ATS messages. Solid lines relate to the implementation of ACARS and AOA; the dotted lines show the future provision of a connection between the ATN/IP router and the CONCEDENT.

2.7 Message exchange in the oceanic region, although it is not the objective of the Concession, must also be guaranteed by the Concessionaire in addition to the coverage of VHF radio stations installed on the mainland.

2.8 ATS messages using ACARS/MSK and AOA are defined in AEEC 622 (bit-oriented) and AEEC 623 (character-oriented) documents. It is emphasized that availability requirements are those present in the FANS 1-A "Operations Manual."

2.9 The availability requirements described in Doc 9694 "Manual of Air Traffic Services Data-Link Applications," which are more restrictive in scope, will only be possible to achieve when a full ATN/IP architecture is in place.

2.10 With regard to the availability requirements for the central processor and the ATN/IP router, when in operation, they are defined in the concession contract at 99.996% on a monthly basis.

2.11 The installation of the entire architecture of remote stations for ACARS and VDL-2 will be made with annual goals, and the completion of the entire system is planned for 2015. The red circles correspond to the actual coverage and the blue circles correspond to additional coverage that will be implemented over the next five years.

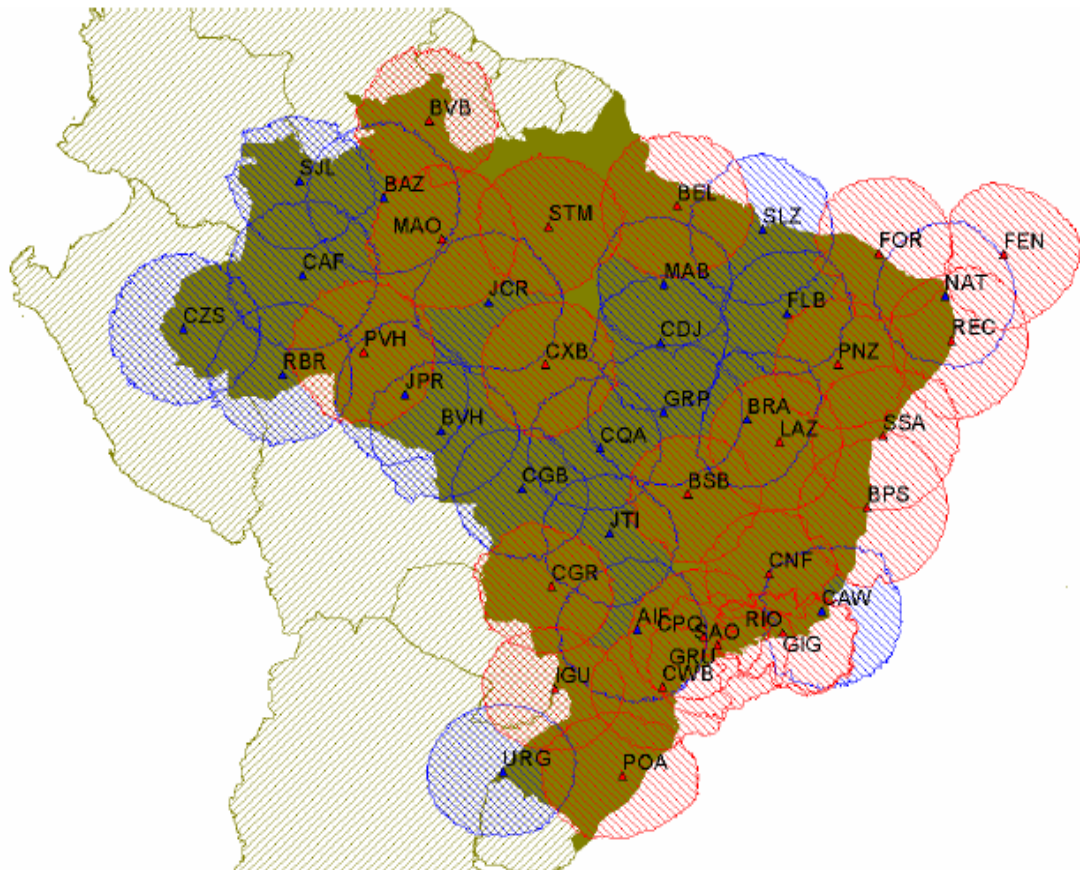


Figure 3: Service Coverage from FL 245

2.12 As technological developments are expected over the life of the concession, according to work developed by ICAO, the entire platform initially deployed should be upgraded after ten years of the concession agreement.

3. Conclusion

3.1. The new Brazilian Data-Link System will be fully modernized through the Concession granted to the SITA Company for a period of twenty years.

3.2. All the remote communication stations must have equipment for the transmission of messages via ACARS, AOA and ATN/IP (VDL-2).

3.3. The concession stipulates that the entire infrastructure is installed within five years after the *execution of the contract, i.e., in 2015, coverage will encompass all the territory from FL 245.*

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