



**SIXTEENTH MEETING ON THE IMPROVEMENT OF AIR
TRAFFIC SERVICES OVER THE SOUTH ATLANTIC (SAT/16)**

(Recife, Brazil, 04-06 May 2011)

Agenda Item 2: Communications, navigation and surveillance (CNS)

Memorandum of Understanding (MoU) model for AMHS Interconnection.

(Presented by Brazil)

SUMMARY

This working paper presents a Memorandum of Understanding (MoU) model to be used for the AMHS interconnection in the SAT Region.

Reference:

- SAT/15 meeting report (Conclusion SAT/15/12)
- Annex 10 to the Chicago Convention, Vol. 3 (ATN SARPS)
- ICAO Doc. 9705, ed. 3, 2002 “Manual of Technical Provisions for the ATN”
- ICAO Doc. 9739 “The Comprehensive ATN Manual (CAMAL)”

1. Introduction

1.1 The following system of ground-ground communications and applications make up the current Aeronautical Fixed Service (AFS):

- Circuit dedicated point to point and different types of networks.
- Circuit meteorological operational.
- The Aeronautical Fixed Telecommunications Network (AFTN), provided a messaging 'Store and forward' in the world to carry text messages.
- In the case of Europe and northern Africa CIDIN network is used, providing transport service for text messages and binary application supporting the AFTN and OPMET applications.

1.2 As part of the standardization work of the ATN Panel, ICAO has developed specifications (SARPs) and guidance material (GM) of a new messaging system based ATS X.400 standard (ITU-T) called AMHS (ATS Message Handling System).

1.3 The AMHS system is recommended by ICAO as the global replacement of current AFTN environments “store and forward”.

1.4 The basic operational requirements have not changed. The categories of messages, however, need to be treated. The ATS messaging environment must face:

- A clear increase in the number of messages to be handled.
- Need for much longer messages that clearly exceed the capabilities of current AFTN.
- Need to exchange messages with binary data, it means, not oriented character.

1.5 In turn, the changes occurring in the communications technology impact the AFTN:

- It increases the costs to develop and maintain the AFTN based on the “old” telegraph technology.
- High rental costs associated with low-speed telegraph circuits.
- The major telecom equipment manufacturers have ceased or will short of making and supporting the X.25 protocol.

1.6 If we take as a starting point that it will still be needed in the future environment “store and forward” to meet the requirements of the current ATS messaging system, the new AMHS system provides a natural evolution of the current AFTN:

- The AMHS system is standardized by ICAO (Annex 10, Doc 9705).
- The AMHS system is based on standard ITU-T X.400, stable and well established.
- The AMHS system is designed to offer a service at least equivalent to that AFTN provides, allowing the exchange of messages of almost a unlimited length.
- The Extended AMHS system makes it possible to exchange any information (text and binary).

2. Analysis

2.1 Taking into consideration that several countries have already implemented the AMHS, it would be extremely important for the international community the interconnection of such systems.

2.2 For the interconnection of the AMHS installed in the Region, the holding of trials between MTA has been considered, with the aim of verifying the inter-operatively of the AMHS installed, as well as studying the band width requirement for AMHS interconnection. There is a conclusion (SAT/15/12) recommending the interconnection between AMHS systems.

2.3 With the aim of carrying out the interconnection of the AMHS, a Memorandum of Understanding (MoU) was developed by from SAM states regions, which contains operational, technical, administrative and financial aspects for AMHS interconnection. Copy of the MoU is shown in **Appendix A** to this working paper.

2.4 Taking into account that to date AMHS is also implemented in Brasil and Spain. It is expected that during the Meeting and taking into consideration the model MoU for AMHS interconnection in Appendix A to this working paper, AMHS interconnection between Brazil-Spain can be drafted.

3. Action suggested

3.1 The Meeting is invited to:

- a) Take note of the information provided in this working paper;
- b) Analyze the model MoU for AMHS interconnection in Appendix A to this working paper;
- c) Draft possible MoUs for AMHS interconnection between Brazil-Spain; and
- d) Analyse any other considerations in this respect that the Meeting might deem necessary.

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**MEMORANDUM OF UNDERSTANDING FOR THE
INTERCONNECTION OF AMHS SYSTEMS

BETWEEN

SPAIN AND BRAZIL**

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Preface

This document defines the Memorandum of Understanding for the bilateral interconnection of AMHS systems between the States of the Region. The two States may revise this document when so required.

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APPROVAL
MEMORANDUM OF UNDERSTANDING FOR THE
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BRAZIL

By Spain

By Brazil

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Revisions

Revision / Date	Description	Pages changed
0 – 17/09/09		

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1. SECTION 1 - INTRODUCTION AND PURPOSE

1.1. INTRODUCTION

In SAT 15, the meeting reviewed the status of planning and implementation of AMHS in SAT regions. Some SAT States (Argentina, Brazil, Cape Verde, Portugal and Spain) have already implemented AMHS systems and intend to carry out trials for their interconnection. Other States/Organizations are planning to purchase and install the system.

1.2. PURPOSE

The goal of this MoU is to provide the planning for the interconnection of AMHS systems between Spain and Brazil, establishing standard procedures that take into account the operational, technical, administrative, and financial aspects involved.

2. SECTION 2 - PRINCIPLES

In preparing this document, the following aspects have been considered:

1. This Memorandum is a guide for States to enter into bilateral agreements; and
2. This document takes into account the aspects contained in documents dealing with AMHS interconnection, ICAO SARPs and documents.

3. SECTION 3 - SCOPE

This document only applies to the interconnection of AMHS systems between Spain and Brazil.

4. SECTION – ORGANISATION

This is a document by virtue of which the participating States will agree to revise or modify its details as necessary.

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The participating States will coordinate the revisions to this Memorandum, or changes to its paragraphs.

5. SECTION 5 - REFERENCES

This Memorandum follows the ICAO recommendations contained in the following documents:

- Report of the Fifteenth Meeting on the Improvement of Air Traffic Services over the South Atlantic (SAT/15);
- Report of the Third Meeting of the Communications, Navigation and Surveillance - Sub-Group (CNS/SG/3)

6. SECTION 6 - CONFIDENTIALITY

Each participating State must implement all the measures necessary to ensure the safety, integrity, and confidentiality of the information.

The dissemination of these data to other organisations not considered in this Memorandum can be done only if previously authorised by the participating States.

7. SECTION 7 - OPERATIONAL ASPECTS

The application of this Memorandum may require adjustments to the operational agreements that exist between the participating States.

The Administrations undertake to provide training on the appropriate parts of this MOU to their personnel working in the systems involved.

8. SECTION 8 - TECHNICAL ASPECTS

The technical considerations for the establishment, by the States, of the interconnection scenarios, the implementation strategy, the implementation of the solution, the monitoring of the operation, and personnel training aspects that will best meet their needs are presented in Section 6 of the Appendix to this Memorandum.

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9. SECTION 9 - ADMINISTRATIVE ASPECTS

For the orderly implementation of the selected interconnection solution, the participating States agree to the creation of an administrative structure based on an Interconnection Management Committee, whose powers, composition, and activities are described in Section 7 of the Appendix to this Memorandum.

The States must designate representatives, members of their respective groups, to be part of the basic structure of the aforementioned Committee.

The States must choose a forum for discussing cases of non-compliance and for the resolution of possible conflicts.

This Memorandum is of a continuous nature, and may be interrupted at any time, by agreement of the parties involved.

10. SECTION 10 - FINANCIAL ASPECTS

The participating States, as individual administrations, will be responsible for any financial obligation to cover direct or indirect expenditures related to the implementation of this Memorandum, including those related to the procurement of equipment, spare parts, training of technical and operational personnel, lines of communications, and others.

Each State will be responsible for its respective portion of any expenses related to CAFSAT upgrades to address increased traffic, in keeping with guidance provided by the CAFSAT Administration.

The parties to this Memorandum understand that they shall not commit to any action that may result in a financial obligation for other parties without previously obtaining the written consent by all the other parties involved.

The States may establish financial mechanisms to carry out the interconnection, for example, through ICAO Technical Cooperation Projects.

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APPENDIX
MEMORANDUM OF UNDERSTANDING
TECHNICAL-OPERATIONAL AGREEMENT FOR THE INTERCONNECTION OF
AMHS SYSTEMS BETWEEN SPAIN AND BRAZIL

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1. PURPOSE

To provide a detailed description of the technical, operational, and administrative aspects of the Memorandum of Understanding that are needed for the interconnection of AMHS systems between Spain and Brazil.

2. SUMMARY

- In SAT 15, the meeting reviewed the status of planning and implementation of AMHS in SAT regions. Some SAT States (Argentina, Brazil, Cape Verde, Portugal and Spain) have already implemented AMHS systems and intend to carry out trials for their interconnection. Other States/Organizations are planning to purchase and install the system.
- The States that have implemented or are planning to implement AMHS systems should register before the ATS message transmission management centre (AMC), according to ICAO State letter AN 7/49.1-09/34 of 14 April 2009 on management and updating of information on addresses of the air traffic service (ATS) message handling system (AMHS), and the procedure for registering a State representative as user of the AMC.
- For the interconnection of the AMHS systems installed in the Region, consideration has been given to conducting trials between MTAs to check the interoperability of AMHS systems, and a study of the bandwidth required for their interconnection.

3. REFERENCE

This Agreement follows the recommendations contained in the following documents:

- Report of the Fifteenth Meeting on the Improvement of Air Traffic Services over the South Atlantic (SAT/15);
- Report of the Third Meeting of the Communications, Navigation and Surveillance - Sub-Group (CNS/SG/3).

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4. SAFETY

Each State must ensure that its communication networks involved in the interconnection have the required protection for this type of service, taking into account, at least, the following aspects:

- Protection against intrusion by unauthorised people and/or systems;
- Protection against attacks from computer viruses; and
- Use of the equipment exclusively for the interconnection of automated systems.

5. OPERATIONAL ASPECTS

The Administrations undertake, within their respective jurisdiction, to provide direct training on the contents of this Memorandum of Understanding to the personnel working in the systems involved.

The selected interconnection option entails that States will have to establish specific operational procedures taking into account the functionality available in each automated system.

6. TECHNICAL ASPECTS

The interconnection must permit the automatic transfer of messaging plans between the Spain and Brazil, using the respective MTAs;

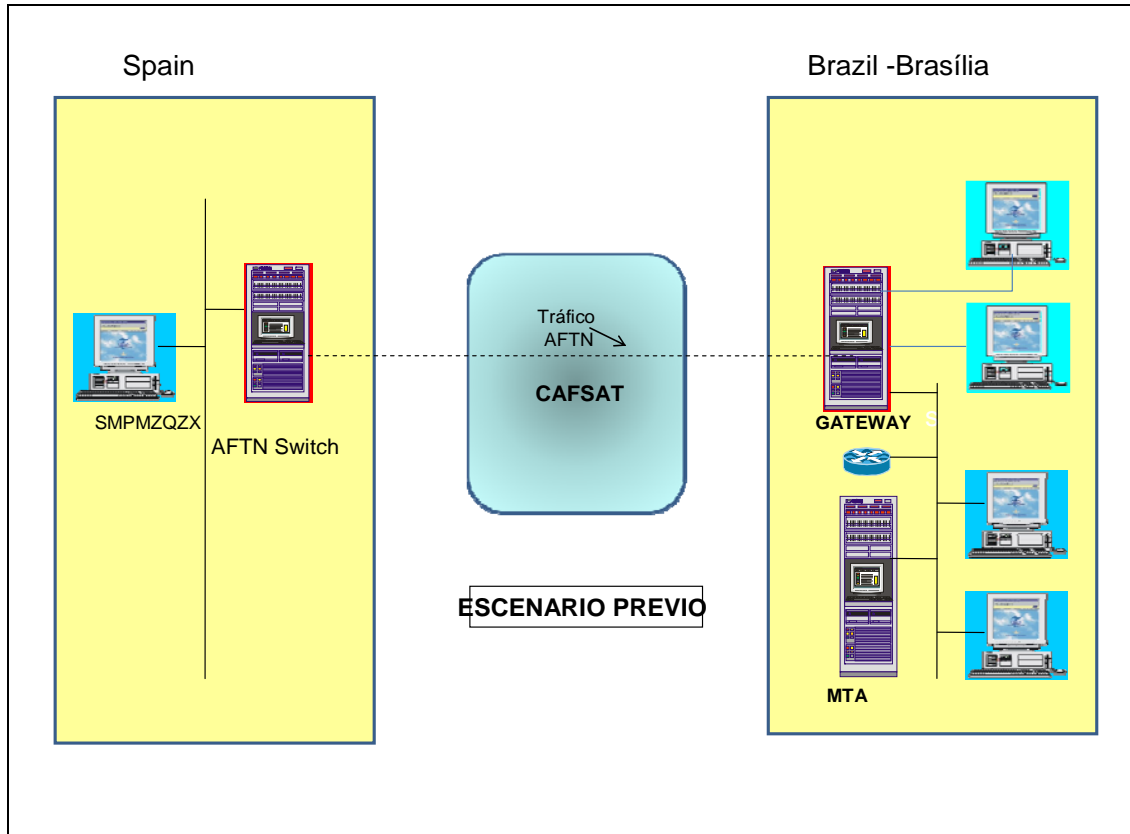
The main aspects are:

- 1) Analysis of the current scenario: Currently, Spain has completed the installation of an AMHS at national level waiting to be tested with Brazil that already is making use of AMHS. However, the operating mode between the two States is still AFTN, that is, Brazil is using the gateway, as shown in the following graphical example while Spain still uses its AFTN Message Switch with only one operational terminal as shown in the following graphical example:

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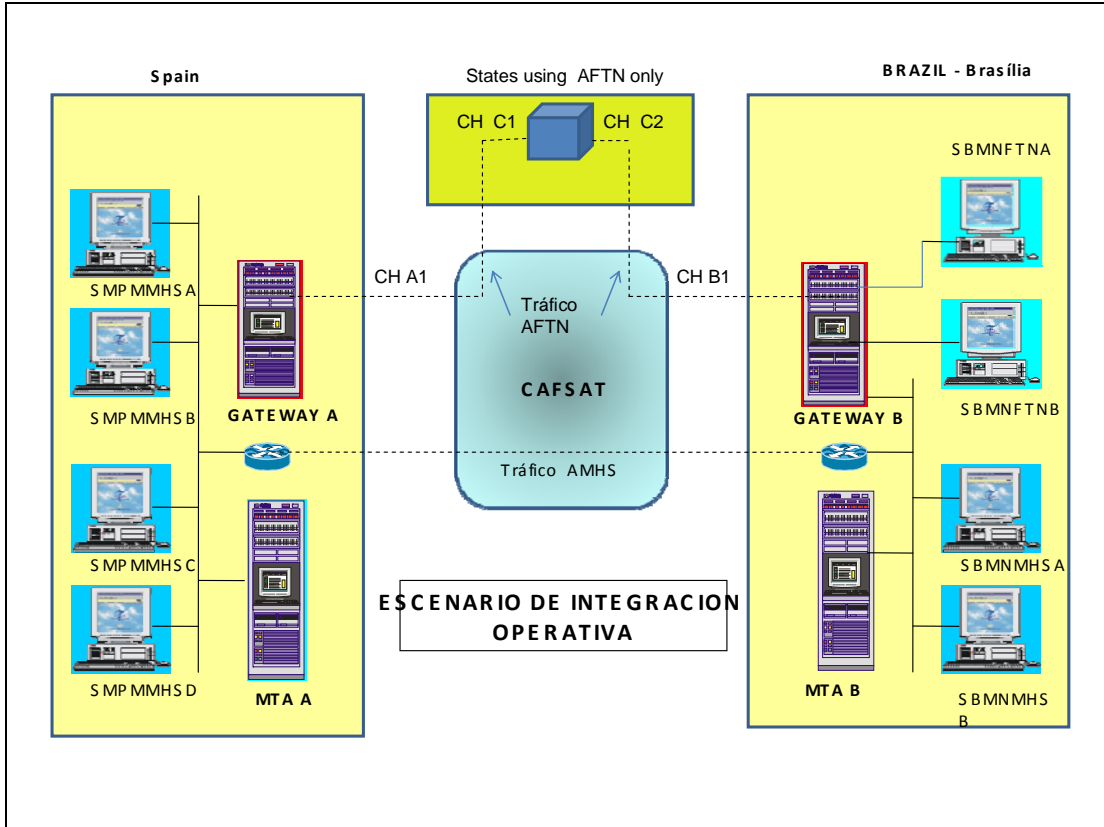


- 2) Selection of the exchange scenario: the functional scenario can only be as follows, in which the exchange of traffic between States is already being carried out through the interconnection of the respective MTAs, keeping, in Spain, the gateway operational for the exchange of messages with those States that have not migrated to the AMHS while in Brazil is also going to keep the gateway operational for the exchange of messages with those States that have not migrate to the AMHS.

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3) Implementation Strategy:

In order to achieve the desired objective, the following action must be taken, indicating, in each case, whether such action has already taken or the tentative date for its implementation:

- Data transportation network: Intra-regional IP ATN - Existing
- Means: CAFSAT - Existing
- Channel: DLCI – To be provided by the CAFSAT Administrator of the States
- ATN boundary elements: routers provided by each State - Existing
- IP addressing of router link ports: to be configured according to the Regional IP Addressing Plan, Link Ports – To be configured by CAFSAT Administrator of the States.
- Serial interfaces: V.35 – Using P03 port on the CAFSAT patch panel
- Tests:
 - *Network transport:* To be tested by CAFSAT administrator of the States
 - *Network connectivity:* To be tested by Spain and Brazil
 - *Message exchange:* Spain has planned to exchange messages during the third week of June 2011
 - *Preparatory phase:*
- *Operational status:* Spain expects to deploy the System in the first week of June 2011.

4) Implementation:

- The Interconnection Management Committee will be in charge of

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implementation management, and will be made up by personnel listed in Annex A.

- This Interconnection Committee will perform its functions until three (3) months after the beginning of the Operational Phase; thereon, the integrated operation will be entrusted to the respective Communication Stations.

5) Operation Monitoring

Each State must be responsible for monitoring the operation of its systems, including the maintenance of its equipment and systems, ensuring the required availability, performance, safety, and efficiency.

All problems of uncertain origin must be analysed jointly by the States through the Interconnection Management Committee, which will coordinate the actions required for their resolution.

However, each State must do its best to carry out the actions under its responsibility, informing the Interconnection Management Committee about their implementation.

In any case, the Interconnection Management Committee must be constantly informed about the occurrence of anomalies, regardless of their origin.

6) Training

The participating States must develop training plans for the technical teams responsible for system maintenance, taking into account extent, periodicity, and technical evolution.

7) Maintenance

Teams must be prepared for contingencies and be technically capable of analysing anomalies.

Each State shall develop its own Action Plan, which will define the technical information required for the interconnection with adjacent ACCs, and will contain, at least:

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1. The topology of the networks involved, with technical details about the bandwidth, availability, latency, and redundancy required;
2. The specifications of the equipment used;
3. Maintenance requirements;
4. Maintenance procedures: preventive, predictive, and corrective; and
5. All related technical documents;

The States agree that the means of communication for the implementation of the interconnection will be the CAFSAT.

7. ADMINISTRATIVE ASPECTS

This Agreement is a dynamic document that can be revised at any time, in keeping with the technological evolution of the systems and communication networks of the participating States.

Interconnection management will be entirely the responsibility of the Interconnection Management Committee established by the two (2) States, in accordance with the following:

1. Organisational Structure

In order to carry out its activities, the Committee will be organised as follows:

1. Coordinator

The coordinators for AMHS interconnection between Spain and Brazil are listed in **Annex A.**

Coordinators will be responsible for general coordination of all the activities of the technical and operational groups, and for maintaining contact with other organisations to address interconnection issues.

2. Technical Group

It must include technicians designated by the two States, with training in their respective fields, especially in communication networks and computer automation systems.

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They will be responsible, in their respective country, for the implementation and/or coordination of the technical activities required for the implementation, maintenance, and support of automated systems, communication networks, and interconnection equipment.

3. Operational Group

It must include experts in the operation of electronic messaging systems.

2. Functions

The Committee is responsible for all the coordination required for the planning, implementation, maintenance, and operational support of the systems and equipment involved in the interconnection of AMHS systems.

It must also ensure the continued safety of the information to be transmitted between the automated systems involved in the interconnection.

Its functions include controlling and updating all technical and operational documentation.

It is also responsible for the network topology to be used for the interconnection, which must be approved by the two (2) States.

Interconnection implementation must be coordinated and controlled by the Committee, through action plans previously approved by the two (2) States.

The Committee must advise the States about the need for technological evolution of the equipment and systems involved in the interconnection.

Its teams must monitor the performance, stability, reliability, and integrity of the equipment and systems involved in the interconnection, and propose and monitor corrective action.

The Committee must establish the necessary procedures for correcting faults.

Also, together with the participating States, it must provide for the resolution of problems.

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3. Management Process

In order to carry out its activities, the Interconnection Management Committee will apply the following management system:

1. Periodic meetings and discussions to identify requirements, preferred technical solutions, alternatives, and options for the interconnection of AMHS systems;
2. Exchange of technical reports and documentation, plans and schedules as required for a successful and timely culmination of these efforts.
3. Joint planning, technical coordination, and implementation of activities by the two (2) States.

8. FINANCIAL ASPECTS

Regarding financial aspects, the States agree to the following:

1. Acquisition of equipment, components, and systems;

The equipment necessary for the interconnection will be acquired by each State, according to the technical specifications approved by the Interconnection Management Committee;

2. Acquisition of spare parts

Spare parts for the equipment involved in the interconnection will be purchased by each State, according to its specific needs, but in keeping with the maintenance guidelines issued by the Interconnection Management Committee.

3. Acquisition of third-party services

Each State agrees to pay for incidental third-party services, such as software adjustments, projects, and implementation of communication networks.

Each State will be responsible for its share of the incidental cost of upgrades to the CAFSAT to address traffic increases, in keeping with the guidance issued by the CAFSAT Administration.

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ANNEX A

AMHS SYSTEM INTERCONNECTION MANAGEMENT COMMITTEE

COORDINATORS OF THE MANAGEMENT GROUP

Spain:

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Phone number:
Email:

Brazil :

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