*International Civil Aviation Organization*
CAR/SAM Regional Planning and Implementation Group (GREPECAS)
**Eleventh Meeting of the GREPECAS Aeronautical Information Management Subgroup (AIM/SG/11)**
Bogotá, Colombia, 16 - 20 June 2008

**Agenda Item 4: Review of the Implementation Process**

# AIS DATA BASE IMPLEMENTED IN PARAGUAY

(Presented by Paraguay)

**SUMMARY**

This paper presents information about the installation and service of AMHS AIS Data Base in Paraguay.

**References**:

- Informes Grupo de Tarea AUTO/AISMAP/
- Informe de GREPECAS 14
- Anexo 15 y Anexo 4

## 1. Background

1.1 On November 28, 2007, the National Direction of Civil Aviation (Dirección Nacional de Aviación Civil - DINAC) of Paraguay officially started operation of a new Air Traffic Service Message Handling System (AMHS), together with an AMHS native NOTAM Databank, provided and installed under ICAO contract awarded to Radiocom, Inc. by the proyect known as DINAC/OACI/PNUD-PAR/03/019, which target is the implementation of the system in fulfillment of the ICAO regulations.

1.2 The inaugural ceremony took place at the Silvio Pettirossi Airport (Asunción) and was attended by Paraguayan government authorities, DINAC authorities and special guests.

1.3 The new state-of-the-art communication system allows the integration of 34 terminals located at the main Paraguayan airports, and the NOTAM Databank is accessible from domestic as well as foreign users around the world, through international links to Argentina and Brazil.

1.4 The new AMHS system is totally compliant with all ICAO's SARPs, and it was designed as an integral part of the future ATN Aeronautic Telecommunications Network, aimed to integrate all the communications required to operate and manage the air traffic.

1.5 It covers communications between terrestrial control centers, but as part of the ATN it can be expanded to include ground-air data communication, facilitating further introduction of automated systems.

## 2. Implementation of AMHS system

2.1 For the first time all the country's air traffic management will be fully covered by state-of-the-art communications. The system was designed and installed over an IP network and it uses satellite links for data transport. Control software allows system supervisors to have real time awareness on the state of all the installed equipment, in any part of the country.

2.2 DINAC's AMHS replaces the old AFTN System, and allows the exchange of air traffic management messages, as well as meteorological, aeronautical information and administrative messages between stations in Asunción (main control center), Ciudad del Este, Pedro Juan Caballero, Concepción, Mariscal Estigarribia, Pilar, Bahía Negra, DINAC Central Offices, an Air Force Base and two international circuits to Brazil and Argentina.

2.3 The system includes DBAIS (Aeronautical Information Database) providing automated services to Aeronautical Information and Communication services. This application is the first operational system inside an AMHS extended service environment in America.

2.4 ICAO was in charge of the entire bid process and final selection of Radiocom, Inc. as system supplier. ICAO experts followed the new system installation process, DINAC personnel training, and conducted the tests for AMHS final acceptance.

## 3. Data Base for Aeronautical Information Service

3.1 ATM requirements are growing fast, and all services that support air navigation, particularly AIS, will have to accompany this growth.

3.2 DBAIS is based on a data bank that automates completely the AIS (Aeronautical Information Service) using a powerful SQL (Simple Query Language) database server to process and store AIS information such as NOTAM, SNOWTAM, ASHTAM and other reports, providing data or answers to different queries received in order to forward the requested information by using AMHS messages, email, LAN/WAN terminals and Web pages.

3.3 DBAIS has been designed to work in AMHS environments using P3 protocol to connect with AMHS servers in LAN (TCP/IP) and WAN networks based in X.400 protocols.

3.4 DBAIS can handle static and dynamic AIS information. If an appropriate Internet Information Server is provided, it can be consulted via Web and it supports different database engines.

3.5 Among another advanced features, DBAIS incorporates a complete module for statistic calculations showing the results in graphical format.

3.6 So it requires no Gateway, specific module or application between DBAIS and the AMHS server and all AMHS security services are provided as X.400 native functions in all communications between DBAIS and the servers and AMHS clients.

3.7 DBAIS is an AIS center in itself, including data storage and treatment of static and dynamic AIS data.

3.8 DBAIS includes all requirement of the ATS messaging system, integrated self-briefing, NOTAM, OPMET and static data. In fact several functions are provided by the AMHS client terminal that acts as a message composing center with pre-defined formats and message validation functionalities based on an internal database, monitored and updated from the DBAIS system.

## 4. DBAIS Characteristics Installed in Paraguay

4.1 Perfectly adaptable to support several scenes of applications of AIS/Mensajería, such as an integrated informative system or like a solution of Terminal ATS.

4.2 DBAIS provides a graphical layer with information MET through a special module that can adapt to the necessities of the client.

4.3 DBAIS can provide information to one or several terminals auto-informative AMHS remote and integrated for pilots and also to obtain data from the own house thanks to the Internet Information Server via Internet with a telephone connection.

4.4 Like integral part of the solution, the Usuary Agent who is the Terminal TAU provides all the attendance for the messages creation without errors.

4.5 DBAIS can interchange information of static data through formats XML in sequence to qualify the migration towards the new AICM (Aeronautical information Concept Model).

4.6 DBAIS is designed to provide all the following facilities:

- Briefing creation.
- MET data entry, validation and management.
- NOTAM operations and data management.
- Basic/Static data management.
- Support for information display and printing.

4.7 Three data categories are managed by DBAIS:

- Static Data: Data common to civil aviation and documented in AIP or other related documents.
- Divided into two types of static data:
- Document data: that includes FIR, aerodrome, NavAids, area maps, rules and other documents related to these subjects.
- Basic Air Navigation Plan Data: Data required by the system to enable NOTAM and FPL checking and validation, e.g. reference lists. This database is also mirrored in each TAU, and periodically updated from the basic database in the AIS server. The server has a Static Database in AIXM format included.
- Dynamic Data: NOTAM, SNOWTAM, and related messages (checklist, repeat, reply), Bulletins, MET data.

*4.8* *DBAIS Components*

4.8.1 Generalities: System DBAIS is based on three components:

- The Component RX (of reception);
- Component TX (of transmission); and
- the Console of Administration and Supervision.

4.8.2 Additional information of the system are contained in the Appendices “A” y “B”.

**5. Suggested action**

5.1 The meeting is invited to:

a) Take note from the information on the implementation made in the AIS of Paraguay; and the information contained in Appendix A and Appendix B;

b) Consider the DBAIS implanted by Paraguay for the activities of regional integration.

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# APPENDIX A

**General description of the Data bank for the Aeronautical Information Service (NOTAM/OPMET)**
With the intention of automating the treatment and diffusion of the news of interest for the air navigation NOTAM, responsibility assigned to the Aeronautical Information service, we have designed and developed an AIS "DBAIS" automation system responding to the recommendations and last amendments of the ICAO (International Civil Aviation Organization) in its manual Document Nº 8126 and Annex-15 AIS for a processing and automation AIS system.

The DBAIS, given their vital importance, is a mission system criticizes designed for the Maxima tolerance to failures and to provide the greater possible up time.

It is made up of different applications from software of different layers, based on an architecture Client.-Server and equipped with connected equipment of last generation to each other in way LAN (Local Area Network) through Ethernet connections.

Si bien el sistema está concebido como un banco de datos NOTAM, la asociación de su nombre con el AIS está dada por las posibilidades futuras que posee que serán, entre otras, el procesamiento, almacenamiento y difusión automática de toda la información posible de ser tratada por el Servicio de Información Aeronáutica.

In its design sufficient scalability has been contemplated as to give terminal connected manifold support of briefing to the LAN of the system and next we will even be implementing consultation methods, through telephone connections dialed and to pages Web, to allow its preparation from a standard navigator like the Microsoft Internet Explorer, Netscape, Mozilla, Firefox, etc. Therefore DBAIS could enormously be connected to the network Internet, extending the possibilities of arriving at the user interested with the updated information in time and forms.

**Functions:**

- To receive, to process and to store the information that receives by means of messages.
- To spread or to publish the information in totally automatic form, using itself different lists from distribution that defined addresses contain previously, or executing works programmed by the supervisor of the system.
- To respond to the different consultations automatically that are made to him, whenever the originador of the same one is qualified by the supervisor of the system.
- The processed information, incoming as much salient, can talk about to the national or international scope and through different means and formats such as messages with encapsulation AMHS or conventional electronic mail.
- The messages that today can be published by the system are of type NOTAM (N/R/C), SNOWTAM and ASHTAM according to formats and recommendations of the OACI.
- It processes NOTAM, SNOWTAM, ASHTAM, the GIP, etc.
- Acepta información local e internacional.
- Total integration in the AMHS.

**General scheme of connections with other systems**

DBAIS is a completely independent system, but its insertion in atmosphere AMHS for the aeronautical electronic mail takes place by means of a network LAN and the MTA/MS (Agent of Messages Transference/Storage of Messages).

The conversions and changes of necessary formats for the interchange of mail with external systems to the AMHS are made by means of the Gateway AMHS that acts of intermediary among other networks and the network in which the DBAIS is inserted.

2. DBAIS Server:

It is the main component of the system and one is in charge of the processing, storage and distribution of the information basing its operation on platform multitask of 32 bits.

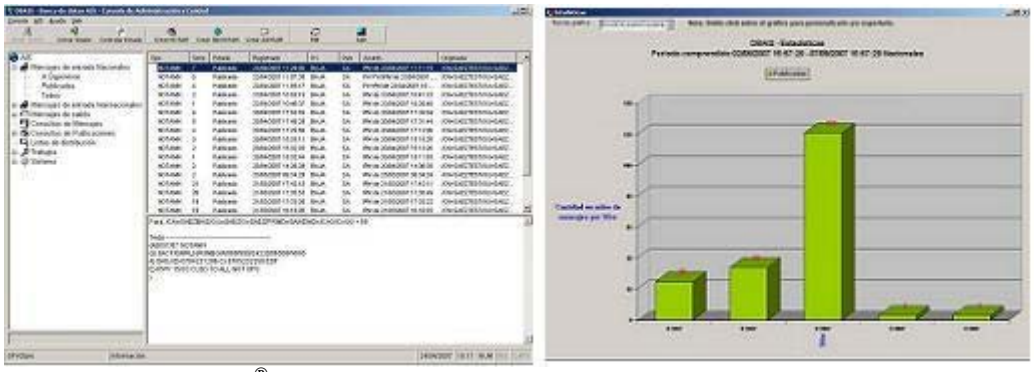
It has Windows 2003 Server version 4.0 as operating system and as motor database administrator:

SQL Standard Server Edition version 2005, both products of the Microsoft Company, including its complete updates.

**The AMHS Gateway:**

This component of network AMHS is external to System DBAIS and is mentioned here for informative purpose.
The Gateway is in charge to receive the information that is sent to it from any terminal of the network AFTN to AMHS or vice versa, controlling its integrity, format (encapsulation) and serialization. Once validated, the information is sent and stored in the DBAIS Server which determines, that it will be to make with the same one.

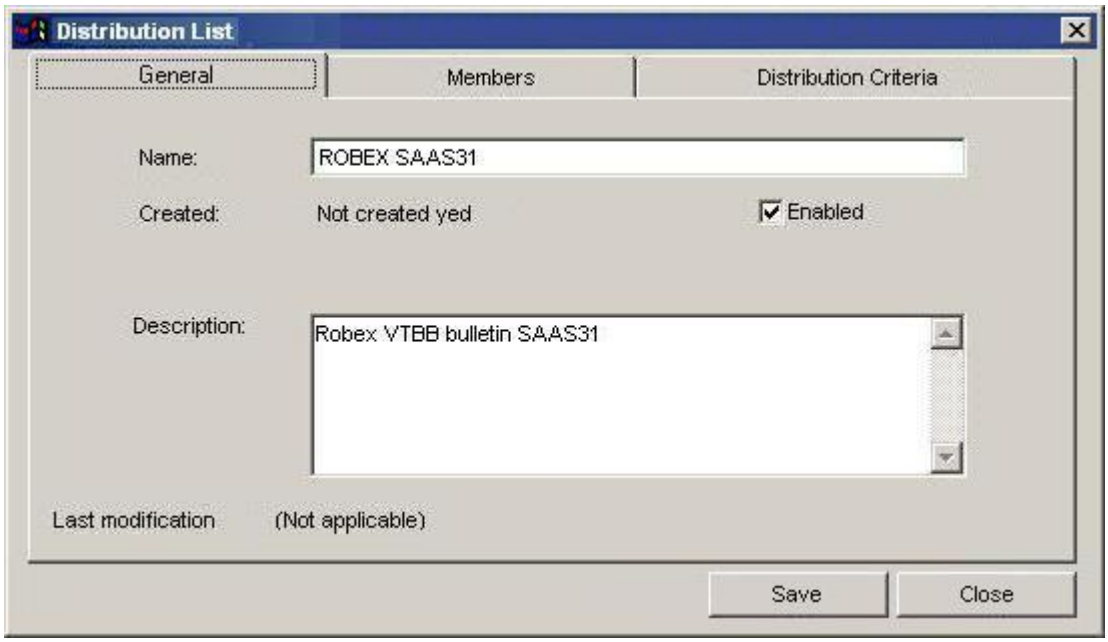
Also, another process of the Gateway is permanently examining the tray of exit, stored in the servant, looking for information to be sent making the described process before but in inverse sense, that is, towards addresses of other networks.



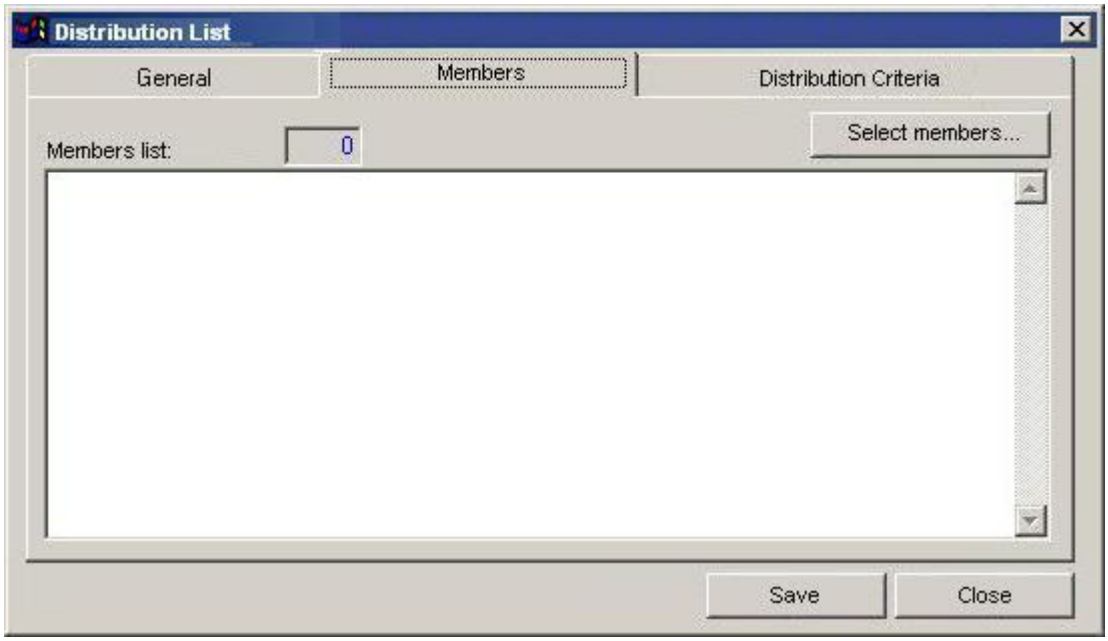
**Pantallas de DBAIS®**

**<u>Bulletin distribution with DBAIS is set up in four easy steps</u>**

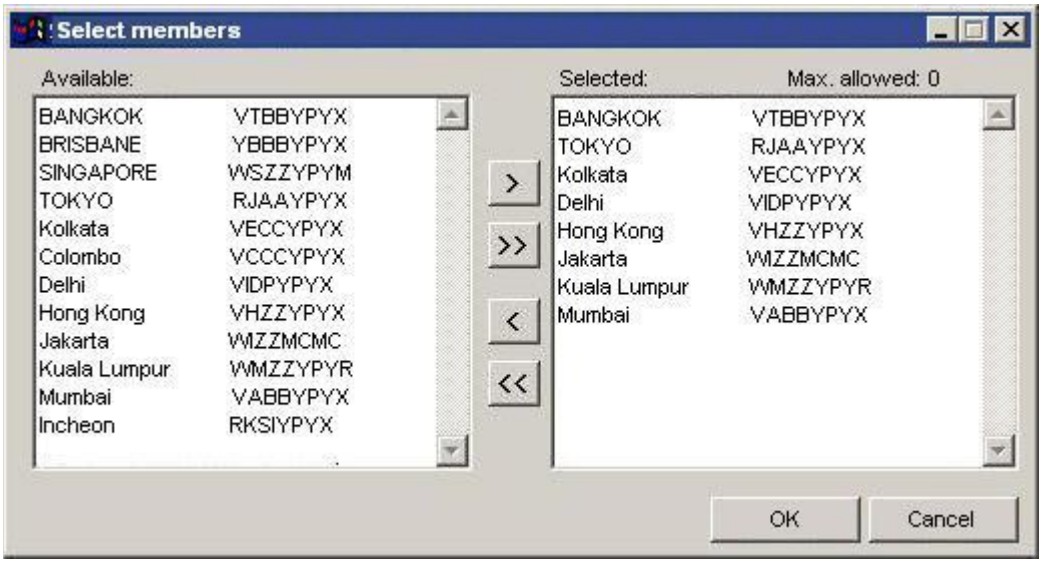
**STEP 1:**
Enter Distribution list pop up screen and set Name and describe the bulletin task to be set up.



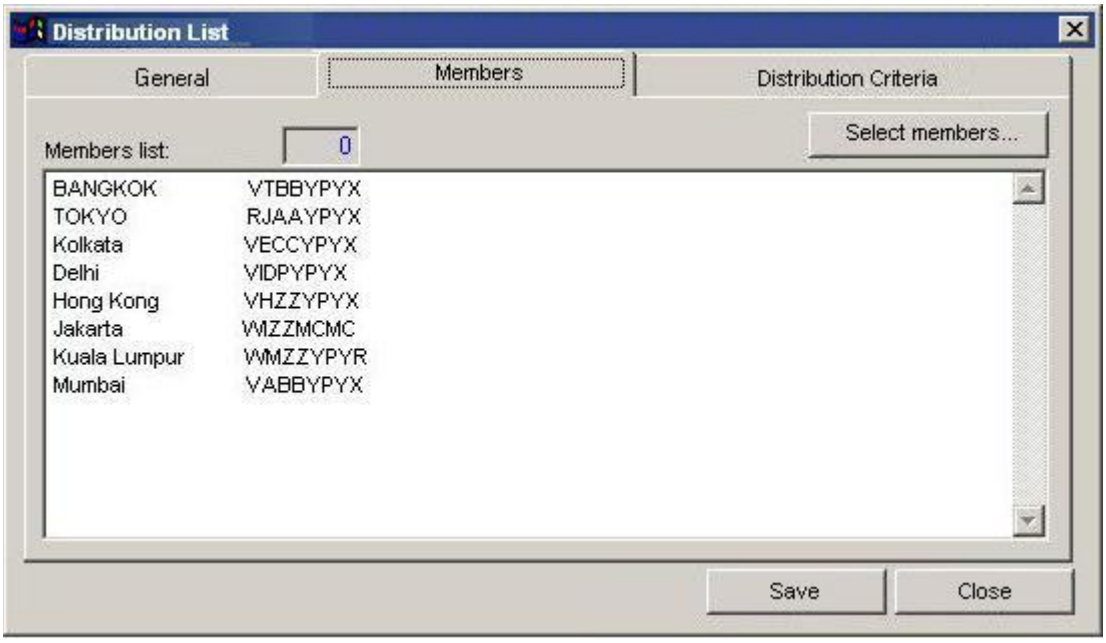

**STEP 2A:**
Choose Members Tab and click on the “Select members...” button.



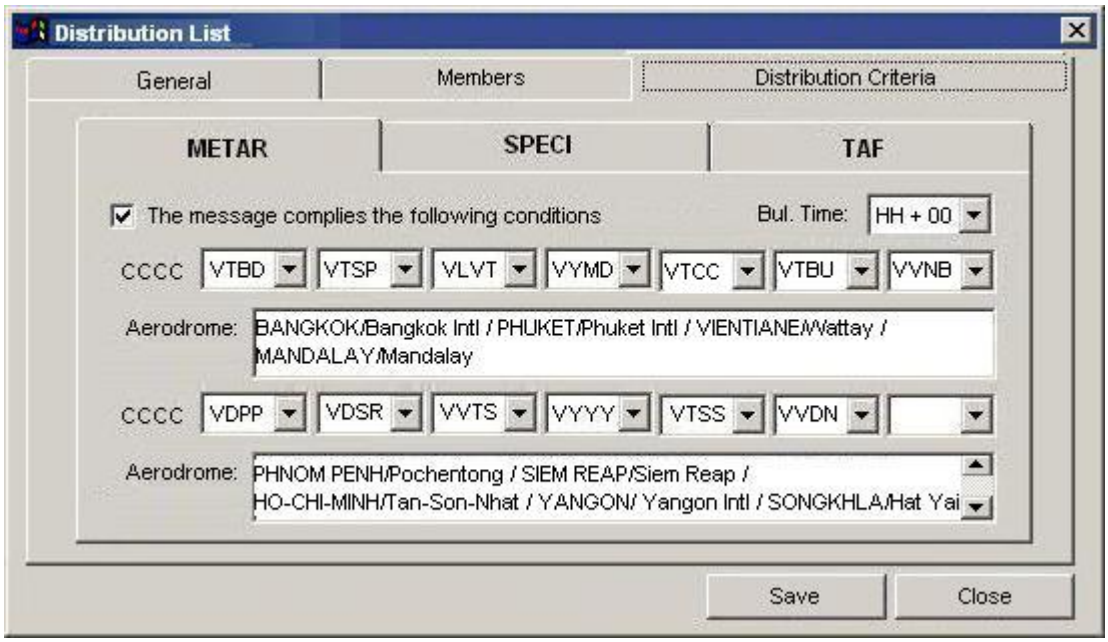

**STEP 2B:**
Choose bulletin recipients from the list of available recipients.




After click in "OK" button, the selected members are included in the Distribution List.

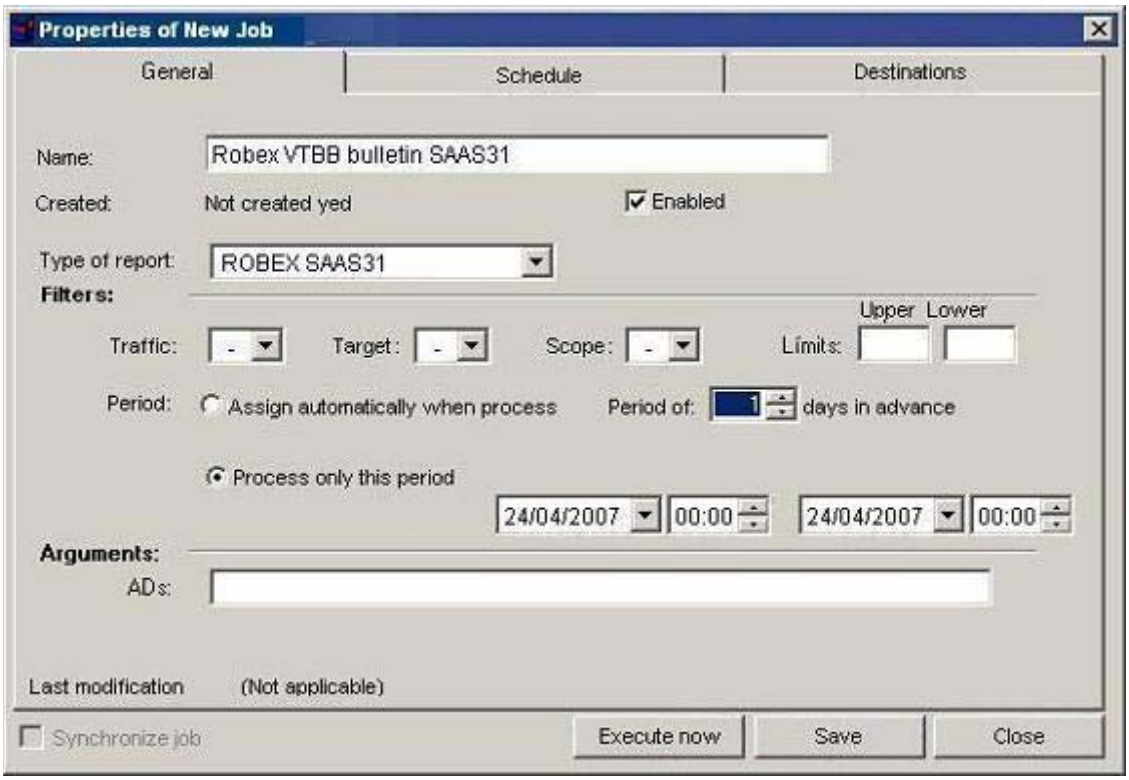



**STEP 3:**
Enter "Distribution Criteria" Tab and select which messages will be included in the bulletin:

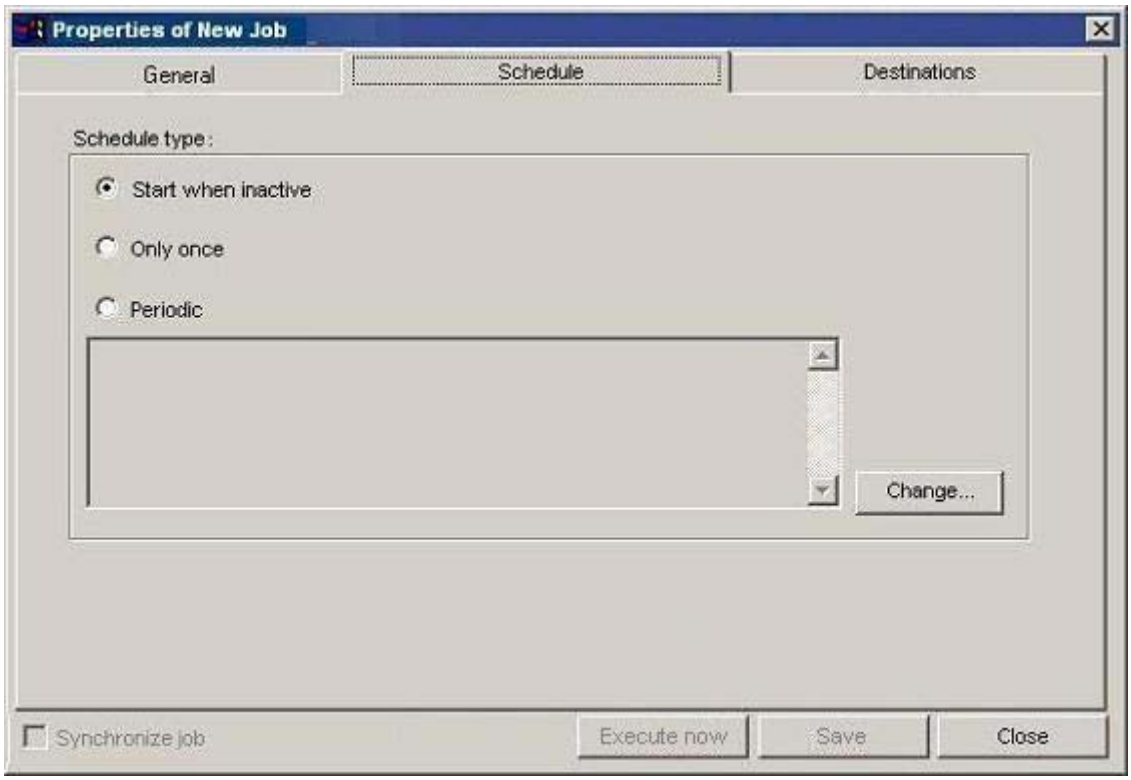



**STEP 4:**

Enter the "New Job" pop up screen and set general characteristics (some might not apply or can more widely used for other messages and therefore must be left blank) and with the distribution schedule tab set up distribution intervals.




After this, job schedule can be modified.




**Easy to use**

DBAIS uses a Management Terminal, where the system settings and processes are established, including domestic and foreign real-time traffic, monitoring information received and sent.
The Management Terminal is able to setup and store different types of SQL queries, program automatic unattended routine broadcasting tasks as PIB reports (Preflight Information Bulletin), verification lists, FIR and Airport reports, etc.

The high number of automated tasks it can perform makes DBAIS a very secure, efficient and stable system, allowing great customizing flexibility.
The system automation allows unattended tasks. To achieve this, the supervisor needs to specify some parameters as address and time schedule. This feature is specially useful to release the pre-flight bulletins (PIB), checklists and the results of different queries.

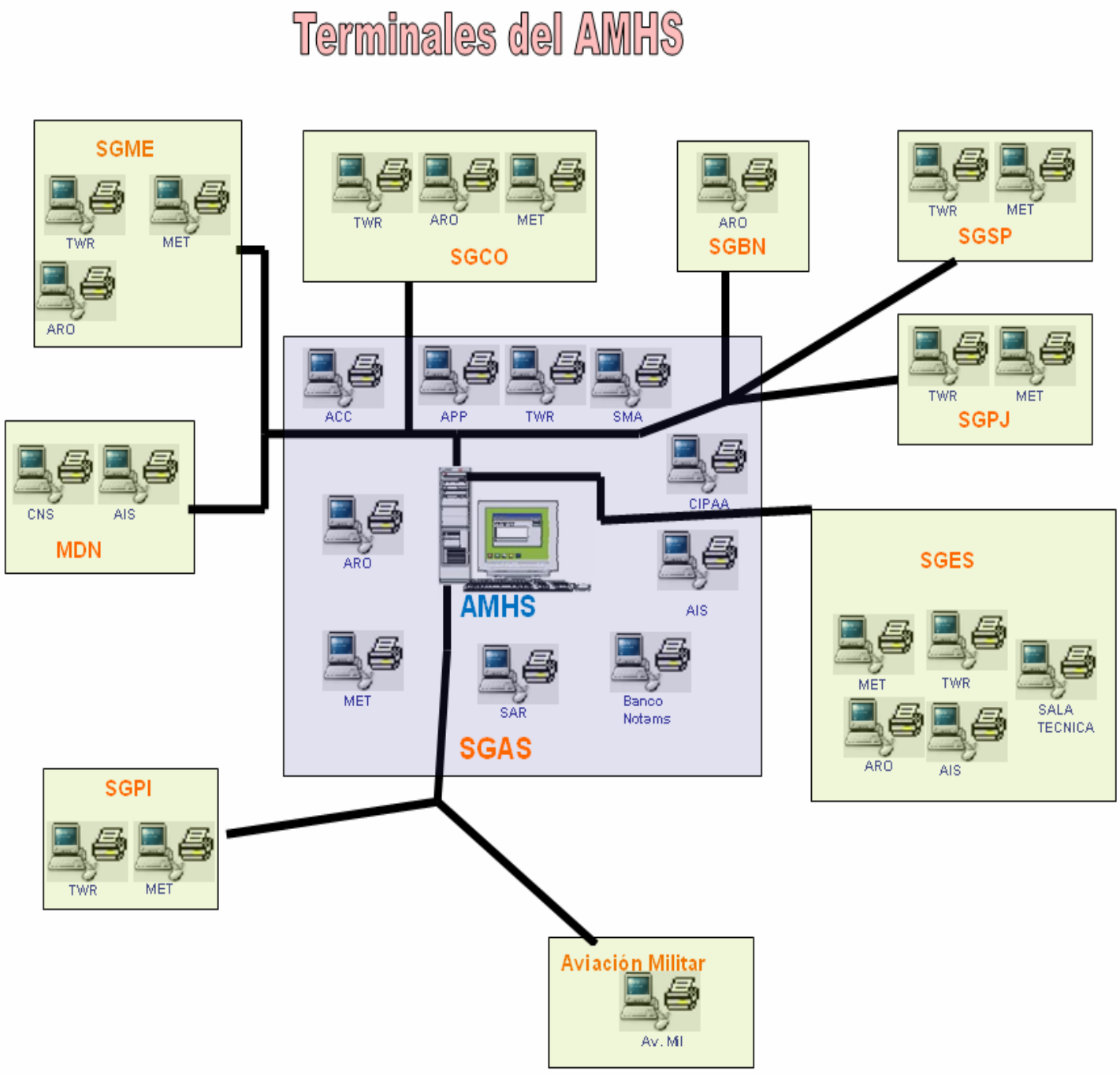
The available information in the database may be either local or international and it can be received from different networks such as ATN or AMHS in different formats, email, Hyper Text Markup Language (HTML), Web pages or simply filling up templates.

If the information comes from an international source, DBAIS stores it automatically, but if it is from a local source, it will be put (at a first stage) under the approval of system supervisor.
Once information has been entered and validated onto the database, it is automatically delivered to any location through pre-defined distribution lists.

DBAIS will also answer automatically to the queries received, for example: Pre-flight Information Bulletin (PIB), Aeronautical Information Publications (AIP), Aeronautical Information Circulars (AIC), amendments MET and any AIS related information.

**APPENDIX B**

TOPOLOGY OF THE AMHS IN PARAGUAY

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