

# Workshop Luxembourg

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**19 October 2001 Data Users & Commercials**



EUROCONTROL

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# 1 INTRODUCTION

## 1.1 Context

Within the European Civil Aviation Conference (ECAC) there are some 38 contracting states each of which, in accordance with Article 28 of the Convention on International Civil Aviation (Chicago Convention) and Annex 15 to this Convention, has responsibility for providing an Aeronautical Information Service (AIS). The formal provision of these services is performed by civil and military, state-owned or privatised Air Navigation Service Provider (ANSP) organisations. Independent of the nature of these organisations, each State remains responsible for the information/data published for and on behalf of itself.

AISs are required to ensure the flow of aeronautical information/data necessary for the safety, regularity and efficiency of international air navigation within the area of responsibility of a State. The ANSPs, airspace users, as well as those commercial organisations serving both ANSPs and airspace users depend on the accuracy and timeliness of such data for safe route management, flight planning, and flight operations.

The current operational structure has several limitations and drawbacks when seen from a European perspective. Incoherence of cross-border aeronautical information, inconsistent quality of data throughout the ECAC area, lack of interoperability between systems due to different data models and exchange formats, and failures in ensuring timely distribution of aeronautical information updates to all stakeholders may possibly compromise the safety and/or efficiency of air navigation. Last, but not least, the duplicated processes and investments of the current operational structure cause high maintenance (costs) for all those involved.

The cost effectiveness of AIS operations, the quality of aeronautical data and the accessibility and availability of such data can be significantly improved through automation and centralisation. This was the rationale for the development of a European AIS Database (EAD) system and a centralised EAD service: enhance operational safety of air navigation by ensuring the quality of aeronautical information and by facilitating its timely and efficient (electronic) distribution.

The EAD will indeed offer a substantial improvement on current facilities and processes for the acquisition, validation, and timely distribution of aeronautical information within the ECAC area. On the one hand, it will support and facilitate ANSP in the maintenance and publication of validated (thorough consistency and coherence checks) aeronautical information. On the other hand, the EAD will provide a centralised facility supporting the exchange of such information amongst ANSPs as well as the timely distribution of and access to the information by the airspace users community and by other interested parties.

The primary beneficiary of the EAD will be the ANSP organisations and the airspace users community from the ECAC member states. The EAD will also be used by airlines that are based outside the ECAC area and by commercial organisations that use the aeronautical information to provide value added services and products. Implementation of the EAD will introduce automation and centralisation in the provision, processing, and distribution of aeronautical information. This will call for a redesign of the current operational structure. The identification and removal of redundant processes and of dispersed investments by the involved stakeholders will result in significant technical and financial benefits to all of them.

In November 1998, the Provisional Council endorsed the creation of the EAD, approving the remit of the EAD Programme and its related organisation. Following approval by the Provisional Council in April 1999, the EUROCONTROL Agency entered into a contract for the implementation of the EAD system in July 1999, which is planned to be delivered to EUROCONTROL by March 2003. Having regard to the progress of the EAD Programme, the Provisional Council adopted draft decision No.83 at its 8<sup>th</sup> session in July 2000 and submitted it to the Permanent Commission. On 13 July 2000, the Permanent Commission took and endorsed this decision and thereby entrusted the EUROCONTROL Organisation with the development, establishment and operation of an EAD.

Concurrently, the EUROCONTROL Organisation has sped up the elaboration and implementation of a new strategy to separate structurally its regulatory functions from its activities of support for and provision of services. This new dimension was taken into account for the EAD Programme and, consequently, the setting-up of the operation of the EAD, i.e. the (EAD) Service. Although the Service will remain a EUROCONTROL service, its practical provision will be performed by an external organisation, under contract with and on behalf of EUROCONTROL. In the wake of this, a 5-year contract was entered into with GroupEAD Europe S.L. (hereafter referred to as the SPC, i.e. the Service Provider Company) for the development of the Service and its subsequent provision in July 2001.

The scope of the EAD Programme covers all activities related to the development and establishment of the EAD system and service, thus including the management of the contracted System implementation, the migration of the first set of users, and the follow-up of the externalised development of the Service. The end of all these activities is planned for mid-2004, at which time the EAD Programme will terminate.

The Agency now has to organise and institute a service responsible for the operation of the EAD, i.e. provision of the Service in compliance with a specific regulatory framework, continuous evolution and innovation of the EAD, and management of the EAD clients. Between mid-2003 and mid-2004, the EAD Programme will be phased out and the service will take over all pending and future activities related to EAD.

## **1.2 Objectives**

The Agency will ensure the successful provision of the service and, thereby, the achievement of the EAD objectives:

- Making available a single repository of aeronautical information for the ECAC area and contributing to the enhancement of the data quality by continually performing data checking processes, including cross-border data coherence verification;
- Supporting and facilitating ANSP in the maintenance and publication of validated (through consistent data checking) aeronautical information;
- Providing a centralised facility supporting the exchange of aeronautical information amongst ANSP as well as the timely distribution of and access to such information by the airspace user community and any other interested party;
- Providing a secure channel/vehicle for the electronic distribution of the aeronautical information stored in the EAD;
- Promoting and implementing a standard for the EAD system interface and for the data exchange in order to ensure harmonisation and interoperability between the EAD and the end user systems and, consequently, also amongst the end user systems themselves.

## **2 STAKEHOLDERS' INVOLVEMENT**

Irrespective of whether they are internal or external to the EUROCONTROL organisation, the stakeholders that will be involved in the EAD activities can be further categorised depending on whether they will be directly involved in the Service, for instance as users of the delivered services, providers of data to the EAD, or providers of the Service itself, or not.

The Service will eventually require the participation of the organisations from all ECAC member states as providers of aeronautical information to the EAD and will, in turn, make available and deliver such information to the users, which include the AIS themselves, ANSP organisations, airline operators commercial air carriers, other air space users and commercial data providers. These stakeholders have the opportunity to take part in the EAD Service in a variety of ways.

### **2.1 External Stakeholders**

#### **2.1.1 *Industry***

A number of companies have committed themselves to the programme by forming the consortium responsible for the development of the EAD system. The companies involved in the implementation of the system are Frequentis Nachrichtentechnik, Avitech, Austrian Product Assurance Company (APAC), Nedgraphics, Mekon, ISO and Solitec. The consortium will design, develop, test and deliver the EAD system.

#### **2.1.2 *GroupEAD Europe S.L.***

GroupEAD Europe S.L. is the company contracted by EUROCONTROL for the development of the Service and, only upon fulfilment of specific conditions, for the subsequent provision of the Service, on behalf of EUROCONTROL, for a term of 5 years. Group EAD Europe S.L is a private limited liability company, registered in Spain, and owned by Aeropuertos españoles y Navegación aérea (Aena), Deutsche Flugsicherung GmbH (DFS) and Frequentis Nachrichtentechnik GmbH.

#### **2.1.3 *Member States' AIS provider Organisations***

The organisations which, in each of the 38 ECAC member States, are responsible for the provision of the AIS will participate as data providers and data users in order to meet the requirements set out in the Permanent Commission decision No. 83.

At present, 5 of such organisations will be migrated to the EAD in the framework of the EAD Programme and will be able to operate with the EAD as from the start of the Service. Subsequently, during the first year of operation of the Service, AIS providers from another 12 ECAC Member States will be also migrated to the EAD.

#### **2.1.4 *Airspace Users***

Airlines throughout the ECAC area and beyond are expected to become data users of the Service. Furthermore, it is anticipated that the General Aviation community will also be a significant user of the EAD via the Internet.

### **2.1.5 Military Organisations**

The EAD will not solely serve the civil aviation community but is also designed to be used by the military organisations throughout the ECAC area, both as data providers and data users. The “Amt für Flugsicherung der Bundeswehr” (AFSBw) of the German air force will also be migrated prior to the start of the Service.

### **2.1.6 Commercial Organisations**

Commercial organisations involved in the production of value-added services and products for the airspace users will also become clients of the Service.

### **2.1.7 Clients Group**

A clients group will be established. All types of clients will be represented in it with the purpose of capturing new requirements and informing the clients on future evolutions of the EAD.

### **2.1.8 Programme Steering Group/Service Steering Group**

The user community is represented by the EUROCONTROL Programme Steering Group (PSG) as part of the EATMP working arrangements Group, which will later be replaced by the Service Steering Group (SSG).

## **2.2 Internal Stakeholders**

The internal stakeholders of the EAD are divided into two groups.

The internal clients are all those EUROCONTROL directorates, units, programmes, and services that will be clients of the Service and with which a Service Level Agreement will be established. The internal Service clients will comprise:

- the Central Flow Management Unit (CFMU), which will be the biggest service consumer of the EAD,
- Bretigny,
- the EATMP Database,
- CRCO,
- UAC Maastricht.

The EAD will also service most EUROCONTROL Agency units and programmes. An evaluation done in 1997 has shown that 12 different internal clients are clearly interested in the service.

Other EUROCONTROL directorates, units, programmes, and services that are not clients of the Service, however, will be internal stakeholders or the EAD due to the influence their deliverables have on the EAD development and further evolutions or due to the enabling function of the EAD, i.e. the Airspace Management domain (FUA, FRAP), the AIS AHEAD Programme and the Nav Programme.

### **3 BENEFITS**

Aeronautical information/data is provided directly by each of the ECAC States. The current systems used by each Air Traffic Service Organisation provide data of varying quality. Data users have to contact many States to gather all the information necessary for their business operations. The EAD will act as a single point of contact for Data Providers and Data Users, offering an opportunity for quality improvement and for saving time and money.

The EAD will offer a cost-effective service to access an integrated AIS system for States without existing or planned systems. The EAD service will reduce costs and improve the quality of data for States with an existing system. This should result in overall savings in the ECAC area by avoiding costs for multiple, similar, but most likely incompatible, procurements.

By gathering all AIS data into a single reference database, the EAD will provide the opportunity to perform enhanced data checking, particularly for data relating to border areas. By avoiding excessive duplication of information, higher accuracy rates will be achieved.

This AIS data will include Static Data and Dynamic Data, such as NOTAMs provided by the States, as well as some supporting data for use by specific clients (e.g. CFMU specific data).

The maximum effectiveness of the EAD will be achieved once all data providers within ECAC have successfully migrated to the system. The outsourced service is regularly controlled with regard to its efficiency and competitiveness.

The EAD will also act as an enabler for several EUROCONTROL Agency internal clients, i.e. CFMU, the Central Route Charges Office (CRCO) and the FUA, which have already identified a need for a reference database containing aeronautical information. Thus the availability of a database in the form of the EAD will provide considerable benefits.

## **4 ORGANISATION**

### **4.1 Oversight Management (of the Service Provision)**

The operation of the EAD, and thus the formal provision of the Service, will be performed under contract by the SPC on behalf of EUROCONTROL. Therefore, EUROCONTROL, owner and sponsor of the Service, will be responsible to its member States that the Service is rendered satisfactorily, in accordance with appropriate and agreed service levels and performance requirements.

In the framework of the service contract concluded between EUROCONTROL and the SPC, a Service Level Specification (SLS), detailing the services to be delivered by the SPC and the roles and responsibilities of each involved party, will also be established. The service contract together with the SLS will represent the tool through which the Agency will implement and ensure compliance with any applicable regulation, and the provision of the Service in particular.

The Agency will thus be responsible for the oversight management of the outsourcing service contract in order to ensure that the SPC meets its contractual obligations.

### **4.2 Stakeholders Management**

The EAD Service will remain and be recognised as a EUROCONTROL service therefore Service Level Agreements (SLA) will be signed between EUROCONTROL and each client of the Service. These SLAs, prepared and subsequently managed by the Agency, will define the scope of the services provided to a client as well as the responsibility of each party.

The Agency will also provide support to new clients of the Service in establishing their migration strategy to the EAD, their future concept of operation, and in planning and implementing such migration.

In the framework of the Stakeholders Management function, the Agency will manage the dialogue with all categories of EAD stakeholders by:

- Organising and managing a Clients Group in which all clients of the EAD would participate to identify their needs and inform them on the future evolutions of the EAD,
- Carrying out a clients satisfaction survey on a yearly basis,
- Organising and managing a Suppliers Group in which all the developers of EAD-compatible end user systems would participate to identify future needs and inform them on the future evolutions of the EAD.



## 5 EAD SYSTEM DESCRIPTION

### 5.1 Overview

The EAD system can be geographically divided into the following main parts: The server sites, the office sites, the clients (or client sites) and the networks. Additional sites are the Training Site and the Test & Development Site.

There will be two central server sites. This is necessary to secure redundancy in case of a major disaster. These server sites contain the EAD servers. For clients, it is totally transparent which site they are connected to.

The two server sites are connected through a Metropolitan Area Network (MAN). The MAN is used to mirror the data from one site to the other, and to connect the Local Area Network (LAN) from site 1 to the LAN of site 2.

There will also be two remote office sites for the EAD Staff. These office sites are connected to the server sites through the EAD Network.

The clients can be separated into Data Providers, Data Users, External Systems, AFTN Subscribers and Public Users. All Clients are connected to the EAD server sites: Data Providers, Data Users and External Systems through the EAD Network, AFTN Subscribers through the AFTN/CIDIN network and the Public Users through the Internet.

In summary, the following network connections exist to connect the various clients with the server sites:

- LANs to connect the HW inside the server and office sites,
- MAN between the two server sites,
- EAD Network (WAN, ISDN),
- AFTN/CIDIN network (to connect to the national Communication Centre),
- Internet.

The test equipment is separated from the operational EAD System in order to avoid any impact from training and test activities on the operational system. The training equipment provides facilities to train EAD Clients.

The EAD Operational Staff is located at the EAD Offices. Both EAD Offices are operational 24h. The definition of the work share is up to operational procedures.

A main overview of the EAD System is shown in Figure 1 EAD Overview.

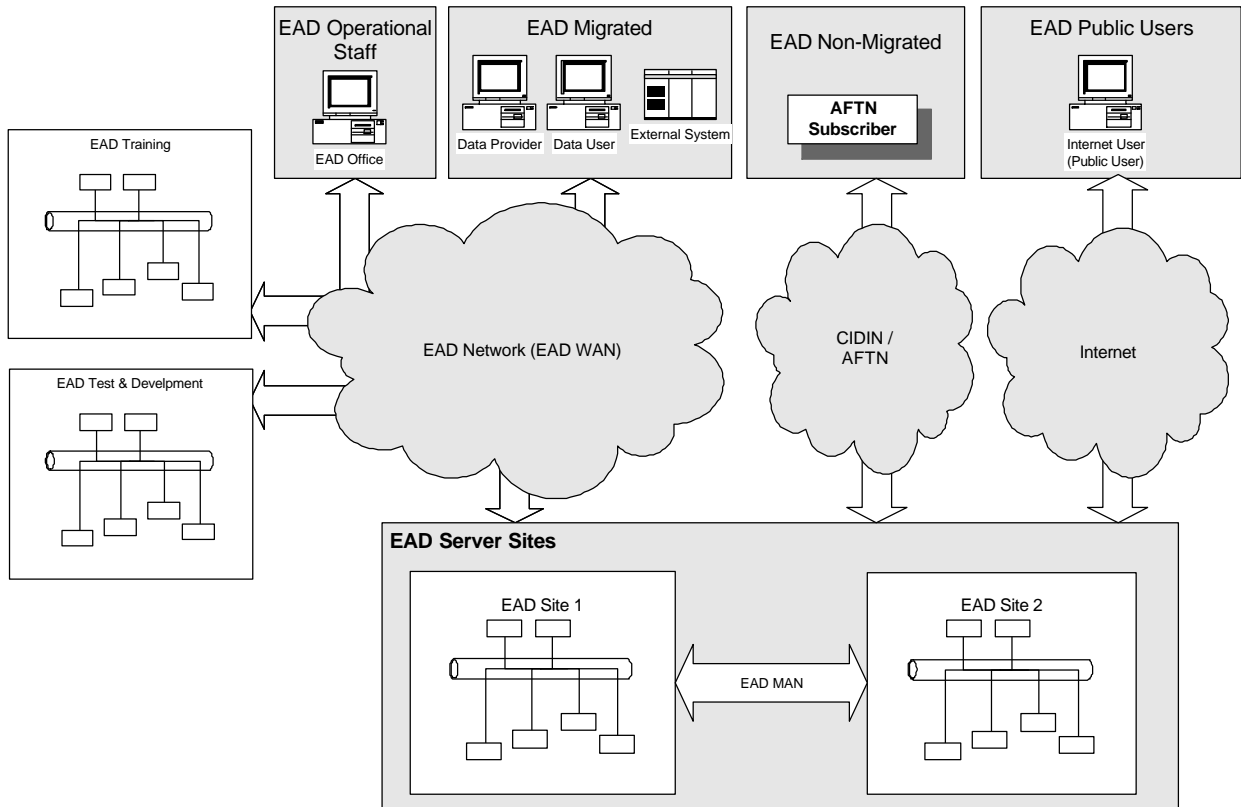


Figure 1 EAD Overview

According to the current plan, the EAD sites are at the following locations:

- EAD Server Site 1: IT Centre Site,
- EAD Server Site 2: IT Centre Site (different location to Server Site 1),
- EAD Office Site 1: Frankfurt,
- EAD Office Site 2: Madrid,
- EAD Training: Frankfurt,
- EAD Development: Vienna.

## 5.2 Software Concept

The EAD System software and the development environment are based on the use of various COTS products. The main COTS products used are FrameAPS and MicroStation/SmartGlobe.

The EAD provides different kinds of services and functionality through various subsystems. The main subsystems of the EAD are:

- INO,
- SDO,
- AIP,
- PAMS,
- Chart Production,
- Message Handling,
- Support functions with:
  - Surveillance, which includes System/Network Management and Helpdesk,
  - Security.

#### **INO (International NOTAM Operations):**

The International NOTAM Operation (INO) provides facilities for processing, checking, and creating international NOTAMs and other relevant message data to be handled by EAD. The INO data is checked against the SDO data and all other INO data in order to ensure coherence and prevent double publications.

#### **SDO (Static Data Operations):**

The Static Data Operation (SDO) provides facilities for the input and checking of the static aeronautical data required for the safe and timely execution of flight operations, for the efficient operation of the INO, and for additional data that is of common interest to EAD Clients.

#### **AIP (Aeronautical Information Publications):**

The AIP is responsible for the production, maintenance and storage of the AIPs, AIP Amendments, AIP Supplements and AICs. The AIP subsystem is based on the FrameMaker/FrameAPS COTS product.

#### **PAMS (Published AIP Management System):**

PAMS is responsible for storing the published documents, viewing services through read-only access and printing the documents. This includes maps and charts that are part of any of the above types of documents. The PAMS can also manage single charts in PDF format. The PAMS subsystem is based on the flash-DMS COTS product.

#### **Chart Production:**

The Chart Production subsystem is used to generate and maintain aeronautical charts from the SDO database. Charting parameters like chart specifications, graticule definitions, ellipsoid definitions and symbolisation can be used and maintained. Chart Production also offers specific charting functionality, such as geographical calculations and map projections. The Chart Production subsystem is based on the MicroStation/SmartGlobe COTS product.

#### **Message Handling:**

The Message Handling provides EAD with an interface to AFTN/CIDIN and AMHS/X400. AMHS/X.400 is an option. It is currently not decided whether this option will be used.

**Support functions:**

- **Surveillance:**  
 Surveillance is based on a COTS product. The product includes functionality that covers the requirements for System Management, Network Management, and Help Desk.  
 The System Management, Network Management, and Helpdesk subsystem will operate at the two central server sites. In addition, a number of user terminals external to the IT site are configured with software that allows support from the IT site for specific functions such as software delivery. This means that EAD client machines (on client site) can also be configured with a software delivery agent client to automatically deliver software, if necessary.
- **Security:**  
 The security management is based on COTS products. The security management provides facilities to secure EAD.

An overview of the provided services is given in Figure 2.

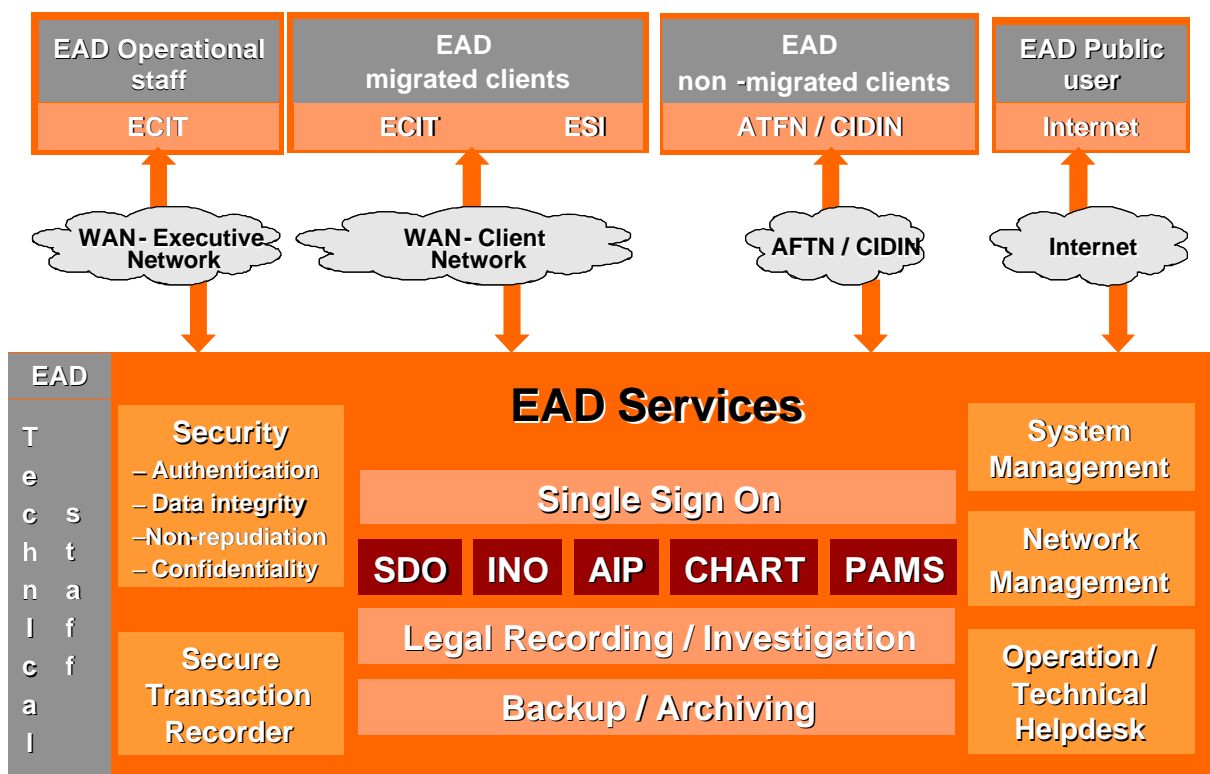


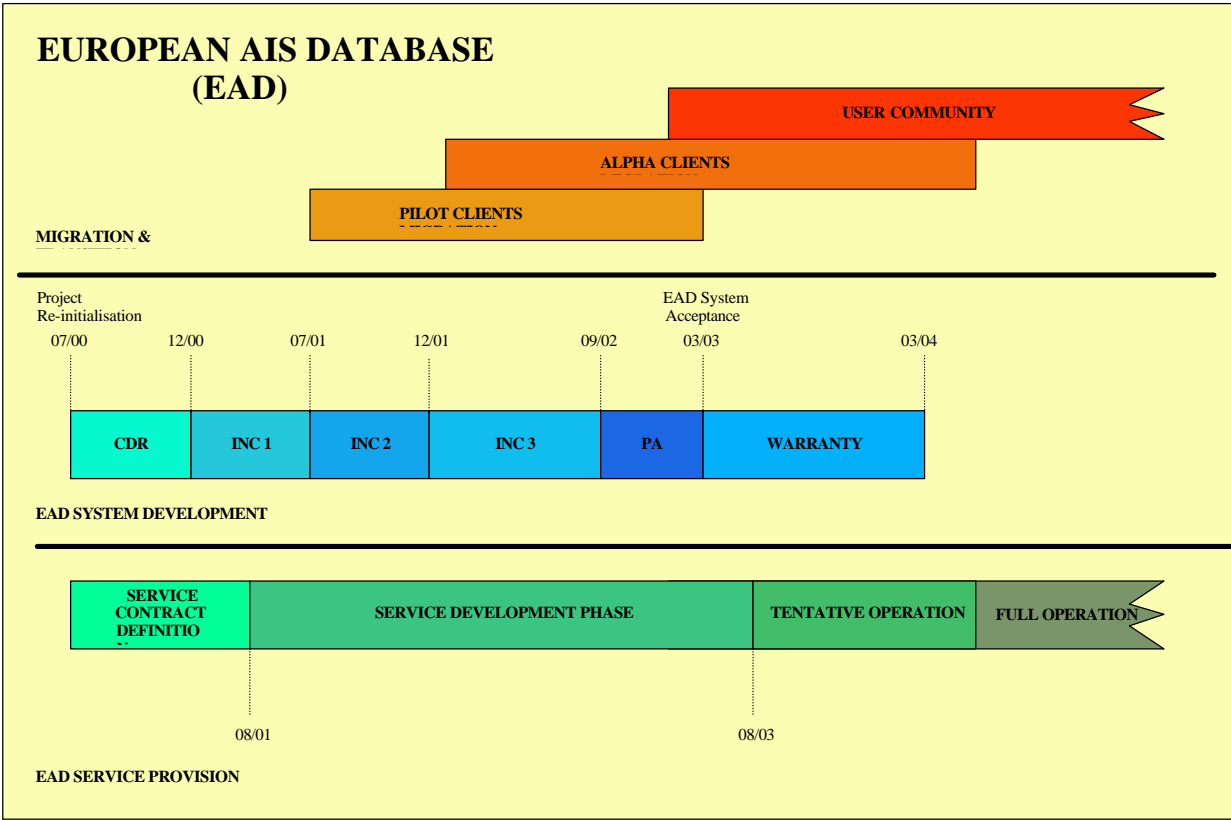
Figure 2 EAD Services

### **5.2.1 Client Concept**

EAD provides support for different kinds of Clients. The access rights and availability of concrete services differs between the clients and also depends on the competence of the client. For EAD, the following kind of clients have been considered:

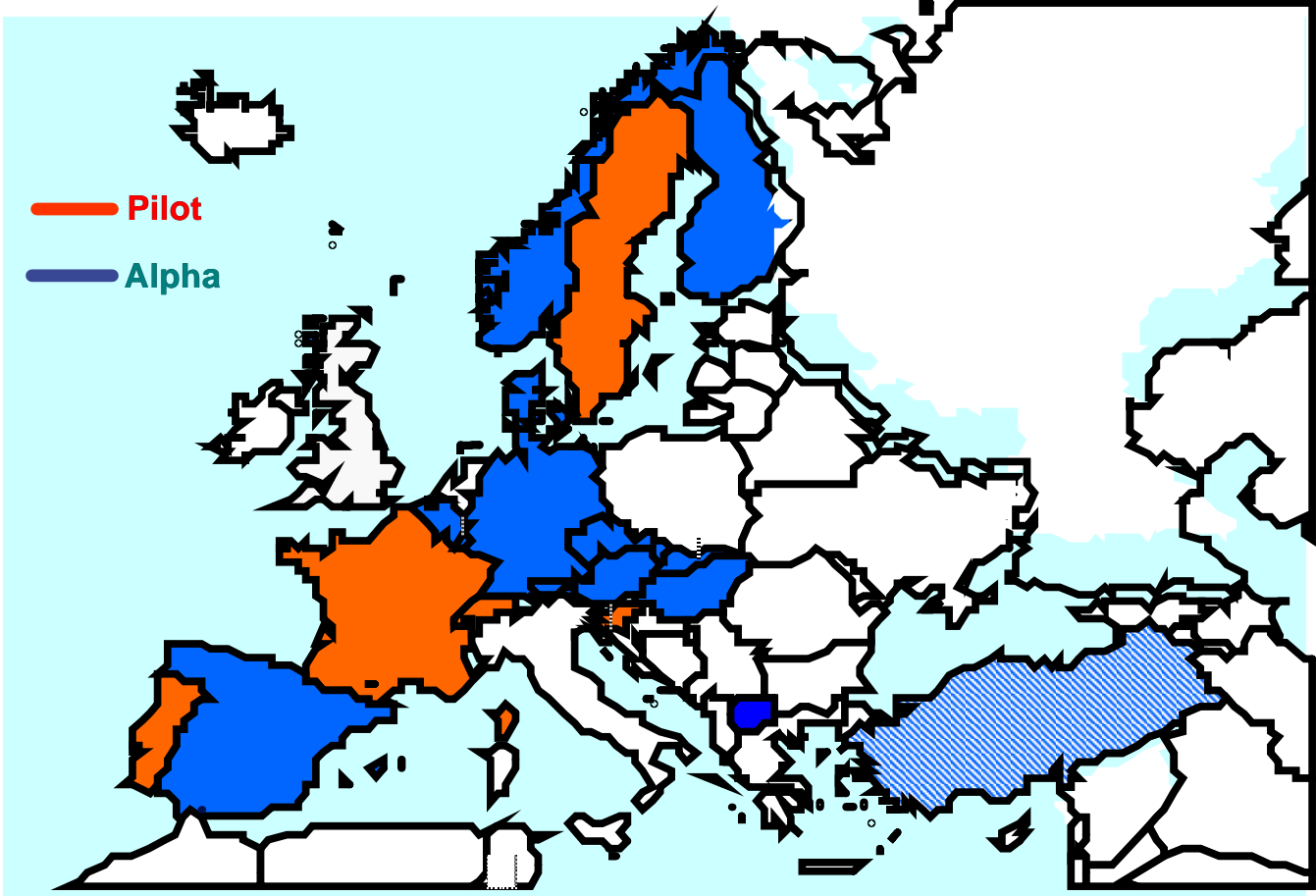
- **EAD Technical Staff (terminal-based internal clients):**  
The EAD Technical Staff, with tasks like Surveillance, Security, and Technical Help Desk is located at the EAD Server Site.
- **EAD Operational Staff (terminal-based external clients):**  
The EAD Operational Staff is located at the EAD Offices and supports the operational procedures of EAD.
- **Data Providers (terminal-based external clients):**  
The Data Providers are responsible for the provision of AIS data. A Data Provider includes Data User functions.
- **Data Users (terminal-based external clients):**  
A Data User has read access to available EAD data. With the possibility to define and store profiles, Data Users can use more functions than Public Users.
- **Public Users (Internet users):**  
Public Users are the non-commercial Internet users. The provided functionality is limited to read only.
- **External Client Systems (with system-based interaction):**  
An External Client System is seen as an existing national AIS system (or any other suitable system) to be connected to EAD via a system-to-system interface. An External Client System can act as a Data Provider and/or Data User.
- **AFTN Subscribers (EAD Non-Migrated):**  
Via AFTN, clients can be connected to EAD as AFTN Subscribers. These clients are either non ECAC Member State Clients or ECAC Member States not yet having migrated.

6 EAD ROADMAP



7 CLIENT MIGRATION

EAD Pilot/alpha Client Participation Status September 2001:



## **Pilot Clients**

The 'Pilot Clients' have been selected at the outset of the EAD Implementation. They will participate in specific areas of EAD development.

The Pilot Clients are a cross-section of all the potential users of EAD.

Why Pilot Clients?

- To include the operational community (data users and data providers) from the start of the programme. The involvement helps to create ownership of the product during development phase and ensures acceptance of the system.
- To prepare the Migration and Transition of all potential clients.

The responsibility for the integration of 'Pilot Clients' is shared between the EAD System Provider and the Pilot Client.

11 Pilot Clients are expected to be involved in the initial implementation phase. Currently the following are fully participating:

- 5 National Administrations;
- 3 Agency (internal);
- 1 Commercial Aviation;
- 1 Military Aviation;

The Pilot Clients will be operational at start of tentative operation of the EAD and they will participate in the acceptance of the EAD System.

## **Alpha Clients**

The Alpha Clients will be the second set of clients to migrate to the EAD.

12 Alpha Clients are selected.

The Alpha Clients will be mainly Data Providers, as this will facilitate the database population.

Preliminary migration activities have already started. They include the definition of the strategy, studies and evaluation of changes and operational concept.

The Alpha Clients must be ready to begin their integration activities at start of Tentative Operation of the EAD. Preparatory work for migration (modification of their system, installation of ECIT, modification of network, etc.) will be completed before the start of Tentative Operations.



## EAD System Implementation

### FREQUENTIS

- Consortium Leader
- INO
- Surveillance
- Security
- Common Services
- ESI
- LAN, Hardware, WAN

<http://www.frequentis.com>



- Charting
- Domain Support

<http://www.nedgraphics.nl>



SDO

<http://www.solitec.com>



MHS

<http://www.avitech.de>



- Programme Management
- Safety/Security Management
- Surveillance Management
- Training Management
- Quality/Configuration Management

<http://www.apac.at>



PAMS

<http://www.isogmbh.de>



AIP

<http://www.mekon.com>

## **EAD Subsystems**

### **Aeronautical Information Publishing (Mekon)**

#### **1. *About Mekon***

Mekon Ltd. based in south London is the market leader in the publishing technology including single source content creation to multiple output delivery; Web, CD and hard copy. The Mekon services and solutions offer industry a cost effective, time saving answer to critical document delivery, ensuring fast accurate output of information essential in today's business environment. The benefits of single source publishing come from creating the content once and then processing the information into the different output formats. This saves time and ensures accuracy in the delivered media. Mekon's portfolio of major clients in industry, aviation and government combined with their partnership with Adobe has made them the principal solution providers in publishing technology.

#### **2. *Subsystem AIP***

The AIP provides the following functionality:

- Creation and modification of AIPs,
- Generation of AIRAC Amendments, Non-AIRAC Amendments, Supplements, AICs,
- Database connectivity allowing linked data from AIP database to the document,
- AIP Management allows an AIP to be added to the database. The AIP Manager is then used to manage files, security and workflow,
- Insertion of change bars at the point where a document has been modified,
- Creation of PDF (Portable Format Files) files of the AIP,
- Report generation of all changes and tracking information.

#### **3. *FrameAPS***

FrameAPS for Windows NT/2000 works exclusively with Adobe FrameMaker providing all the necessary enhancements usually not found in DTP tools which are specific to AIS documentation. In addition to detailed proven templates, advanced functions include: document version control, AIRAC and non-AIRAC amendment tracking, change bar generation and AIXM based database connectivity.

The fundamental principle behind FrameAPS is that AIP sections are maintained in an Oracle database called the AIP Manager. Text changes and adjustments to these sections are recorded with an effective date and all critical data is generated by links to the SDO Database.

FrameAPS generates a new version of the AIP by synchronisation with the Oracle-based SDO database running on an HP Unix System, automatically inserting change bars while producing a detailed report on all changes.

Once a new version is approved, a new List of AIP Pages and a Table of Contents can be generated across all three sections (GEN, ENR and AD). The changed pages are now ready for publishing for the next AIRAC or non-AIRAC issue of the AIP which are automatically printed to PDF.

The principal difference between the FrameAPS COTS product and the version to be used for EAD is that EAD provides its own SDO database, which is validated and maintained, independently to FrameAPS.

## **Chart Production (NedGraphics)**

### **1. About NedGraphics**

NedGraphics provides integrated ICT solutions in two niche markets: Textiles & Apparel and Geographical Information Systems (GIS). With its GIS division, NedGraphics is market leader in the area of Local Government in the Netherlands, serving more than 170 communities. As an independent system integrator NedGraphics provides turnkey solutions, including consultancy and training to its world-wide customers.

NedGraphics Holding N.V. is listed on the New Market of Amsterdam Exchanges (NMAX) since April 3, 1998 and operates from 14 international offices.

### **2. Subsystem Chart Production**

The EAD chart production subsystem is based on the NedGraphics smartGlobe (TM) COTS product, one of the few specialised aeronautical charting products. SmartGlobe follows the philosophy of providing flexible and easy-to-use tools to the expert user. The chart production subsystem provides the following capabilities:

- Map projection and geodetic calculation,
- Grid and Graticule Generation,
- Symbolisation of Aeronautical (Static) Data in a projected chart,
- Flexible symbolisation and annotation,
- Effective Date and Update facilities,
- Chart templates can be created following, for instance, ICAO guidelines.

All visual aspects of charts, such as symbolisation, are user-definable.

### **3. Chart Production COTS products**

SmartGlobe is based on the MicroStation® product of Bentley® Systems, Inc. and an Oracle® 8 database from Oracle®, Inc. MicroStation is one of the most widely used Computer Aided Design (CAD) applications in the GIS domain, providing a powerful application development and integration platform.

SmartGlobe is in use with major airlines, such as KLM and SAS Flight Support who maintain large numbers of navigation charts as well as several Civil Aviation Authorities as a standard tool for AIP chart production.

### **4. EAD Customisation**

EAD users will be able to benefit from the full functionality as provided by the smartGlobe COTS product. Improvements have been added in the area of On-line Help and Ease-of-Use in general. In addition to this, EAD users will be able to use the EAD Static Data Operation as a source of data, which means that there is no need to maintain a smartGlobe static database separately.

## **Common Services (Frequentis)**

### **1. About Frequentis**

In the past few years FREQUENTIS has developed from a small Austrian-based company into a mid-sized company group with subsidiaries all over the world – you may find us in Germany, the Czech Republic, Slovakia, the United Kingdom, Canada and the USA.

Additionally, regional offices have been founded to keep close contact to the customers on site. Together with joint ventures and strategic partnerships they form the basis for a world-wide customer-oriented know-how network.

An average growth rate of more than 30% per year shows that the customers appreciate the efforts taken by FREQUENTIS.

### **2. Subsystem Common Services**

The Common Services Subsystem provides utilities used by – as you might guess by the name –several other subsystems. Visible to the user, these are mainly:

#### *EAD-Explorer*

The EAD-Explorer is the first Front-End application you see when you enter the world of EAD. It provides a Single-Sign-On (one log-on for all) for the different EAD subsystems. It provides a centralized and integrated access to all EAD applications and abolishes the heterogeneous subsystem structure.

#### *Legal Recording*

All changes in the system's database are logged for legal proof – this is what is meant by legal recording. This logging is done by every subsystem. Common Services provides a common centralised deposit for this logging procedures and provides tools for investigating this deposit. You will be able to track any data changes down to a user, authority, time slot within an EAD application or throughout different applications.

## International NOTAM Operations (Frequentis)

### 1. **About Frequentis**

See description Common Services

### 2. **Subsystem INO**

The INO (International NOTAM Operation) provides facilities for creating, processing, checking, distributing and retrieving international NOTAM and other relevant message data to be handled by EAD. The INO receives requests related to International NOTAM Operation, processes them and returns replies to clients. The INO provides the following functionality:

#### *Message Creation*

Message Creation comprises functions to create, edit, store or delete messages. The following messages are supported:

- NOTAM,
- SNOWTAM,
- ASHTAM,
- BIRDTAM,
- AFTN Freetext.

Messages are created by using the content of the SDO database. The system verifies the messages against a pre-defined set of rules and the SDO database. In case of an error, the system will react by the appropriate error handling. If no error occurs, the message will be stored, distributed, and made available for Retrieval.

#### *INO Message Processing*

INO Message Processing receives different types of messages. The system verifies the format against a pre-defined set of rules and the SDO database. In case of an error, the system reacts by the appropriate error handling. An erroneous message is either stored in a queue for manual processing or rejected and sent back to the message originator. Whether an erroneous message is stored in the message queue or not depends on the message type and the system configuration.

#### *PIB and Message Retrieval*

PIB and Message Retrieval comprise different report generator modules to retrieve NOTAM and to format Pre-flight Information Bulletins, NOTAM summaries, and other NOTAM Retrieval products. To reduce the amount of information that must be typed in again and again in case of frequently used inquiries, the EAD staff maintains predetermined profiles. The following kinds of PIB are provided: Aerodrome PIB, Area PIB including special Area PIB, Route PIB, Narrow Route PIB.

### *Basic Data Maintenance*

Basic Data Maintenance comprises various functions used to add new NOTAM related operational data and to read, update or delete existing operational data (Distribution Lists, System Parameters, NOF Profiles, NOTAM Selection Criteria, NOTAM Code);

### *INO Client Interface Support for ESI*

The INO supports a data interface for ESI. Via the ESI an External Client System can subscribe and unsubscribe to NOTAM distribution. Furthermore, the NOTAM data itself is distributed via the ESI. Additionally, Message Creation, PIB and Message Retrieval are provided via ESI.

### **3. Use of COTS Products**

The INO Data Provider implementation is based on ORACLE Forms and ORACLE database technology.

The INO Data User and Public User are based on state-of-the-art Java Web-technology.

## Message Handling Service (Avitech)

### 1. About Avitech

Avitech – Aviation Management Technologies GmbH designs, develops and maintains IT systems for Air Traffic Control (ATC) applications world-wide.

Although Avitech is a young name on the ATC market, the company is proud to look back on 30 years of international experience in planning, development, integration and support of IT systems in this market segment. With its nearly one hundred highly qualified employees, Avitech is to be found on locations in Germany (Friedrichshafen, Berlin, Frankfurt), Austria and Canada.

### 2. Subsystem MHS

The subsystem MHS (Message Handling System) consists of Avitech's COTS product ADAMS MHS and provides EAD with access to the AFTN/CIDIN networks. In addition to the AFTN Message Handling functionality, an X.400 Message Transfer Agent (MTA) is supported for the later introduction of an AMHS/AFTN gateway as an upgrade path.

EAD is connected to the AFTN/CIDIN via a primary and an alternate international AFTN/CIDIN Communication Centre. In the initial phase, CIDIN will be used to interconnect EAD and the Communication Centres.

AFTN users have access to the EAD via their direct connected Communication Centre and the international AFTN/CIDIN.

The following figure shows a communication scenario between the EAD and the AFTN Clients.

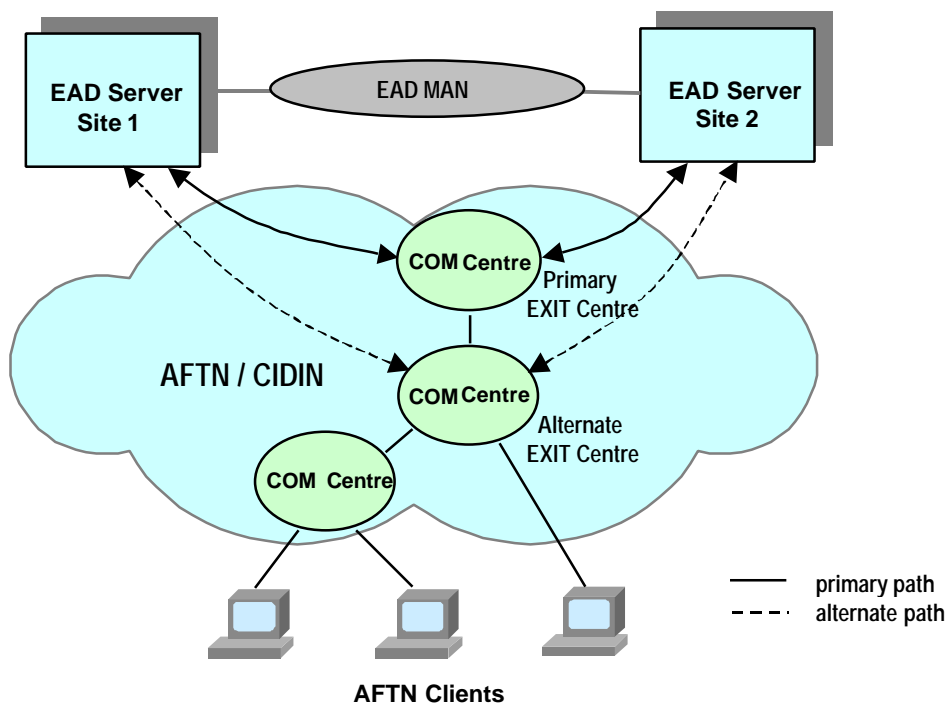


Figure 3 Connecting AFTN clients to the EAD

## **Published AIP Management System (ISO)**

### **1. About ISO**

*ISO Software Systeme* was founded in 1979. The company with its head office in Nuremberg and branch offices in Frankfurt, Munich, Stuttgart and Hamburg employs a staff of around 180 people and provides IT solutions and consulting.

ISO focuses on but is not limited to the following business branches:

1. Airports, with IT-solutions for airport management including Airport operational database
2. Air traffic control, with international projects in the field of tower systems and AIS systems
3. Tourism, with own products for tour operators, incoming operators and airlines
4. Document management and PDM systems
5. SAP R/3, consulting and development for airports, construction industry and administration having competence in almost all R/3-modules.

### **2. Subsystem PAMS**

PAMS (Published AIP management system), provided by ISO, is a document management system to handle published AIP, AIP Supplements, AIP Amendments and AICs.

The system provides the Data User and Public User with the following services:

- Viewing of published AIP documents,
- Downloading of AIP documents,
- Printing the AIP documents,
- Viewing of the same document by several users simultaneously.

And in addition to Data Provider:

- Viewing the history of the documents,
- Check-in of AIP documents,
- Check-out of AIP documents,
- Deletion of AIP documents.

The system is integrated in the EAD environment and provides interfaces to other subsystems of the EAD system.



### **3. Use of COTS Products**

PAMS is based on ISO's COTS product flash DMS. Flash DMS is a tool box which builds the platform for user\_specific document management applications. Flash DMS provides the following basic functionalities:

- User authentication,
- Check-in of documents,
- Check-out of documents,
- Downloading of documents,
- Retrieval of documents,
- User interface to define selection criteria for document retrieval,
- Viewing of documents,
- Deletion of documents.

Flash DMS uses a client-server architecture with the server being a UNIX based system with the RDBMS ORACLE, and the client application being based on platform-independent Web technology.

## Static Data Operations (Solitec)

### 1. **About Solitec**

Vienna-based SOLITEC Software Solutions GmbH was founded in 1997 as a spin-off by former employees of Cap Gemini Austria. As an independent software company SOLITEC focuses on delivering high quality turnkey IT solutions and services based on state-of-the-art Oracle® Technology from the very beginning. Since 1998 SOLITEC is one of the first Certified Solution Partners of Oracle® in Austria. They carry out even the most complex IT projects by using reliable methods and tools and by permanent education of their employees and co-operation with external Business Consultants. Within the scope of our successfully delivered large-scale projects we have gained valuable domain expertise in aviation, insurance/finance, government/public authority and transportation/logistics. Our company's policy reads as follows: "Keep your customers AND your employees for life".

### 2. **Subsystem SDO**

The subsystem SDO is a new development within the scope of EAD and serves as the "Data Backbone" for other subsystems like AIP (Aeronautical Information Publication), Charting (Aeronautical Chart Production) and INO (International NOTAM Operations). All static data as defined in the AIXM (Aeronautical Information Exchange Model) data model is contained in the SDO database and is accessed and/or maintained via functionalities provided by SDO.

#### *SDO Slot Management*

Slot Management provides a publishing mechanism to co-ordinate and check static data updates for which multiple Data Providers are responsible. A set of related static data updates for one Data Provider is called a private slot. A set of private slots with the same effective date is called a public slot that can only be maintained by EAD staff. Private slot validation checks static data within a private slot against published data and includes category B checks. Public slot validation checks static data against published data and also against all private slots within the same public slot and includes category C checks.

#### *SDO Static Data Maintenance*

Static Data Maintenance is fully based on Slot Management. Static Data Maintenance provides an AIXM-based comfortable access layer to update the SDO database, which prevents clients from directly accessing the SDO objects in the SDO database. It also makes the implementation details of temporality and traceability transparent to clients. It maintains the integrity of the database by performing category A data checking on all data input. Static Data Maintenance maintains spatial attributes to make spatial queries possible (e.g. all VORs within a region).

#### *SDO Reporting*

In order to have read access to static data contained in the SDO database, report functionalities (queries against the SDO database) are provided by SDO for Data Users and Data Providers. A set of predefined reports (useful reports of common interest) is provided by SDO. Furthermore, SDO provides facilities to allow the creation of user-defined reports. For Public Users accessing EAD via the Internet only predefined reports are foreseen.

### *SDO Bulk Upload / Download*

AIXM Upload: The AIXM Upload is responsible for processing a file containing aeronautical data in AIXM (XML syntax) exchange format. The data is checked, and stored in the database, using the Static Data Maintenance and Slot Management software. The data is accompanied by identification of the Responsible Authority. AIXM Upload is fully under control of EAD staff.

AIXM / ARINC Download and Data Distribution: The AIXM/ARINC Download and Data Distribution is responsible for extracting static data from the SDO database, using Parameter Sets specifying the selection criteria, such as region, entities, and format. The data is formatted in accordance with either the ARINC 424 or AIXM (XML syntax) exchange format. The resulting data file is passed on to the EAD Office for on-line or off-line transport to the authority who requested the download. The delivery of data files through on-line transport is not part of SWU SDO but of the ESI. Parameter Sets can only be updated by EAD staff. Because AIXM/ARINC Download and Data Distribution are only triggered by Parameter Sets, it is fully under control of EAD staff.

### *SDO Parameter Set Management*

Parameter Set Management provides services for EAD staff for managing the Parameter Sets for User Profiles, as well as the contents of Parameter Sets, which are used for AIXM / ARINC Download and Data Distribution. Parameter Sets contain, among others, a description of the type and frequency of the delivery and format of the output file.

### *SDO Client Interface Support for ESI*

- Static Data Maintenance,
- Slot Management (only private slot),
- Reporting Management (only user defined reports),
- Receive static data output of parameter sets,
- Database View Access.

## Safety / Security (APAC)

### 1. About APAC

The Austrian Product Assurance Company Ges.m.b.H. was founded in 1994 and supports leading ATC/AIS organisations and associated industrial companies with project-, quality-, configuration-, safety- and security management. APAC's services are based on state-of-the-art methods and tools including a Lotus Notes database for Configuration Management and Test Management.

APAC has implemented and maintains a Quality Assurance System conforming to ISO 9001 certified by ÖQS in 1994, 1997 and 2000.

APAC is teaching security management and project management at the University of Applied Sciences St.Pölten.

### 2. Subsystem Safety / Security

The overall objective of a safety/security programme is to reduce and keep potential risks of harm caused by your system or by security threats as low as reasonably practicable. The goal of the safety/security subsystem and its activities is to assure the design of an inherently safe and effective system. We provide a comprehensive assessment of the systems' ability to maintain service to its users in the event of hardware and/or software failures and failures caused by external threats.

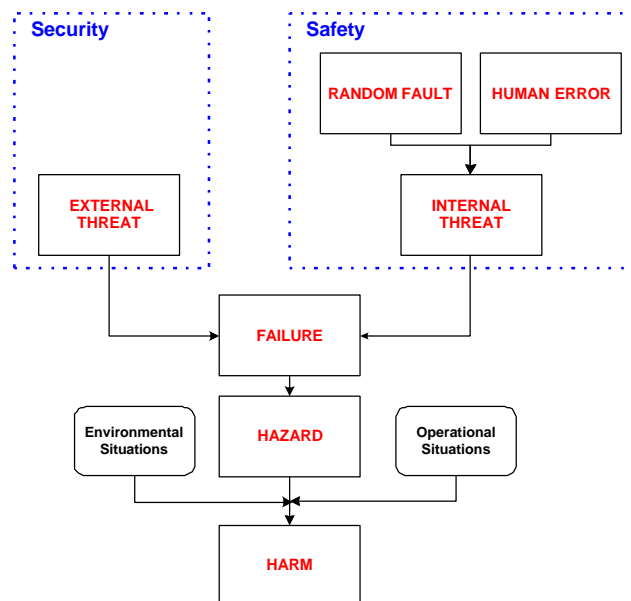


Figure 4 Failure chain

Subsystem Security will implement the following services:

- Firewall,
- Virtual Private Network,
- Intrusion Detection System,
- Secure Transaction Recorder and,
- Public Key Infrastructure;

with state-of-the-art COTS products as mitigation measures against potential security threats.

## **Surveillance (APAC)**

### **1. About APAC**

See Safety/Security (APAC)

### **2. Subsystem Surveillance**

Subsystem Surveillance is divided into:

- Advanced Helpdesk,
- Network Management,
- System Management.

Unicenter provides a management framework function comprising Systems Management, Network Management, and Help Desk.

The interface may be on one display if the operator is skilled both in the operational and technical management or on separate screens: one for the help desk and one for system/network management.

Within the EAD Server Sites, equipment and platforms are monitored and managed within the capability of the management interface they support. For each of the hardware platforms, Unicenter provides Agents to run on the platform and interact with the available Management Information Base (MIB). For the Oracle database, a monitoring agent is installed to provide the management framework with status and alerts if resources are operating close to their limits.

For the EAD Clients located outside the EAD, some Unicenter software is available to support management functions such as ECIT software delivery if this is both required and procured by the user.

### **3. Use of the COTS Products**

Unicenter Advanced Helpdesk completely automates help desk service tasks to reduce service response time, ensure the availability of enterprise-wide resources, and optimise an organisation's response to user requests.

Unicenter System Management enables system administrators to control their environment by monitoring status, event, and configuration information for critical operating system parameters. These system agents also monitor key desktop and server operating system resources as to their adherence to user-defined policy. They detect deviations from profiles and, if necessary, escalate events to Computer Associates Unicenter TNG for appropriate action.

Unicenter Network Management provides an interface to monitor status, event, and configuration information for network parameters. The network management will be carried out by the IT Service Provider.

## ***EAD System Interface (Frequentis)***

### **1. About Frequentis**

See description Common Services

### **2. Subsystem ESI**

The ESI subsystem provides a high-level interface to services of other EAD subsystems for external clients of the EAD system. ESI is mainly a system-to-system interface which enables EAD's integration with existing AIS infrastructures. The main focus of ESI is to ease integration and, therefore, to enable external clients to use as much information inside EAD as possible.

Mainly the ESI Client Interface and the ESI Validation Suite are visible to the external client.

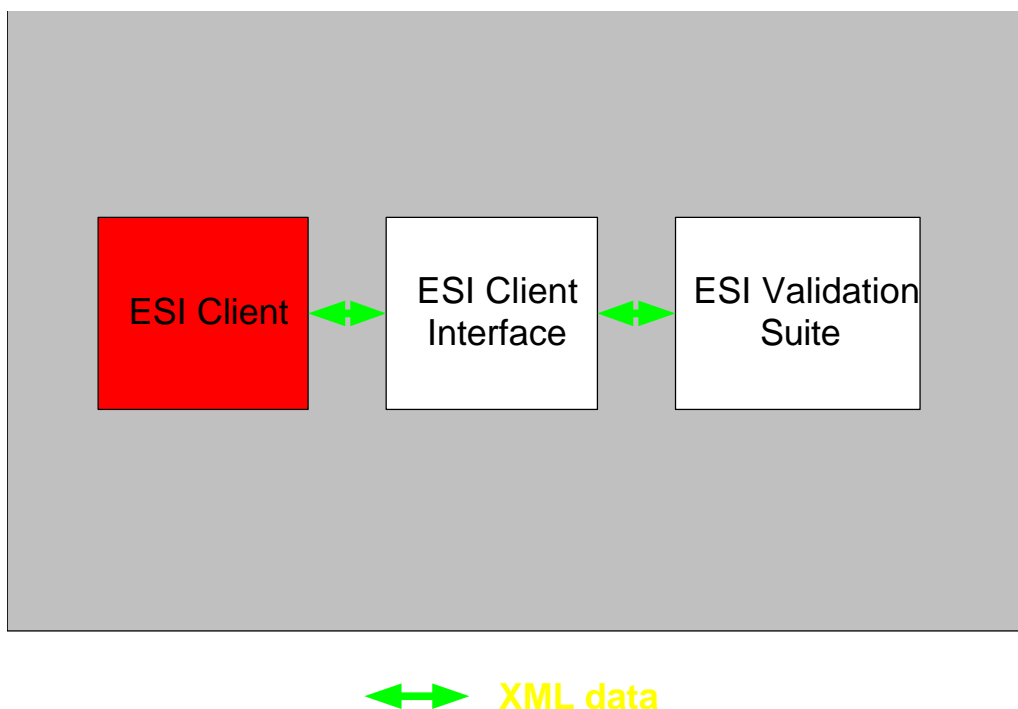
#### *ESI Client Interface*

The ESI Client Interface provides transparent access to the EAD subsystems. Communication is based on XML, a language designed to represent information in a way that is easy to interpret by the communication parties. Both synchronous and asynchronous communication is supported: synchronous requests will be used mainly by client processes that make direct queries about information from inside the EAD subsystems and expect immediate responses; asynchronous requests will be used for batch processing (e.g. uploading or downloading bulk data).

#### *ESI Validation Suite*

The ESI Validation Suite is used to validate that implementers of a new EAD system-to-system client are capable of implementing a connection of their systems to EAD, without compromising data quality and integrity.

The EAD expects a new ESI Client to take 'an exam'. A new Client system will not be allowed to use the ESI Client Interface until it has passed this exam, which will consist of making an application using a number of typical messages, as specified in the ESI Validation Suite documentation.



## **EAD Service Provision**

### ***About GroupEAD Europe S.L.***

GroupEAD Europe S.L. is a private limited liability company established in Madrid under the laws of the Kingdom of Spain to operate the European AIS Database (EAD) and to deliver the EAD Service, on behalf of EUROCONTROL . It has been founded in April 2001 by Aeropuertos Españoles y Navegación Aérea, Aena, Madrid, DFS Deutsche Flugsicherung GmbH, Offenbach a. Main and Frequentis Nachrichtentechnik Gesellschaft mbH, Vienna. Representing a model for the future service provision activities in Europe, GroupEAD Europe S.L. is currently offering 49 % of its share capital to all Air Traffic Service Providers of the European Civil Aviation Conference (ECAC) member States, some of which have already declared their interest in becoming a shareholder.

From August 2003, GroupEAD Europe S.L. will provide the EAD service from two Data Operations Centres, located in Madrid (Spain) and Frankfurt /Main (Germany) operating in dynamic workshare mode. The provision of the IT services for EAD will be outsourced and will be performed from Vienna.

A Board of Directors nominated by the Shareholders' Meeting is in charge of the administration and representation of the company. The Board of Directors includes up to five members, the founding shareholders of the company appointing one member each. The Board of Directors supervises and supports the Chief Executive Officer (CEO) of the company and is the highest executive decision-making body of GroupEAD Europe S.L.

The CEO of GroupEAD Europe S.L is the responsible manager of the EAD service contract signed with EUROCONTROL and, therefore, has the overall responsibility for the EAD service provision in terms of monitoring service performance and service quality, and the provision of regular reports to EUROCONTROL. The CEO reports directly to the Board of Directors.