Typical SIGRA environment

Characteristics

Civil Works Management Module
It is in charge of managing and controlling the geographical information and its technical data for the civil works existing within the airport’s field limits, and the resources and costs of each project and civil work, its technical data, photographs and other associated documents. Additionally, it can carry out the observations and actions inventory, managing the civil works and data generating alerts to detect deviating out of rank.

Architecture
It is based on distributed work environment for functionality and data management purposes. It uses services oriented architecture (SOA) and it is composed of several server nodes (Web Map services, Web Image services, GIS - CAD application servers and others). Standard products are used such as ESP tools, Oracle 9i/2000, DB2, SQL Server 2000, ArcGIS 9.0, etc. There are different client types (Heavy, Light, Mobile), all of them in an open and scalable architecture. The user goes into the system through client services technologies (Adobe Reader, WinMap, MacMap, etc.) or intranet Web technologies according to a defined users policy.

Main Benefits of SIGRA
It enables the integration of other airport information systems in a common spatial data interface, simplifying and enhancing their use, and adapting them to the advantages of web and high speed communication services. A unique and corporate airport maps-plans database is maintained at the airport common for all the airport users. This fact improves the information maintenance and optimization of airport operations associated to databases. It simplifies and saves time in maintenance duties, associated to airport requirements. It also helps locating commercial and patrimonial assets, yielding more effective business monitoring and control.

Air Traffic Management

GEO-REFERENCED INFORMATION SYSTEM FOR AIRPORT MANAGEMENT

Suppling ATM systems around the world for more than 30 years.
**GEO-REFERENCED INFORMATION SYSTEM FOR AIRPORT MANAGEMENT**

Supplying ATM systems around the world for more than 30 years

Typical SIGRA environment

<table>
<thead>
<tr>
<th>Feature</th>
<th>SIGRA Functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Web query profile</strong></td>
<td>ArcMap, ArcCatalog, ArcEditor, ArcView, ArcInfo, ArcPAD</td>
</tr>
<tr>
<td><strong>Edition profile</strong></td>
<td>ArcGIS, ArcSDE 9, Oracle</td>
</tr>
<tr>
<td><strong>Administration profile</strong></td>
<td>ArcIMS 9, Image, CAD, DIACAE, DWG, SAOS, ECW</td>
</tr>
<tr>
<td><strong>Business logic</strong></td>
<td>SAP, Oracle-XML, Conoper Scena, Excel-XML</td>
</tr>
<tr>
<td><strong>GIS</strong></td>
<td>ESRI tools, Oracle DBMS, BEA Weblogic, IIS Microsoft, Crystal Reports, MS Office tools</td>
</tr>
<tr>
<td><strong>Web services</strong></td>
<td>Web Map services, Web Image services, GIS - CAD application servers and others</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>Inet, Oracle, MAXIMO, Siglo, Notifies, Oracle-XML</td>
</tr>
</tbody>
</table>

**Characteristics**

**Civil Works Management Module**

It is in charge of managing and controlling the geographical information and its technical data for the civil works existing inside the airport field limits, including the plan and charts of each project and civil works, its technical data, its photographs and other associated documents. Additionally, it carries out the inspections and actions inventory, managing the civil works database and generating reports to detect any deviations or breakdowns.

**Main Benefits of SIGRA**

- It enables the integration of other airport information systems in a common spatial data interface, simplifying and managing the access to the existing and historical data. It makes full use of the advantages of web and high speed communication services.
- A unique and corporate airport maps-plans database is maintained at the airport common for all the airport users. This fact improves the information maintenance and operational efficiency of the airport operations associated to databases.
- It simplifies and saves time in maintenance duties associated to airport equipment. It also helps locating commercial and patrimonial assets, leading to more effective maintenance analysis and control.

**Architecture**

It is based on a distributed work environment for functionality and data management purposes. It uses a services oriented architecture (SOA) for server nodes (Web Map services, Web Image services, GIS - CAD application servers and others). Standard products are used, such as ESRI tools, Oracle DBMS, BEA Weblogic, IIS Microsoft, Crystal Reports and MS Office tools). There are different client types (Heavy, Light, Mobile), all of them in an open and scalable architecture. The user goes into the system through a client server technology (ADMIN, EDITION and DYNAMIC ANALYSIS), or through the public network, or through the intranet, according to an defined user policy.

**Main Benefits of SIGRA**

- It enables the integration of other airport information systems in a common spatial data interface, simplifying and managing the access to the existing and historical data. It makes full use of the advantages of web and high speed communication services.
- A unique and corporate airport maps-plans database is maintained at the airport common for all the airport users. This fact improves the information maintenance and operational efficiency of the airport operations associated to databases.
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**V.1-02-2009**
## GEO-REFERENCED INFORMATION SYSTEM FOR AIRPORT MANAGEMENT

### Introduction

SIGRA is a geographically referenced information system, developed by Indra for Aena, and focused on airport environment information systems, helping them to present their data cooperatively with other airport information systems such as SAP. Passenger routes can be created and commercial spaces can be associated to different modules.

### Typical administrative environment

- **Functional modules of the airport GIS**
  - **Airports**
  - **Geospatial utilities**
  - **AIS management**
  - **AIP management**

### More SIGRA modules

#### Facility and fixed assets module

This module manages and operates the environmental information existing in the AOG (Aeronautical Information System) for each airport, being capable to spatially access to any AIS equipments sited at the airside airport, being capable to spatially access to the geospatial information existing in the AIS (Aeronautical Information System) for each airport.

#### Air Traffic Management

- **Flights planning**
- **Maintenance operations**
- **Alarms and incidents**
- **Collision management**
- **Geospatial AIS module**

- **DIACAE, computer-aided engineering**
- **MAXIMO, infrastructure servicing and management**
- **SCENA, cooperative airport management**
- **SAP (ERP)**

- **System management and common utilities**
  - **Intelligence**
  - **Application**
  - **Environment**
  - **Patrimony**

- **Commercial and advertising management module**

- **Handling management module**

- **Environment management module**

- **Security module**

- **Maintenance module**

- **Aena, and focused on airport environment information systems, helping them to present their data cooperatively with other airport information systems such as SAP. Passenger routes can be created and commercial spaces can be associated to different modules.
SIGRA: A global airport management also includes the environment and non-flying activities.

Introduction

SIGRA is a georeferenced information system primarily developed by Indra for the environment and non-flying activities. Though the general purposes are, SIGRA makes a powerful tool in the administration management. These modules have been developed by the core product SIGRA, a modular tool that can interact with airport activities, as those related with the environment and non-flying management, handling also supporting activities such as safety, maintenance, airports operations, environment and civil variables management, AIP, RAP, and even equipment management, noise and those become essential.

The system is designed to work correctly with other airport information systems telling them from their data and results associated to their corresponding geographical location. In its full configuration, SIGRA system is composed of nine operative and running modules, which are Administration, Commercial Management, Patrimony and assets management, Engineering and maintenance, Environment management, Airport operations, Passenger routes monitoring, Airports Security, and Geospatial AIS.

Typical administrative environment

SIGRA’s modules

Airport operations module

It supports the premises and the permanent assets management and operation corresponding to the ownership, equipment, it comprises those assets and data associated with the premises and other assets associated with the premises inventory, such as SAP.

Environment management module

It is in charge of managing and operating the environment and non-flying equipment and services of passenger terminal, baggage flow, control, and air traffic support. The module includes computing areas related with the airport, such as the one for disposing the passenger routes, equipment and services of reduced mobility, information points, information panels, and formalization software, in accordance with the regulations of the air traffic.

Geospatial AIS module

This module manages and operates the Geospatial AIS equipment and services in the airport. It also manages the Aeronautical Information System (AIS) for each airfield, being capable to report any information in the geographical information system, and it includes also the definition of the airport zones and the association of the objects associated with the security support devices as well as their GIS objects.

Five SIGRA modules

Primary and fixed assets module

It supports the premises and the permanent assets management and operation, answering to the premises inventory, such as the definition of the airport zones and the association of the objects associated with the security support devices as well as their GIS objects.

Airport Security module

It supports the management and operating of the Geospatial AIS equipment and services in the airport. It also manages the Aeronautical Information System (AIS) for each airfield, being capable to report any information in the geographical information system, and it includes also the definition of the airport zones and the association of the objects associated with the security support devices as well as their GIS objects.

Optional modules

Maintenance management module

This module is in charge of managing and operating the equipment and services of passenger terminal, baggage flow, control, and air traffic support. The module includes computing areas related with the airport, such as the one for disposing the passenger routes, equipment and services of reduced mobility, information points, information panels, and formalization software, in accordance with the regulations of the air traffic.

Typical administrative environment

This module will create, modify and delete the positions and the associated fixed assets, being able to show the results and the daily activities of the airport.

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SIGRA

became essential. security support systems, more and more airports operations, environment and civil variables management, AIP, RAP, and even equipment management, noise and those become essential.

SIGRA modules

The second one shows the airport administration system of the associated advertising contracts. There are conventional and non-conventional fixed devices, advertising spots and advertising groups, accessing the contracts.

This module, as well as the following ones, includes the support for heavy client applications to show queries, editions and their associated alphanumeric attributes. The second one shows the airport administration system of the associated advertising contracts. There are conventional and non-conventional fixed devices, advertising spots and advertising groups, accessing the contracts.

Three SIGRA modules

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Air Traffic Management

To achieve the definition of the airport zones and the association of the objects associated with the security support devices as well as their GIS objects.

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To achieve the definition of the airport zones and the association of the objects associated with the security support devices as well as their GIS objects.
GEO-REFERENCED INFORMATION SYSTEM FOR AIRPORT MANAGEMENT

Introduction

The SIGRA system is designed to work in coordination with other airport information systems helping them to exchange data and results associated with their corresponding geographical location.

In its full configuration, SIGRA system is composed of nine modules and ten configuring modules, which are Administration, Commercial Management, Safety, Airside Operations, Environment, Security, Air Traffic Management, Airport Surveying and Geospatial ARC.

The system supplies the information for all the airport core modules management, such as:

• SIGSA (SIGRA cooperative airport management system) (AIP)
• SIGRA Safety, Airport Security System
• SIGRA/Infrasys Airport Orhnoimage System
• SIGRA/Airport Information Systems
• SIGRA/Computer aided design systems for spanish airports

Field and fixed assets module

It supports the permits and the permanent assets management and operation corresponding to the ownership, inventory, it comprises those assets and data associated with the ownership inventory stored in other systems such as SAP.

Hiring and leasing contracts

This module manages and operates the follow-me vehicles which guide the airport ground operations.

Air Traffic Management

It supports the permits and the permanent assets management and operation of the air traffic, managing the flight space and its different elements, such as the air traffic lights, landing gates and control zones.

More SIGRA modules

Typical administrative environment

The first one is concerned with the business processes management and operation as well as with the different administrative and commercial spaces of the airport, carrying out the management of commercial and administration contracts associated with the business processes, this module can be associated with other data associated with the contracts stored in other systems such as SAP. Passenger pressure can be created and commercial spaces can be associated to different modules.

The second one shows the airport support service with their associated advertising contracts. There are conventional and non-conventional fixed devices, advertising sites and advertising groups, accessing the contracts.

This module as well as all the following ones, supplies the support for the human resources management processes with other data associated with personnel and other data associated with the advertising circuits and advertising groups, including the technical equipments of the companies on duties in air operations.

The third one is to map the fire extinguishes services as well as the graphic alert utilities to handle these units.

This module manages and operates the graphic information existing in the AIS (Aeronautical Information System) for each airport, being capable to spatially access to the geographic information of the airport, querying technical data.

It can also query the APS aircraft technical data, where it reviews and queries aircraft equipment and the aeromedical airport charts in PDF format.
Typical SIGRA environment

Characteristics

Civil Works Management Module
It is based on a distributed work environment for functionality and data management purposes. It supports multiple databases and applications for the geographical information and its technical data for the civil works existing inside the airport field limits, accessing to the plan and charts of each project and civil work, its technical data, photographs and other associated documents.

Additionally it manages the affections and actions inventory, managing the civil works historical data and generating alarms to detect delivery out of time.

Architecture
It is based on a distributed work environment for functionality and data management purposes. It uses services-oriented architecture (SOA) and it is composed of several server nodes (Web Map services, Web Image services, GIS - CAD application servers and others). Standard products are used, such as ESRI tools, Oracle DBMS, BSD (DOS/Win/Unix) (If not Oracle). There are different client types (client-server, Light, PDA, etc.) at all times, open and scalable architecture. The user goes into the system through client services technologies (desktop, intranet and dynamic analysis) or intranet services (WWW) according to a defined users’ policy.

Main Benefits of SIGRA

It enables the integration of other airport information systems in a common spatial TV interface, simplifying and managing the information handling and communication services. There is an advantage of webs and high speed communication services.

A unique and corporate airport maps plans database is maintained at the airport common for all the airport users. This fact improves the information maintenance and effectiveness of airport operations associated to database.

It simplifies and saves time in maintenance duties associated to airport equipments. It also facilitates locating commercial and patrimonial assets, yielding an effective business monitoring and control.

AVTRAFFIC MANAGEMENT

GEO-REFERENCED INFORMATION SYSTEM FOR AIRPORT MANAGEMENT

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