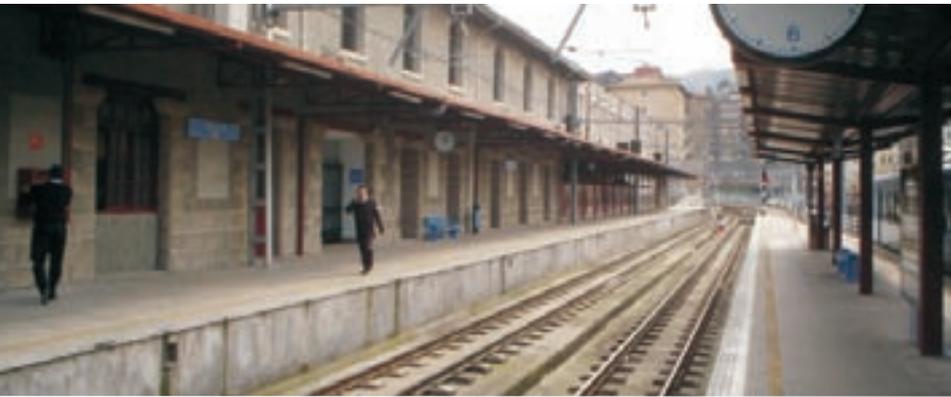
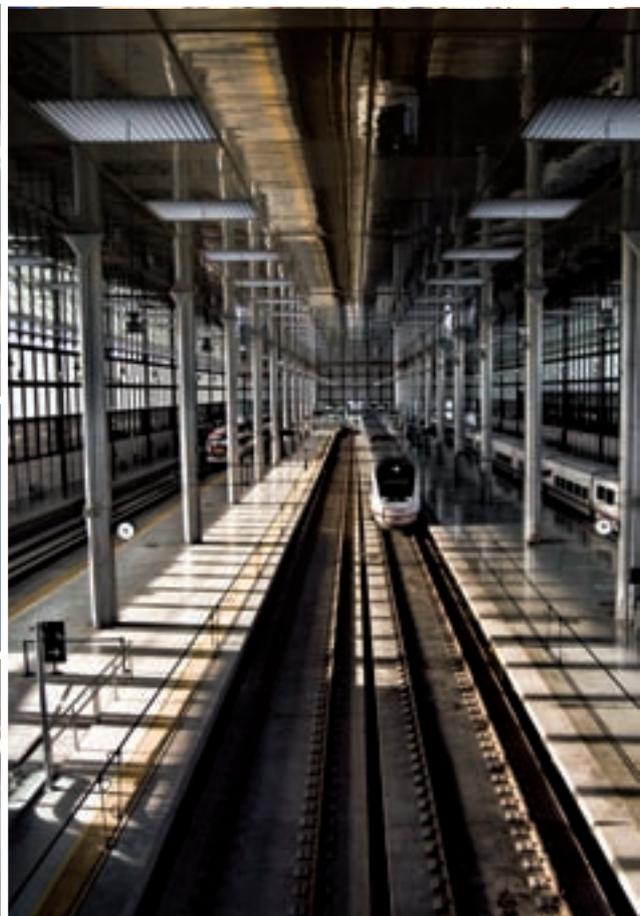


Ardanuy



RAILKM



INVENTORY MANAGEMENT SYSTEM APPLIED
TO RAILWAY INFRASTRUCTURES

INTRODUCTION

Ardanuy Ingeniería, plc, is an engineering and architectural consulting firm specialised in studies, projects, works supervision and technical assessment for railways, metro, trams, building, electromechanical installations, power: electrical engineering and hydrocarbons, telecommunications, environment, management of refuse and industry. During the company's 19 years of experience we have always committed ourselves to research and development for the benefit of our clients and in the interests of meeting the needs of our business.

The need to keep the elements of a network managed is an intrinsic characteristic of any organisation. These elements can be assets, products or even documents, subject to variation in time and that comprise a total called inventory. The R&D department of Ardanuy Ingeniería, plc, contributes an innovative tool, using the latest technologies, which helps keep an inventory updated easily and from anywhere.

● Background

This first approach by Ardanuy Ingeniería, plc, culminated in the SIGGLO project, a software application for the field of Geographical Knowledge Management Systems meant for management of Railway Infrastructures. As a complement to the Geographic Information Systems (GIS), SIGGLO provided additional utilities to those traditional systems, simplifying their functioning and offering solutions to the need for information storage.

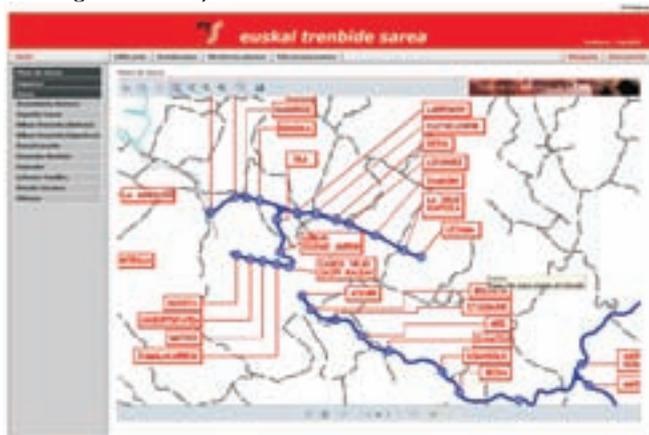
In parallel, the INFO PROJECT was developed, an Document Management system meant for administering the documentation generated during the development of a project. This software allows company employees and their clients to share information quickly as well as to keep the documentation organised for its use as a reference.

The knowledge acquired during the life cycle of both applications are now incorporated in the development of the IMS applications (Inventory Management System) designed for Infrastructure Managers but easily transferrable to other kinds of companies

● Main functionalities

The tool is backed by the strong growth it has experimented thanks to new web technologies. An example of the application of this solution to a specific problem, such as the inventory of elements in a railway station network, is detailed next. In this case, the aim is to allow us to monitor those physical elements prone to breakdown, storing all of the information available for each one regardless of what their format happens to be.

Once the user is authenticated, entry is granted to the application, showing different ways to access the desired information.

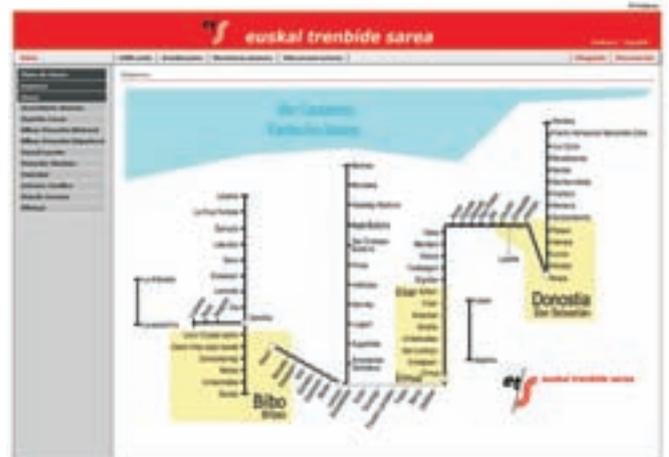


These options will depend on each case, taking into consideration factors such as parameterisation of the information, physical media or dispersion of the elements. For example, in this case, they are located in a limited number of railway stations so visual access is provided through maps in two different formats, image and DWF.

In this specific development the maps are not georeferenced. It was considered that the stations are fixed elements of a limited number and easily locatable. In other projects in which it would be useful, such as, for example, in an inventory of equipment and railway installations throughout a network, they could be included in the RAILKM application easily as it is modularly designed.

Once the station is selected, through the map or the side menu, the page comes up where the technical specifications of the stations are shown.

On the page the information is divided into different categories (general, typology, level crossings, etc.). At the bottom representative photographs of the station or even documents relevant to the station and in any format can be introduced. The selected station will be highlighted in the menu on the left. Likewise, a new menu appears along the top which could be called the station menu. This menu allows for navigation of the different sections of a station: technical specifications, drawings and elements. The section being worked on will always be marked, in this case "Technical Specifications".



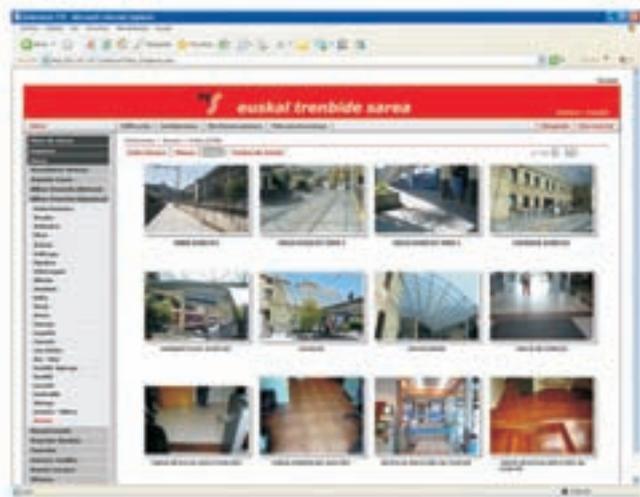
If the Drawings tab is selected on the station menu the drawings associated with the station where the user is can be seen.

These will be shown in thumbnails and on clicking them a new PDF screen will pop up. Additionally, if the drawing exists in another format (DWG, DWF, etc.), it can be downloaded directly to the computer. The drawings can be divided into different categories depending on the type of drawing in question and what it shows (general ground plan, architecture, electricity, etc.).

Upon clicking the Photos tab in the station menu all of the photographs of the elements belonging to that station can be seen, giving a general visual idea of the station's appearance and the elements it contains.

Videos related to the station can also be included in the application, whether of real or simulated train runs, as well as evacuation simulations or another type of technical video. The formats that the application accepts are varied and flash technology is used to show

the videos on screen, reducing its size and maintaining quality. The conversion to flash format is done automatically within the application with no involvement from the user. In the "Station Elements" tab of the station menu, initially a small summary of the elements can be seen. To the left the existing families are shown and, to the right, the locations of the selected station containing elements.

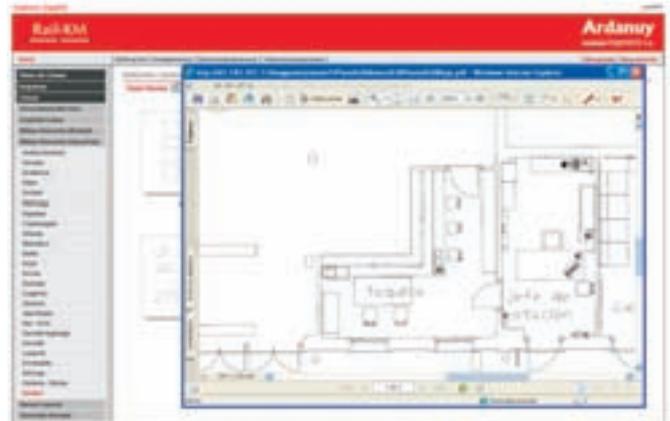


Upon clicking on a family link a page is accessed containing a list of elements belonging to that family. When clicking on a location, a list shows all of the elements at the selected location. A filter can be applied for arrangement by group, family, element type, brand and model.



Each one of the elements of the list corresponds to an element, showing its type, quantity, location, brand, model and characteristics. In addition, if the user has an administrator profile they can eliminate the element with the red x or create a new element with the "New Station Element" button.

Upon clicking an element the page for each one of them showing general information about them will open as well as photographs at web resolution and the related documents. Upon selecting a photograph it is opened in a new window with the original resolution; the same is true for documents. It is possible to scroll the element list with the arrows in the Data box.



• Conclusions

The Inventory Management Systems simplify a necessary task for companies managing Railway Infrastructures, not only in those dedicated to product sales. Service companies and organisations also need to keep information on their assets and the condition they're in organised. With the tool developed by Ardanuy Ingenieria, plc, this can be done quickly and with no added difficulty.

In this document a specific example of how this tool can be used is given but the application can be adapted to any kind of need, depending on the use it will be put to and the elements to be inventoried. With this application we reduce the time dedicated to administrative tasks, taking advantage of the advantages of the web.

ADVANTAGES

- Flexibility. The application is developed modularly. Functionalities can be added as necessary
- Ease of use. The navigation through the interface is very intuitive. No long training sessions are required for new users.
- Cost savings. The people in charge of maintenance can know the brand and model of the malfunctioning element with no need for travel to the station.
- Ease of maintenance. The applications must be fed to preserve their usefulness. RAILKM has been designed to facilitate maintenance as much as possible and so that modifying, eliminating or adding information is not complicated.
- Variety of formats. The information can be stored in photographs, videos, attached documents, text fields, etc.
- Searches: Each element can be parameterised by line, station, location, family, type, brand, model and year of installation. It is possible to filter and order the lists by all of these parameters.
- Availability: Since this is a web application, if they so desire, users can access it from anywhere and at any time. This is modifiable and restrictable by hours as well as by physical location.
- Report generation: The application includes a strong report generation module allowing for printing and importing the technical pages for stations and elements to the most popular formats as well as the application lists. These reports can be generated by users and presented to the management to quickly analyse the information.
- Users: Throughout the tool users with the administrator profile can add, eliminate or modify the information related to the elements, insert or delete photographs, drawings or other documents, manage the stations, reordering their position or update the visual access



Madrid: Av. Europa nº 34 B. 28023
 Tel. (+34) 91.799.45.00
 Fax: (+34) 91.799.45.01
 E-mail: madrid@ardanuy.com

Barcelona: C/ Entença 236-240 Pln. Baja. 08029
 Tel. (+34) 93.206.33.00
 Fax: (+34) 93.206.33.01
 E-mail: catalunya@ardanuy.com

Valencia: Av. Instituto Obrero de Valencia nº 18. 1º-3º-A. 46013
 Tel. (+34) 96.331.86.00
 Fax: (+34) 96.330.22.01
 E-mail: valencia@ardanuy.com

Sevilla: Alcalde Luis Uruñuela, 6.
 Edif. Congreso Pln. 3 Mod. 304.41020
 Tel. (+34) 95.451.65.84
 Fax: (+34) 95.451.63.06
 E-mail: emilio.dominguez@ardanuy.com

Tenerife: C/ Imeldo Serís nº 108, 4º D. 38003
 Tel. (+34) 922.53.11.36
 Fax: (+34) 922.27.67.70
 E-mail: alberto.gonzalez@ardanuy.com

India: C4/145, 3rd Floor B
 Safdarjung Development Area
 New Delhi 110 049.
 Tel. (+91) 11.26518285
 Fax: (+91) 11.26568286
 E-mail: delhi@ardanuy.com

Lithuania: Teatro g. 9B, LT-03107. Vilnius
 Tel. (+370) 5.264.42.00
 Fax: (+370) 5.212.14.99
 E-mail: vilnius@ardanuy.com

Poland: Ul. Morelowa 2 A. 03-192. Warszawa
 Tel. (+48) 227.45.36.00
 Fax: (+48) 227.45.36.01
 E-mail: polska@ardanuy.com

Morocco: 15 bis, Rue Jbele bouyblane
 Angle Fel Ould Oumeir,
 Appartement 7, Agdal, Rabat
 Tel: (+212) 530.300.383
 E-mail: maroc@ardanuy.com

United States: 325W 38th Street Suite 405
 New York, NY 10018
 Tel: +1 (212) 706.9800
 Fax: +1 (212) 600.4275
 E-mail: usa@ardanuy.com

Algeria: 19 Rue Louis Pasquier Brond Lot 103 A
 Les Sources · Bir Morad Rais
 Alger 16300
 Tel: (+213) 21.44.89.73
 E-mail: algerie@ardanuy.com

www.ardanuy.com

Ardanuy

