

## INTRODUCTION

INDRA is a multinational Spanish enterprise focused on consultancy and technologies of information. It is one of the most important of the sector at a global level. One of INDRA departments is SCV (Digital Voice Communication System).



Figure 1: Indra's logo

The SCV department is in charge of the integration of both voice and data through the technology provided by the hardware and software platform of the enterprise. It obtains the highest flexibility for all kind of solutions in the control of the environment of air traffic. What means that this department is responsible of the design, creation and improvement in the communications systems in the majority part of airports (Spain, Equator, Argentine, India, Pakistan, Australia, Colombia, Oman, Bosnia, etc.).

These communications systems work just the same as others we work with and that we already know well. The mobile operating system from Apple, IOS, is a system in continual progress and improvement, what is, each time it comes out on the market an actualization of the operating system IOS, it involves upgrades and correction of errors detected in the previous version.

The airports communications systems that the SCV department develops have the same routine. INDRA delivers a version system to the corresponding airport. Some software or hardware incidences are going to be found in this version and they would have to be solved, so the department will eventually deliver a new version of the system improved where all these problems are already solved. You can see the process in the following diagram:

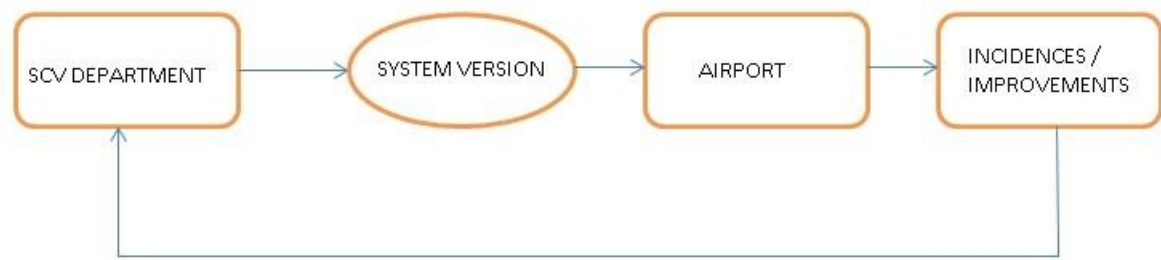


Figure 2: Communication system process

Internally this communication system is formed of a big amount of software components. Each one of these parts has his own software version, that may be modified or not, it depends on the component, if the latest version had to touch it for improvements or to solve an incidence.

All this change of versions (both system versions and those for software components) affects to all the airports for which the SCV department works, that is why all the software versioning must be controlled, so every moment is known what is installed in each airport and also its record.

Nowadays, the SCV department does not have a very safe control of the communication systems. The versioning of the systems is stored in an excel file. This is not very safe due to the possible introduction of mistakes when updating the file and because is not very efficient when it comes to find the software report of a certain version of a project.

The present project has as purpose to solve this actual control of version that has the SCV department, creating an application that in an efficient way allows to manage all this information.

## ABSTRACT

The main goal of the present project **is to implement a system that manages the software versioning of the voice communications systems.** This system needs to fulfill the following requirements:

- **The final design system has to use in its entirety a free software.**  
The application will be used in the SCV department, so in order to avoid additional costs free software has been chosen.

- The application has to be simple and understandable.**  
When an user of the SCV department decides to use the application, must be able to use the tool without any complication.
- Working with csv files.**  
The application will work by csv files. When the development team has ready a new version to be launch to any of the airports for which INDRA works, it generates a csv files with all the relative information about the version. These files are the ones that have to be charged on the application so they can be loaded in the system.
- The information must be modifiable.**  
If the information in relation to a version is stored in the system and it is wrong, the application will allow to correct the information loading the right csv file of the affected version.
- Management / Quick display of information.**  
The application will allow an efficient and fast search of the information relative to a system version. This is going to be one of the main improvements and comfortably regarding to the versioning control that the department has at the moment, the previously mentioned Excel file.

Cases of use that the system will have:

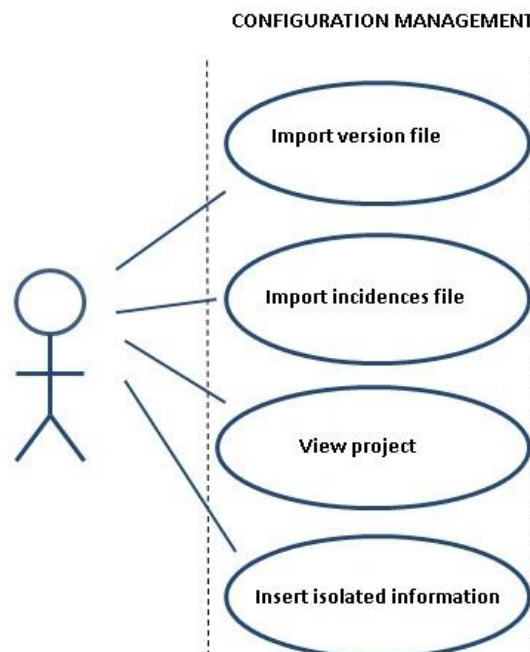


Figure 3: Use cases

On the system's design, two main parts are differentiated: the design of the core and the design of the graphical user interface (GUI).

The core system is mainly formed of the design of the database that will load all the information relative to versions, components, incidences, projects, etc. The database contains all the necessary and important information that must be controlled in order to check any version of the digital voice communication system of an airport. What means that if an installation engineer is about to open a version in an airport, all the information that he might need is the one that has to be stored in the designed database.

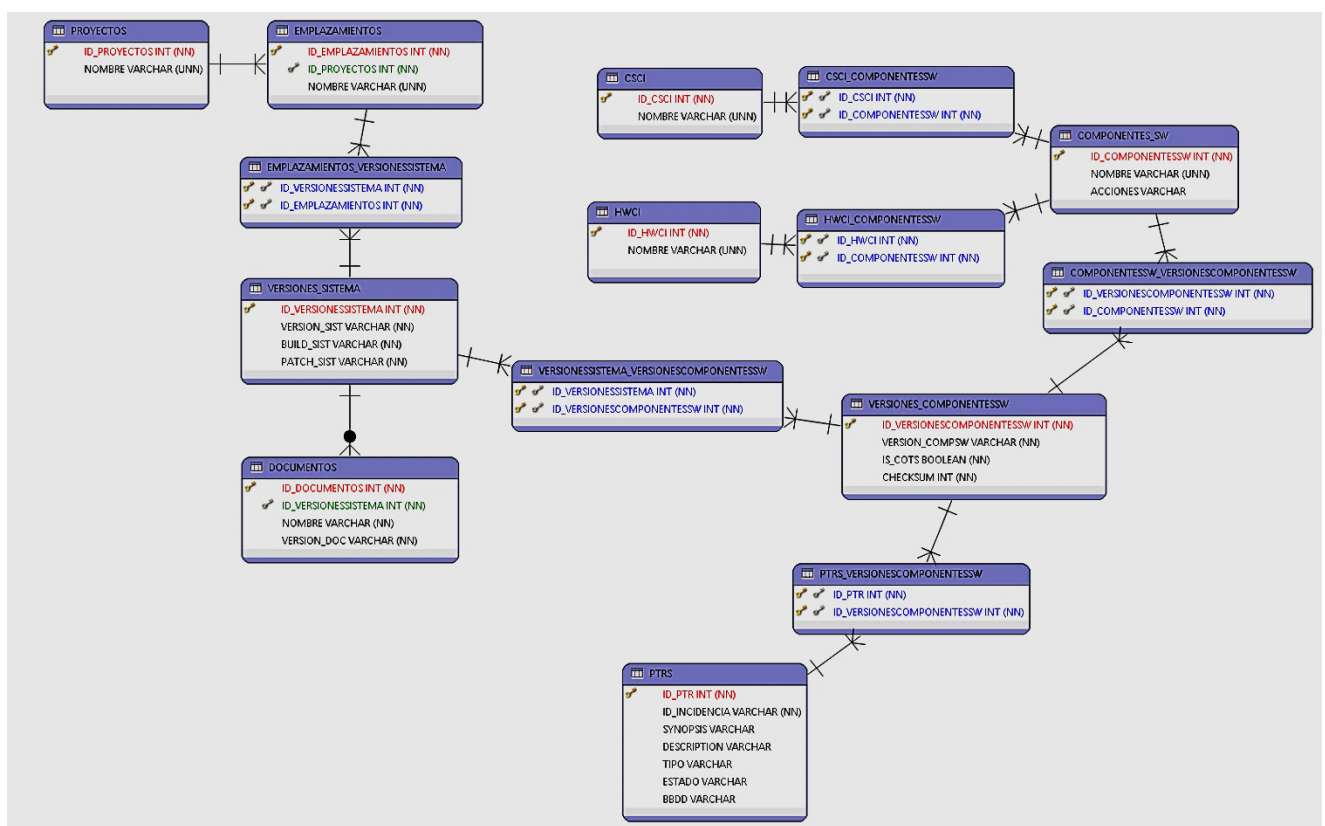


Figure 4: Database design

The database has been implemented with PostgreSQL.

Once the database in which the system's information is going to be stored is designed, the design of the graphical user interface is the main part of the application.

For the design of the graphic interface, a division in four layers was chosen, having as objective a clear, reusable, and maintainable code: persistence layer, metadata layer, service layer and business layer.

The graphic interface leads to the visual look that the application is going to have, the appearance for the user.

A simple and plain look has been chosen, since it was not a requirement of the system. For future improvements, the appearance will be one of the goals.

The visual look of the app is the following:

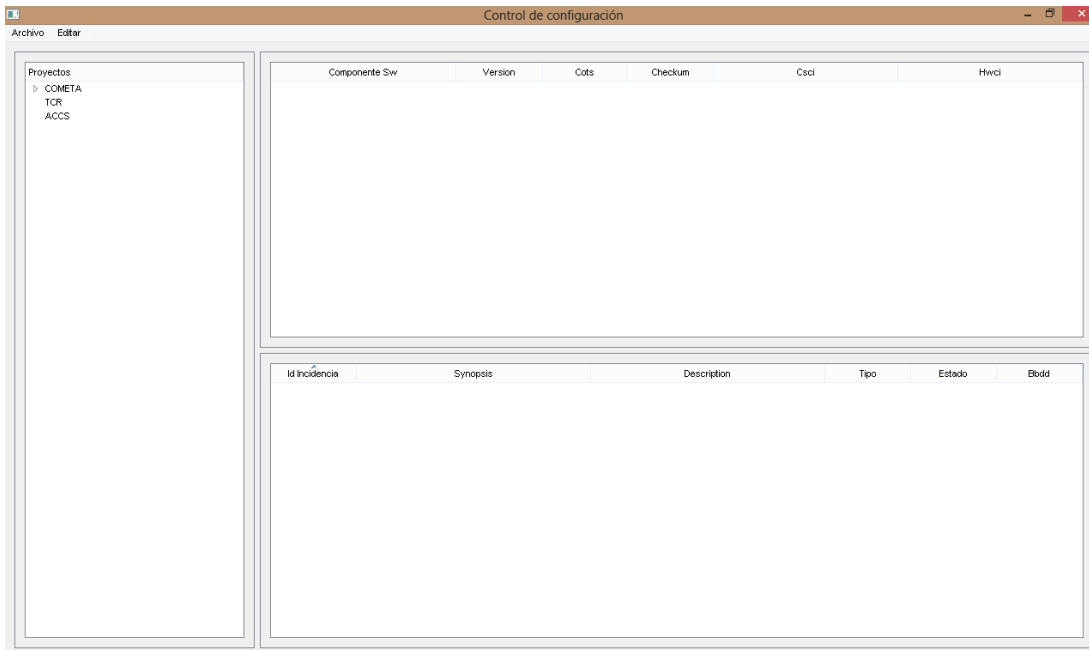


Figure 5: Main window

At the main window you can see the projects that the system has stored in the database, as well as visualize the versions that every Project has installed, with its respective components and incidences.

The principal function of the application is to store a control of the software version. This, as already stated, it's made through csv files importation.

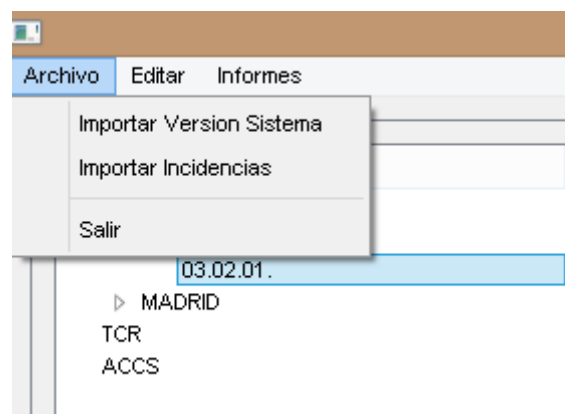


Figure 6: Importation

Importation is made in two steps: in the first one, all the information of the components that is attached to the introduced version is imported. For the second step the incidences associated to the version are imported.

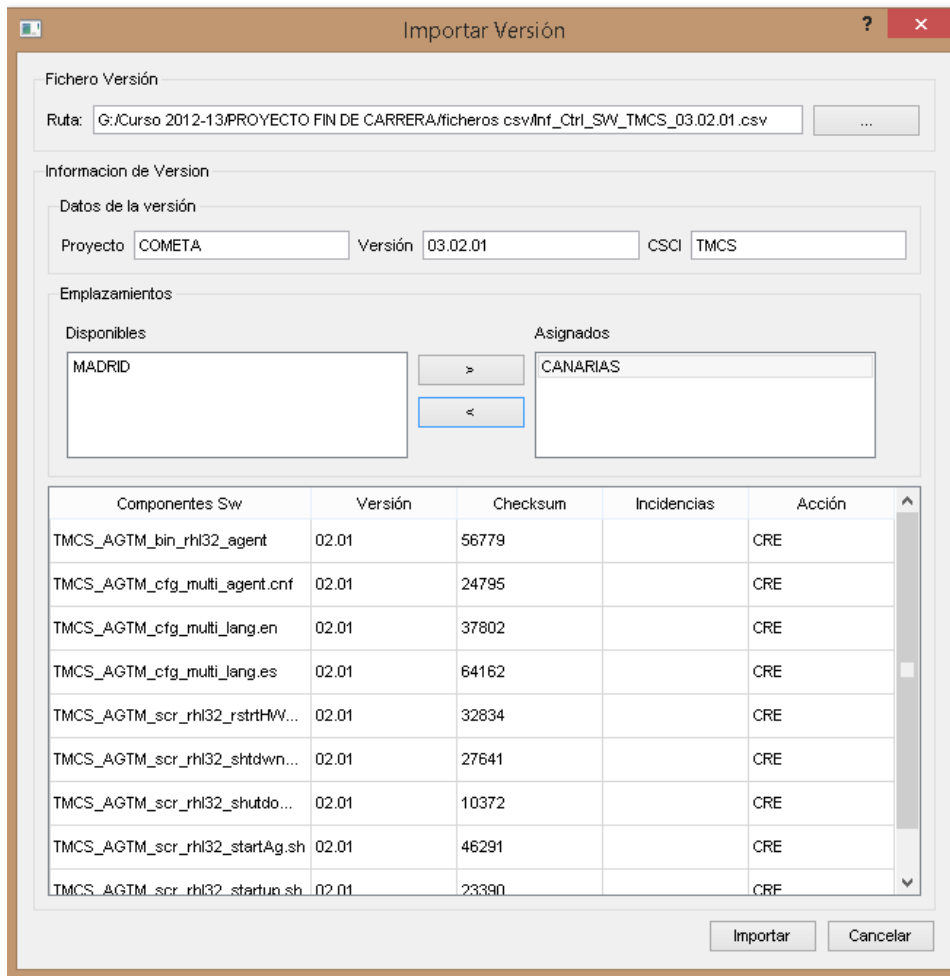


Figure 7: Version importation

## CONCLUSIONS

The implementation of a system to control software versions for SCV (Digital Voice Communication System) department is a project that since the beginning turned up as a challenge. A big challenge due to the difficulty that the development of a software application barely having any knowledge of the area (databases and programming on C++) meant. On top of this, the need of making a good job so the SCV department could use the application in the fixed dates.

On the other hand, the ignorance about databases and programming on C++ was in the other hand a positive fact, since it would help to acquire and increase the knowledge about subjects that were not covered at college.

The development of an application for an enterprise such as INDRA SISTEMAS also made the project a lot more attractive, considering that the work made would yield good results and it would be used by a Spanish enterprise renown in the international market. Besides, the fulfillment of a project for INDRA, means a first approach of the student to the work environment and it helps to make up your mind about which one would be your labour exit in the future.

Finally, the goals initially proposed for the development of the system have been achieved, leading to an application that makes a lot easier the work made until now in the SCV department. Thanks to the application, the excel file that was used up to then for the management of the versioning has been replaced, increasing its efficiency, efficacy and security.

When there is a version ready to be launched in one of the airports for which the SCV department works, the development team sends the csv files with all the relative information about the version. This information is imported to the application developed, so from that point on, the information is accessible in a quick and easy way for any employee of the department, without needing an Excel, where the information must be searched between thousands of records that may have the file.

The application keeps on developing at the time, including improvements and functionalities that are not included on the project. The improvements and functionalities were detected during the quality control and will be included in the future development.