# SIS-PRUEBA

# A tool for rapid prototyping and testing of Speech Recognition user interfaces in Telefónica Móviles España

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**ABSTRACT**

SIS PRUEBA is a software tool to integrate usability and user-centred design principles in the development process of services within Telefónica Móviles España (TME), the largest mobile telecommunications operator in Spain.

The successful deployment of complex services, from both users' and developer's points of view, require of a high degree of integration of a User Centered methodology with the design, development and usability tests in all the phases of the life cycle of services. An important example is Telefónica Móviles Portal de Voz (Voice Portal), a service providing information retrieval on a large number of issues using the voice or DTMF commands.

With this objective, the purpose of SIS PRUEBA is to provide a single tool to integrate the characteristics of the unified processes of development (UP) with techniques of rapid prototyping like part of the usability methodology.

Main benefits of SIS PRUEBA are:

- Definition and management of assigned components to usability projects (services, functionalities, use cases, types of users and use contexts).
- Creation of measurement libraries (questions, formats of answers and questionnaires).
- Allows for the quick production of batteries of usability trials by means of different experimental designs.
- Management of user panels for trials
- Administration of usability trials in supports of "paper and pencil" and/or remote (Internet).
- Emulation of voice interfaces on flow charts in design time.

**Keywords**

User-centered design, prototyping and model based design, software development methodology

**INTRODUCTION**

Telefónica Móviles (http://www.telefonicamoviles.com) is the company of the Grupo Telefónica (http://www.telefonica.com/home_eng.html) dedicated to the mobile telephony business. In May 2003, Telefónica Móviles was the sixth world operator by capital, managing over 45.7 million customers, mainly in Spain and Latin-America, including Mexico, Brasil, Peru, Chile and Argentina.

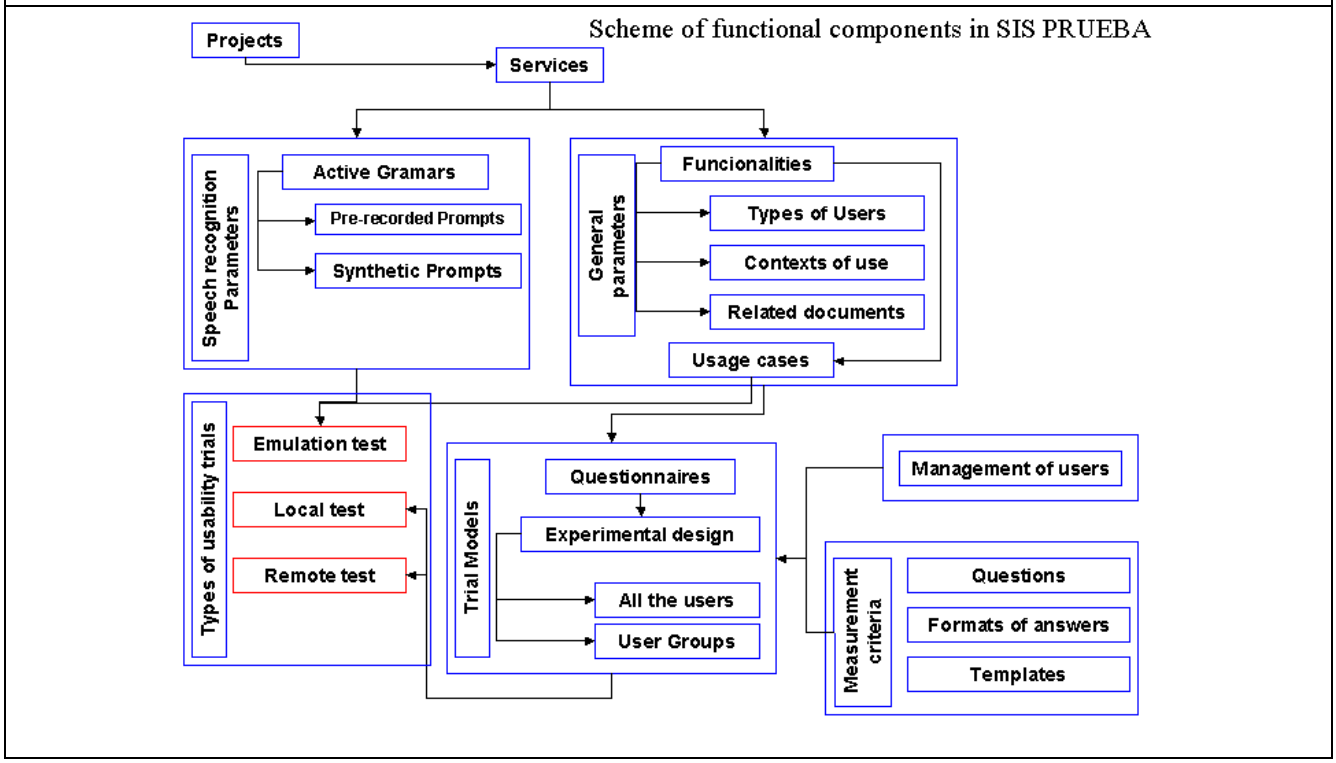
TME is continuously providing new services to its customers and a main objective is to ensure their usability. One of the key services deployed during 2002 has been the Portal de Voz (Voice Portal). This service provides a single entry to many information retrieval services already available by SMS, but with a voice and DTMF user interface. The whole service provides hierarchical navigation on pre-recorded or synthetic speech contents like news, weather forecasts, horoscope, and stock news. It also allows complex queries, as films shown in a specific theatre, all obtained by a complex information retrieval service that can be managed by both speech recognition and more traditional DTMF commands.

**USER-CENTRED SERVICE DEVELOPMENT METHODOLOGY WITH SIS-PRUEBA**

Based on well-known usability standards, like ISO 9241 [2], ISO 13407 [3], and in the Unified Process (UP) [1] and Unified Modelling Language (UML) [4] software engineering approaches, the usability group in Telefónica I+D proposed a development driven by use cases. The idea is that the UI-specific constructs can be reused and the development process follows an iterative cycle supported by early prototype tests.

Use cases represent the basic requisites to be accomplished by the system. The development process requires an increasing refinement of the requisites. The success criteria are met when the specifications in the use cases are met, and these are basis for the tests. A thorough description of the Unified Process can be found in Jacobson and Rumbaugh [1].

**Figure 1. Scheme of functional components in SIS PRUEBA**




The development methodology also defines the following essential concepts:

- **User**: the definition for the different types of users must include the cognitive and motor requirements and previous experience or training for the use of the system under consideration.

- **Functionality**: it is the component implemented or to be implemented in a service or system that allows the user to achieve an objective.

- **Context of use**: this is formed by all the variables and situations that form the environment in which the user is when using the system. This concept includes other users, equipment, physical and social environment

- **The use case (or usage scenario)** is a representation of all conditions and actions that the user has to carry out in order to perform an interaction, which is always conducted by relevant objectives for him or her.

- **Test case** represents a concrete situation with which you validate system and user requisites as specified in a use case. A test case is itself a process, including several components: work scenario, test procedure, and evaluation of the test.

With all these concepts two aggregates are built: use case model, representing all user types and all possible use cases, and tests model, which selects a representative set of the use case model together with their associated test cases, all by means of an experimental design.

SIS PRUEBA allows two types of experimental design: (1) within-subjects *designs*, in which all users go through all possible test combinations, and (2) between-subjects *designs*, in these design the users are grouped by one of the experimental factors and this determines the final combinations of tests they receive.

Finally, the tests generated by the program can be used in two different formats, (1) tests of local administration in paper, and (2) published tests in Internet for their remote access.

(In figure 1 an illustration of the components of the program can be seen).

## WORKING WITH SIS-PRUEBA FOR TESTS MANAGEMENT AND RAPID PROTOTYPING

SIS-PRUEBA is a software tool developed by Telefónica I+D for Telefónica Móviles, which provides methods to manage usability tests and to store all required data so that a design template can be produced and afterwards

manipulated in MS-Visio™. The template and associated libraries allow for rapid prototyping on flowcharts in design time.

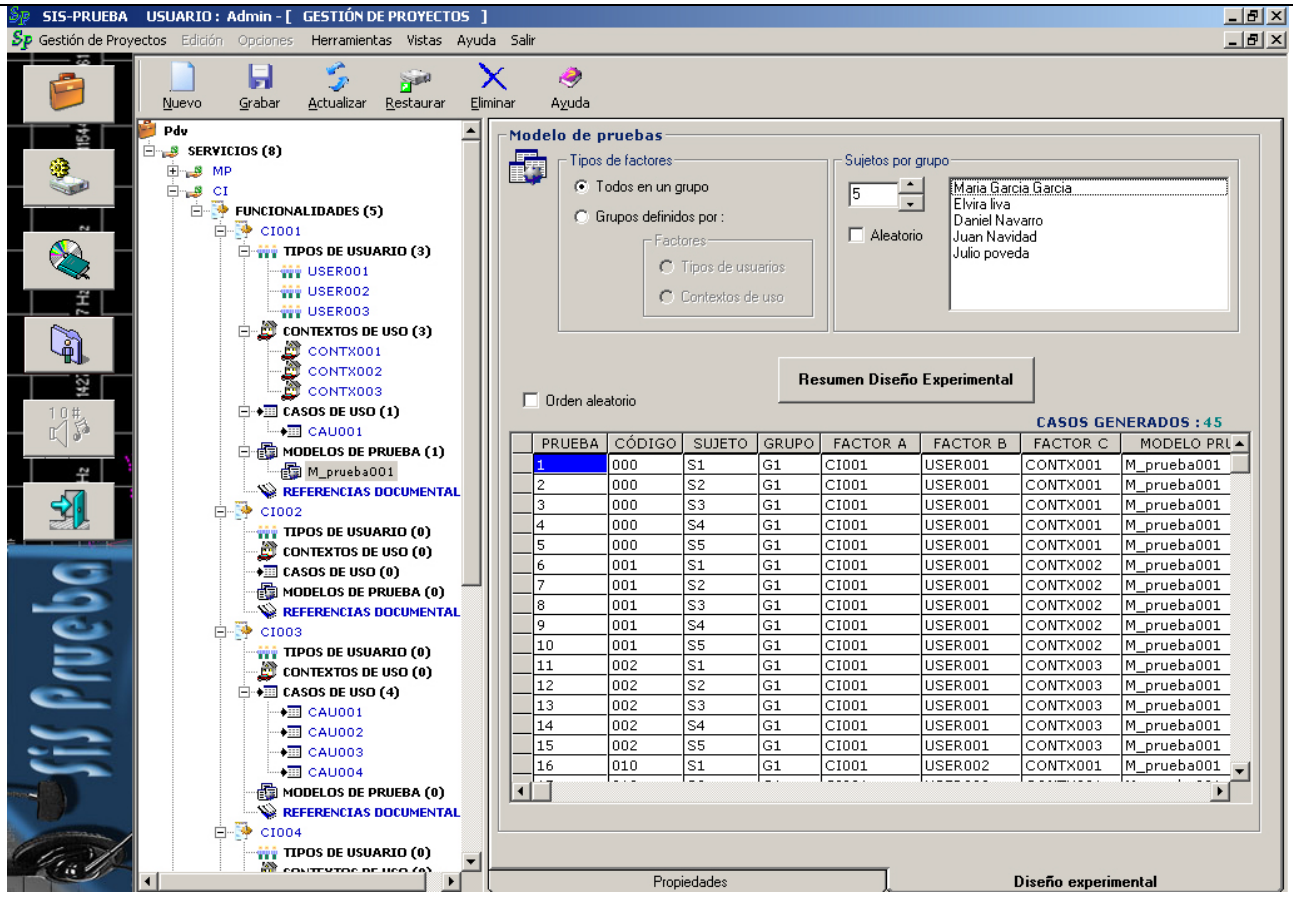
(Figure 2 shows the main interface of program for the management of usability tests)

Practical use of SIS PRUEBA comprises the following steps:

1. Introduce all components of the methodology for your project in a single database. Each project can create and maintain all definitions as stated previously, i.e., functionality, user types, use contexts, etc.

2. Create test models by combining the different concepts and using basic experimental designs.

**Figure 2. Test Management Modules**




3. Create usability criteria, questions for user tests and all associated tools as required in actual usability tests.

4. Administer user tests in both "paper and pencil" and "remote testing" (either web or e-mail) formats. This module allows the automatic capture of the generated data.

The emulation modules require the following steps:

1. Introduce grammars, DTMF syntax and expressions, including stored voice recordings and also synthetic speech files, for speech recognition services.

2. Produce the template.

3. Design the prototype of your service, using the produced template in Microsoft Visio™. The template allows to consult the corporate voice services style guide on-line and also allows to emulate and quickly prototype any data or voice services over the produced diagrams.

(Figure 3 shows the interface of program to emulate voice recognition system).

## BENEFITS OBTAINED WITH SIS-PRUEBA AND THE USER-CENTERED DEVELOPMENT METHODOLOGY IN TELEFÓNICA MÓVILES

SIS-PRUEBA and the methodology on which it is based has allowed to:

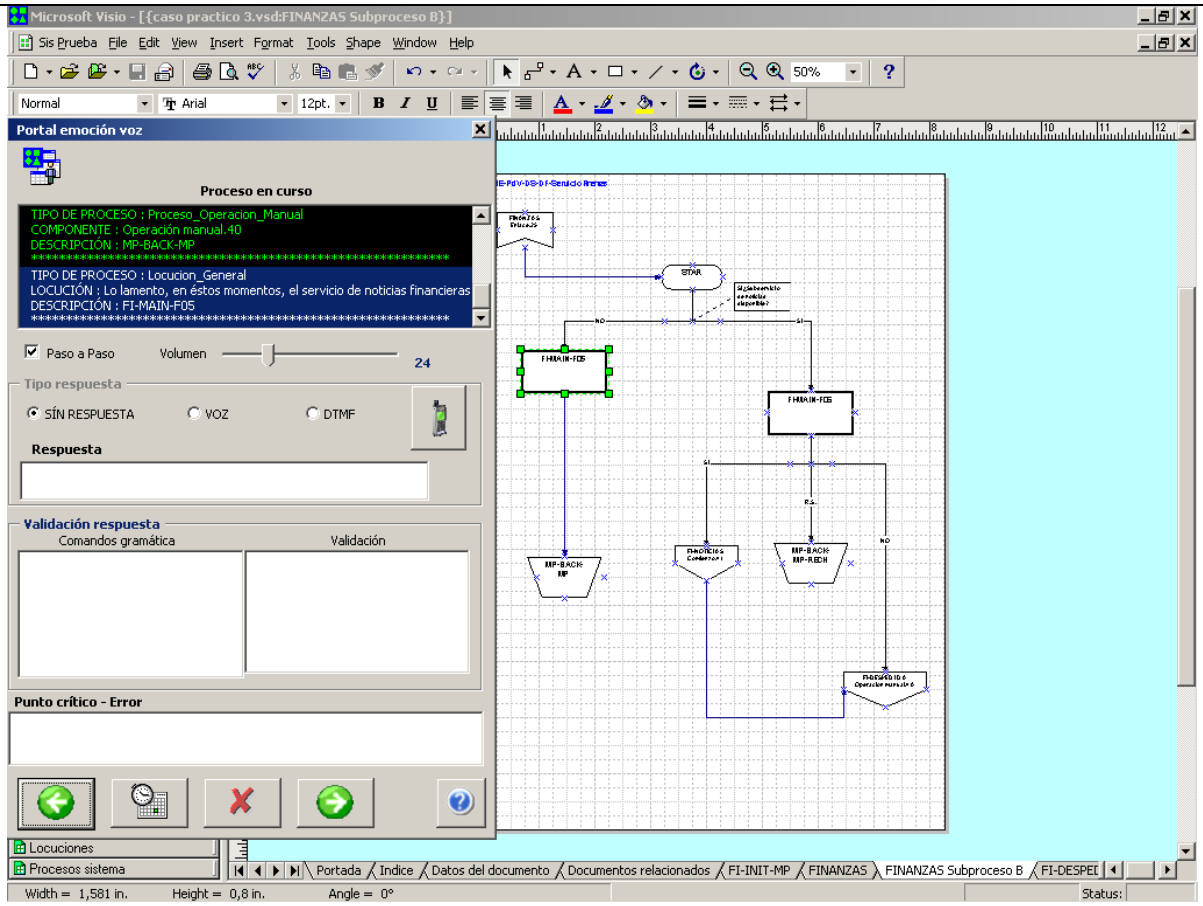
- Standardize all properties of the basic components of voice-operated services in Telefónica Móviles, by

proposing a practical set of tools that have been applied in all development stages.

- Implement an iterative methodology that works from the very beginning of the project with real use scenarios, in addition to functional parameters, at the same time allowing tests of early prototypes.

- Improve the efficiency of the whole development process and the final quality of the product as delivered to the market.

**Figure 3. Emulation modules**

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