RIMAP
(112_PR3_08_0477)
Design and Development of Rich Internet Online Mapping Tool

Scientific Platform and Tools Project 2013/3/8

Inception Report | Draft Version
26/06/2012

This report presents a more detailed overview of the analytical approach to be applied by the project. This "Scientific Platform and Tools" Project is conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON Programme and projects can be found on www.espon.eu

The web site provides the possibility to download and examine the most recent documents produced by finalised and ongoing ESPON projects.

This basic report exists only in an electronic version.

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[1] The listing of the elements included here should serve as a reminder of the standard elements that need to be covered by an Inception Report. The concrete content might vary from project to project. The level of detail to which these standard elements need to be addressed also depends on the quality of the project proposal and the level of detail to which some of these elements might already have been addressed there. Therefore the table of content for the report can be devised by the TPG, taking into account the elements that are requested to be dealt with in this report.

Annexes

A1 – D1. User and Data Needs and Requirements Report (June 2012).

A2 – D2. Governance structure, communication flow and methods. Quality Plan (June 2012).

A3 – D3. Architecture Design Report (June 2012).

A4 - D4. Project Web Site (June 2012).

A5 – D5. 1ST Version of the Dissemination plan (June 2012).

Executive Summary

The RIMAP Inception Report covers the work done during the first period of the RIMAP project, between February and June 2012.

According to Annex III of RIMAP Subsidy Contract (dated on 29th March 2012) the Inception Report shall include the following results:

- Review of the most relevant existing web mapping tools including an indication of those elements useful or to be avoided for the tool to be built and a proposal on the various elements to consider in the ESPON online Mapping tool.
- Detailed description of the project, taking into account the objectives envisaged, including the identification of priorities, resolution of problems, proposals (including screen designs) for all seven domains and definition of delimitations.
- Presentation of a strategic overview of all activities and an overall time planning.
- Presentation of the description and timetable of the various project deliveries.
- Work plan until the Interim Report.

Taking it into account, this report is divided into 4 main sections:

- ❖ Overview of the Online Mapping Tool.
- ❖ Distribution of the work packages.
- ❖ First results achieved.
- ❖ Orientation of the project previewed towards the Interim report.

Moreover, expected deliverables are shown as annexes.

1. Overview of the Online Mapping-Tool.

RIMAP (Rich Internet MAPping Tool) is conceived for an On-line tool development upon ESPON 2013 Database. This tool will be online, made available via ESPON website and should provide a toolbox to visualise and analyse data in maps and diagrams. The main target is to fill the gap between disseminating data in tables and disseminating data in fixed and interactive maps.

RIMAP will be fully compatible with the ESPON 2013 Database and will query it for building the maps and diagrams that its users need. Thus the user could select data through its interface and display datasets or maps. By the way, RIMAP is considered to be complementary to the ESPON Database, the ESPON Online MapFinder and ESPON Hyperatlas and to allow users to access to a fixed set of most relevant maps develop during the carrying out of several projects, but also to let them to query and display several kinds of maps attending their information needs.

Furthermore, it is important to mention that RIMAP project is in line with Priority 3 – Scientific Platform of ESPON Programme 2007 – 2013. Scientific Platform development is supported by an ESPON Database project and actions dealing with territorial indicators and monitoring as well as tools related to territorial analyses, typologies, modelling and updates of statistics.

In order to support policy making related to regions, cities and larger territories, this platform has to be continuously built up and effectively maintained. This is the mail goal of RIMAP: providing access to and enabling using the ESPON knowledge base in an easy and highly digestible manner. This will be done by giving people the possibility to produce, visualise, analyse and download maps and diagrams of data and indicators that are directly coming from the ESPON 2013 Database.

To achieve Online Mapping Tool objectives seven main domains have to be considered:
1. Data Storage.
2. Data Visualization.
3. Data Analysis.
4. Output.
5. User Interface.
6. User Support.
7. Web Application.

2. Distribution of the work packages

To achieve the project objectives, the working plan is structured in a matrix composed by horizontal and vertical actions (work packages). There are two horizontal actions devoted to project management (WP0) and dissemination activities (WP5).
Other 3 vertical actions are focused on research and development activities (from WP1 to WP3) and another one for evaluation activities (WP4). The WPs are linked together via crosscutting and synergetic activities all along the project duration as to produce a total result/effect/impact much greater than the sum of the deliverables of all WPs. The structure includes all the required components to address the complexity and the increased scientific and administrative needs of this integrated project to successfully achieve its objectives.
.
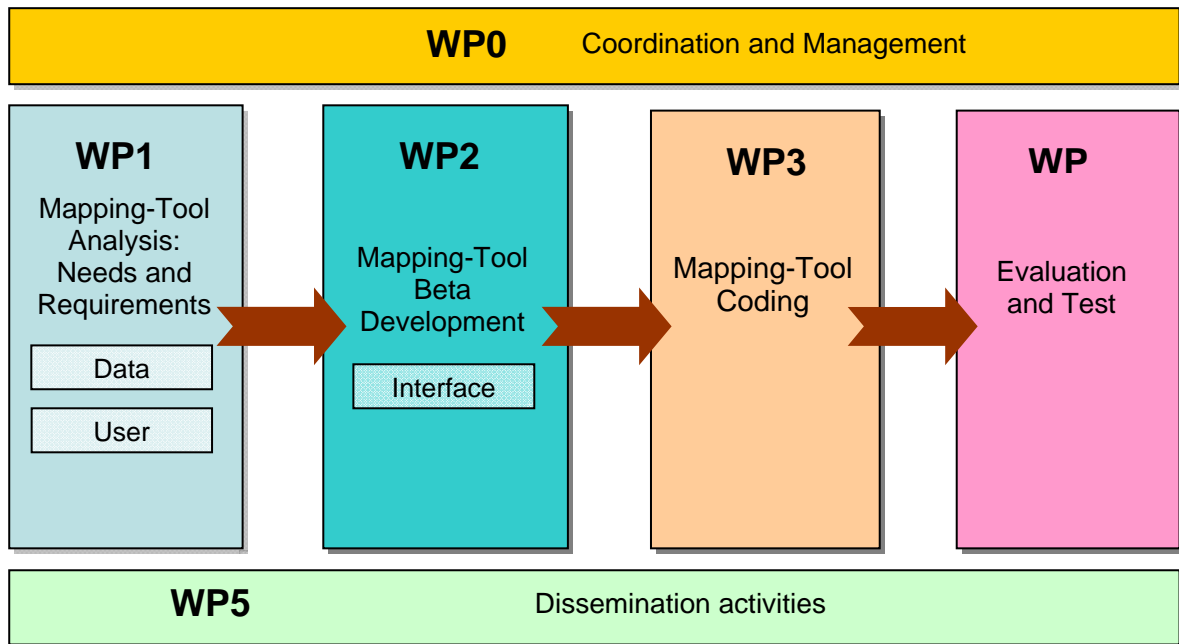
Figure 1 – WP schema

Those Work packages are distributed along the time as the Gantt Chart shows.

Gantt Chart	YEAR 1 quarter				YEAR 2 quarter			
	1	2	3	4	1	2	3	4
WP0 - Coordination and Management	▓	▓	▓	▓	▓	▓	▓	▓
WP1 – Mapping-Tool Analysis: Needs and Requirements	▓	▓						
WP2 – Mapping-Tool Beta Development		▓	▓					
WP3 – Mapping-Tool Coding				▓	▓	▓	▓	
WP4 – Evaluation and Test								▓
WP5 – Dissemination and Exploitation activities	▓	▓	▓	▓	▓	▓	▓	▓

Figure 2 – WP Gantt Chart

2.1. Work Package 0 – Coordination and Management.

The aim of this WP is to establish an effective coordination and decision structure to adequately address the following objectives:

- Assure the execution of work packages and deliverables in terms of execution time, cost and adequate quality.
- Specify project objectives to be achieved within the estimated time and cost frame.
- Ensure communication between ESPON and external.
- Organization and coordination of project start, meetings and workshops.
- Coordination of networking activities.

Regarding the Progress monitoring of RIMAP, there will be regular content deliveries, which will contain the detailed implementation of the project, the deliverables and the planning for the next reporting period:

- ❖ Inception Report (June 2012).
- ❖ Interim Report (December 2012).
- ❖ Draft Final Report (September 2013).
- ❖ Final Report (December 2013).

Furthermore, complete financial delivery (progress reports) will be submitted each six months period (according to point 5.3 of Subsidy Contract). These financial reports will be validated by the first level control (appointed by AIDICO in a decentralized system) *(see Annex A-2)*

Deliverables

D2 Governance structure, communication flow and methods. Quality Plan (June 2012).

2.2. Work Package 1 – Mapping-Tool Analysis: Needs and Requirements.

The aim of this WP is to analyze the needs and requirements of the Mapping-Tool since different points of view:

- **-** Data: Indicators and Geographical Info may be analyzed in order to define how must be shown.
- **-** Users: Is very important to define user capacities in order to develop and easy and friendly tool.

This information will be used to design the architecture of the Mapping-Tool through these actions:

- **-** Selection of platforms and language development.
- **-** Architecture design.
- **-** Interface design.

Deliverables

D1 User and Data Needs and Requirements Report (June 2012).
D3 Architecture Design Report (June 2012).

2.3. Work Package 2 – Mapping-Tool Beta Development.

The aim of this work package is to develop a Mapping Tool prototype which can be used to verify the understanding about user needs and requirements.

It's very important to work closely with database TPG 2013, in order to make a good connection.

Development of a Mapping-Tool functional prototype for each device (computer, tablet, mobile) will be done as a limited representation of the final tool will be developed, allowing test real situations and explore the user experience.

Deliverables

D6 First beta-version of the Online Mapping tool (December 2012).
D7 Table of Content for the user guidelines (December 2012).

2.4. Work Package 3 – Mapping-Tool Coding.

The basic objective of this work package is to develop the code that implements the specifications and architecture defined in the previous tasks.

Coding will be done taking account that the data, the logic control and user interface are well differentiated so that any change in one of these three components will not affect others.

Moreover, some user guides must be developed.

Deliverables

D8 Draft Final version of the Online Mapping tool (September 2013).
D9 Draft Final version of the User guidelines (September 2013).

2.5. Work Package 4 – Evaluation and Test.

The objective of this WP is to validate the system through testing and application examples.

Task 4.1 Systematic Testing
The different modules will be checked; a document consisting of a history of errors detected which permits the correction of behaviors that do not match initial expectations.
Different test typologies will be done:
- Acceptance test, verifying that the functionality is developed.
- Functional test, following use cases described in the definition of requirements.
- Integration test ensures the proper integration of the different modules of the application.

Task 4.2 Bug fixes.

A detailed analysis of the triggers and effects of bugs detected during simulation testing will be done, which will have been recorded in the document tools error and appropriated and corrective actions will be taken in order to continue the verification process.

Task 4.3 End-users validation

End-users will test the Mapping-Tool, and a document will be elaborated integrating all the errors detected.

The chosen methodology for the realization of this task is the Heuristic Evaluation. The main goal of heuristic evaluations is to identify any problems associated with the design of user interfaces looking at an interface and trying to come up with an opinion about what is good and bad about the interface.

Deliverables

D10 Final version of the Online Mapping tool (December 2013).
D11 Source code of the final version of the Online Mapping tool (December 2013).
D12 Final version of the User guidelines (December 2013).
D13 Usability Report (December 2013).

2.6. Work Package 5 – Dissemination Activities.

To carry out activities to disseminate research results and to prepare for their take-up and use, including knowledge management and, activities directly related to the protection of foreground.

A dissemination plan will be made at the beginning of the project (following the indications in Annex III of the Subsidy Contract). RIMAP project Communication and Dissemination Plan are structured in the following elements:

- Objectives and stakeholders.
- Strategy, Activities and tools selected.
- Estimated budget to put into practice these actions.
- Main expected results.
- EC and ESPON Requirements.

Dissemination Activities are fully described in Deliverable 5 (see Annex A-5)

Deliverables

D4 Project Web Site (June 2012).
D5 1ST Version of the Dissemination plan (June 2012).
D14 Final version of the Dissemination plan (December 2013).

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3. First Results

During the first period of the project, some tasks have been developed related to WP0, WP1 and WP5.

3.1. Governance structure, communication flow and methods. Quality Plan

Deliverable D2 *(see annex A-2)* deals with the objective of WP0, coordinating and managing RIMAP project in an effective way.

In order to fulfill with these objectives the project requires an efficiently Governance Structure which is composed by the following roles:

- Project Technical Management

- Financial and Administrative Management

- Communication manager

These roles are duly detailed in D2 in order to ensure the task and responsibilities of every person person involved in the project.

According to indications of ESPON team, the management structure was simplified; it is not needed an structure so complex. It is shown this simplification structure:

```
┌─────────────────────────┐
│   Project Technical     │              ┌──────────┐
│     Coordinator         │─────────────▶│  ESPON   │
│     SERGIO MUÑOZ        │              │    CU    │
└───────────┬─────────────┘              │   AND    │
            │                            └──────────┘
┌───────────┴─────────────┐
│  Financial /Administrative│
│       Manager            │
│     IGNACIO BUENO        │
│   PATRICIA GALISTEO      │
└───────────┬─────────────┘
            │
┌───────────┴─────────────┐
│     FIRST LEVEL         │
│     CONTROLLER          │
│ Appointing Russell Bedford│
└─────────────────────────┘

┌──────────────────┐  ┌──────────────────┐  ┌──────────────────┐
│  WP Coordination │  │ WP Activity(wp1-2-3-4)│ WP Dissemination │
│ Leader: Sergio   │  │ Leader: Sergio   │  │ Leader: Patricia │
│ Muñoz / Ignacio  │  │ Muñoz / Lucía    │  │ Galisteo         │
│ Bueno            │  │ Irusta           │  │                  │
└──────────────────┘  └──────────────────┘  └──────────────────┘
```
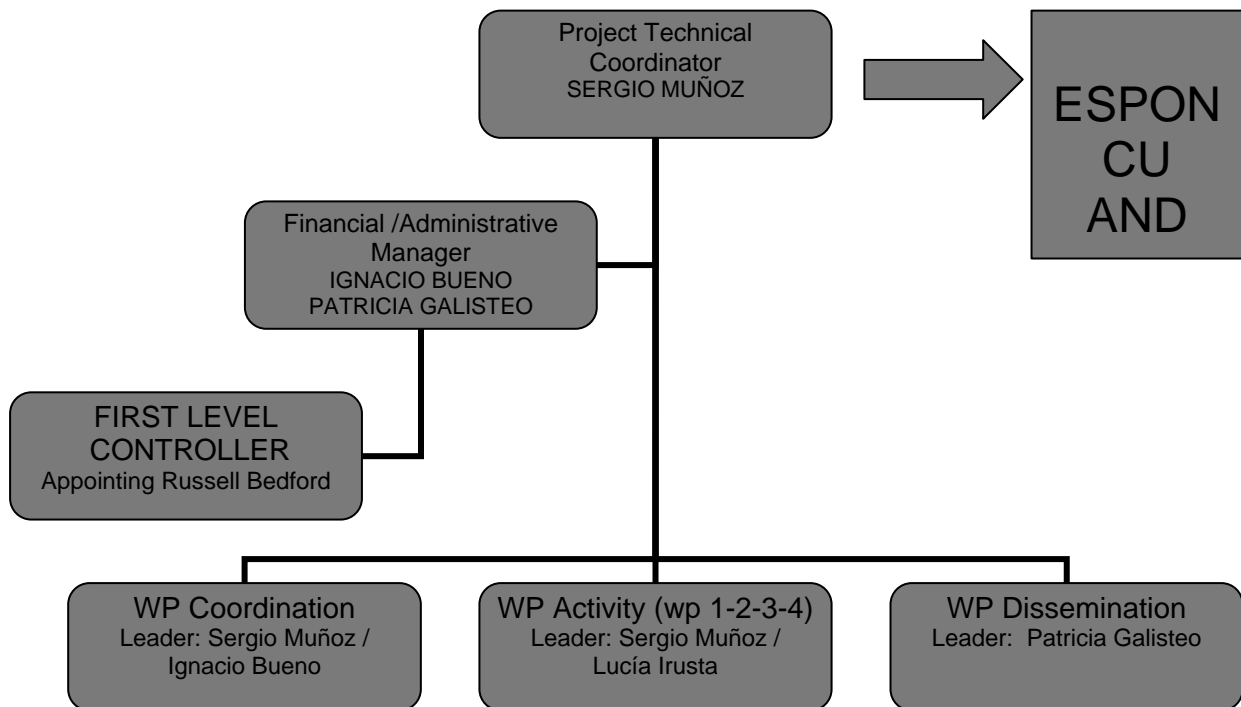
Deliverable 2 describes the financial flow of ESPON projects. It is important to know this process because every progress report during the implementation of the project have to be accompanied of a request for payment. It is mandatory to obtain a verification of costs done by the First Level Controller.

At this moment we are appointed RUSSELL BEDFORD for being our First Level Controller.

Finally, Deliverable 2 finishes with a Quality Plan including significant Risks and Contingency Plans

3.2. User and Data Needs and Requirements

The developing of a web mapping tool project needs some tasks that are focused specifically on identifying, gathering, communicating, and documenting user requirements. Once identified, the user requirements effectively define the basis for developers, testers, and implementers to begin determining the functionality, responsiveness and interoperability required of that system.

During the first months of the project, RIMAP development team have defined a Mapping Tool Requirements Proposal, which will be able to be discussed and improved along the next months.

Although sometimes is believed that establishing user requirements is useless, there are obvious benefits. These benefits can include increased productivity, enhanced

quality of work, reductions in support and training costs and improved user satisfaction.

There are a number of methodologies for identifying such needs. We are just going to point out them here:

- User surveys.
- Focus groups.
- Interviewing.
- Scenarios and use cases.
- Evaluating an existing system.

During the project development, we have chosen to use three of the methods for laying the user requirements: User surveys, scenarios and use cases, and evaluating an existing system. The first one was post-posed by the ESPON Commission, so we have mainly worked on the other methods.

3.2.1. Review if the most relevant existing web mapping tools

One of the methodologies for laying the user requirements of an IT system is the evaluation of an existing system. This action can provide valuable information about the extent to which current systems meet user needs and can identify potential usability problems to avoid in the new system. Useful features identified in a previous system can also be fed into the design process as potential user requirements. Measures of effectiveness, efficiency and satisfaction can be used as a baseline for the new system. To obtain accurate measures a controlled user test should be used, but valuable information can still be obtained from less formal methods of testing.

The call of ESPON collected some websites where other web mapping tools can be found, so we have proceed to the analysis and extract some conclusions from there. Here is the list of the websites analysed:

- OECD Explorer - http://stats.oecd.org/OECDregionalstatistics/
- ECB: Inflation and the euro - http://www.ecb.eu/stats/prices/hicp/html/inflation.en.html
- Indiemapper - http://indiemapper.com/
- Interactive Statistical Atlas of Slovenia - http://www.stat.si/eng/iatlas.asp
- Gapminder - http://www.gapminder.org/world/
- France découverte - http://www.geoclip.fr/danseuse/carto.php?lang=en
- International Human Development Indicators - http://hdr.undp.org/en/data/map/
- Migrant Population Map - http://www.ninis.nisra.gov.uk/mapxtreme/InteractiveMaps/A8Migration/atlas.html
- Mapa interactivo de indicadores - http://www.guiadelmundo.org.uy/cd/indicators/index.htm

Although the complete report can be found on the annex 2, we remark here the main conclusions.

- **The geographical depth of the maps is quite general.** The countries are the geographical depth for almost every web mapping tools studied. There are few that go deeper in administrative organization as provinces or counties, for example.

- **The main language of all them is English.** Mainly, only the webs managed for country institutions have more than one language.
- **Technologies and limitations**: All above web applications (or components of the web applications) are developed using Adobe Flash technologies. It implies the requirement of Adobe Flash plugin installation in the web browser and no operation on certain mobile devices (smartphones, tablets…). Moreover, these web applications do not provide a mobile version to facilitate use from tactile devices.
- **The target market is policy and decision makers**. There are some web mapping tools that are undeveloped or with a low level of information, but the reason is the developer wants to sell a tool, not provide useful information from the generated map.
- **Chart generator is needed over that the mapping tool**. Although, the map generators help to draw a reality, the charting tools help to study it. In addition, the charting tools are more powerful, the users are more used to use them and the data representation are more usable and brought more options in a chart than a map.
- **Printing is useless**. The studied web mapping tools prefer saving an image in the PC than sending it to the printer.
- **Timeline is a must**. If you have temporal series of an indicator, you cannot avoid including an option of "Timeline" in the interface.
- **Predefined indicators are more important than customize the colour scheme**. Although you can use any indicator any time and even change the colours of the maps, the developers believe that is more useful to set some predefined indicators rather colour schemes.
- **Resize the windows and zoom in/out are options present in every web mapping tool.**

3.2.2. Online Mapping Tool Wireframing

An early wireframe of the Online Mapping Tool has been designed taking account the analysis detailed above. The screen is divided in several zones:

A: Main area for displaying maps. At this area, the user can do the actions:
- This area can be maximized or minimized for easy viewing.
- Zoom in/Zoom out.
- Ranges representation (minimum six).
- Sensitive: mouse over and click events.

B: Area for the temporary selection of indicators. At this area, the user can do the actions:
- Search indicators by theme, name and relevance.
- Play and stop the representation of the temporal evolution of the selected indicators.
- General or separate (maps/graphs) selection.

C: Auxiliary area for displaying graphics. At this area, the user can do the actions:
- This area can be maximized or minimized for easy viewing.
- Tabs for selecting the chart type (Frequency, distribution, scatter, bar, sectorial or data table representation).
- Ability to configure through the Zone B to provide analysis tools.

D: Bar for selecting geographical areas and levels of the map display. Ability to create a geographical area (usable in the current session).

E: Main menu area. At this area, the user can do the actions:
- General tool settings.
- General view options.
- About Mapping Tool.
- Help and assistance section.

F: Options zone with icon based access. At this area, the user can do the actions:
- Map Style (change line thickness, line color, colors gradation of the map…)
- Print and Print preview
- Save map as image (png, pdf, jpg…)
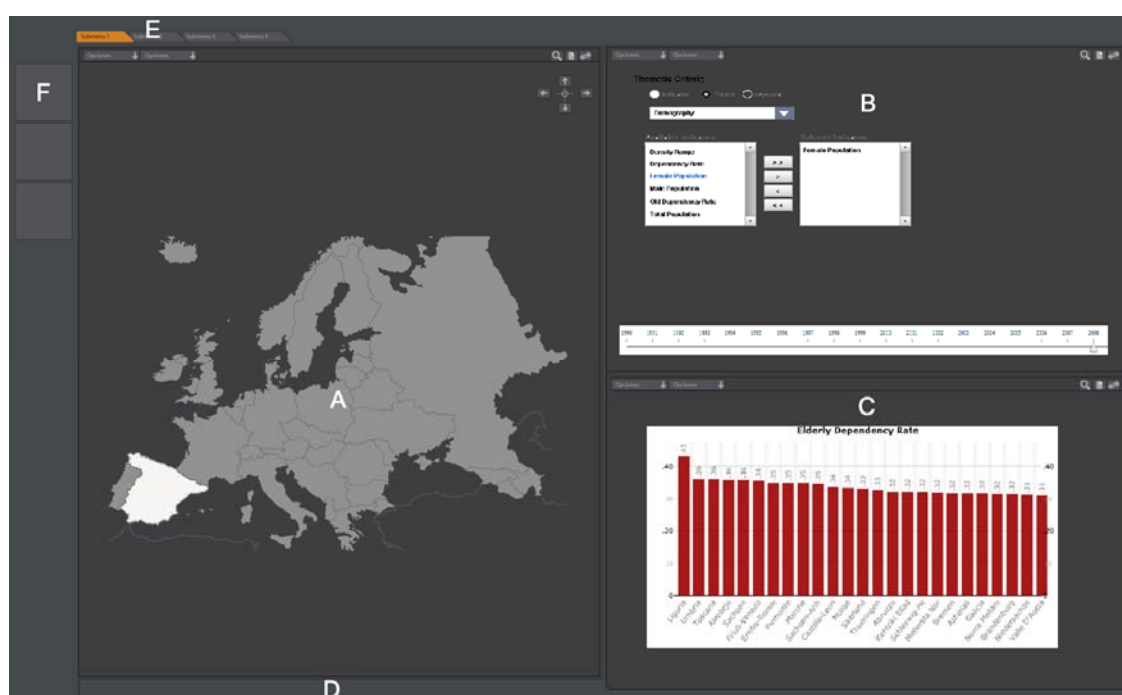- Save chart as image (png, pdf, jpg…).

Figure 6 – Mapping Tool Screen Design

3.2.3. Scenarios and Use Cases

In computing, a scenario is a narrative, which most commonly describes foreseeable interactions of user roles and the technical system, which usually includes computer hardware and software.

Many types of scenario are in use in system development:

a)   Story: "a narrated description of a causally connected sequence of events, or of actions taken".

b)   Situation, Alternative World: "a projected future situation or snapshot". This meaning is common in planning, but less usual in software development.

c)   Simulation: models to explore and animate 'Stories' or 'Situations', to "give precise answers about whether such a scenario could be realized with any plausible design" or "to evaluate the implications of alternative possible worlds or situations".

d) Storyboard: a drawing, or a sequence of drawings, used to describe a user interface or to tell a story. This meaning is common in Human–computer interaction to define what a user will see on a screen.

e) Sequence: a list of interactive steps taken by human or machine agents playing system roles. The many forms of scenario written as sequences of steps include Operational Scenarios, Concepts of Operations, and Test Cases.

f) Structure: any more elaborately-structured representation of a scenario, including Flowcharts, UML/ITU 'Sequence Charts', and especially in software development Use cases.

We have used a combination of a) and f) to define the scenario cases as a sequence of use cases (which are detailed in Annex 2):

Test case id	1
Situation	A MEP (Member of the European Parliament) wants to analyze the evolution of GDP in some Mediterranean regions in the last 10 years
Actors	MEP
Assumptions	1. Access to the Mapping Tool URL [Use Case - 1] 2. Basic expertise of the platform
Steps to be executed	1. Selection of NUTS level (in this case NUTS2) [User Case - 6] 2. Selection of the geographical areas studied by the pointer (in this case, Catalonia, Languedoc, Provence and Liguria) [Use case - 9] 3. Zoom in the areas to study 4. Selecting the desired indicator (GPD in the region) [Use case - 3] 5. Selecting the desired time range (2000-2010) through timeline [Use case - 4] 6. Download the maps generated in the years (2000, 2005 and 2010) [Use case - 8]

Test case id	2
Title	An economist wants to compare two indicators, Unemployment and Research innovation, through time and in the ESPON Area. For doing that he wants to get the ratio between them and get a choropleth map from different NUTS levels
Actors	Economist
Assumptions	1. Access to the RIMAP URL [Use Case - 1] 2. Basic expertise of the platform
Steps to be executed	1. Selection of NUTS0 [User Case - 6] 2. Selection of Study Area to ESPON area [Use Case - 5] 3. Selection of the first indicator through the path: Economy -> Employment -> Unemployment Rate [Use Case - 3] 4. Selection of the second indicator through the path: Economy -> Research and Innovation -> European Patent Applications [Use Case - 3] 5. Selection of the type of map: Ratio [Use Case - 3]

	6. Slide the arrow of the timeline to the year 2000 [Use case - 4]
	7. Push the play button[Use case - 4]
	8. Change the NUTS0 to NUTS2 [User Case - 6]
	9.
	10. Selection of the Classes Number to 10 [User Case - 2]
	11. Slide the arrow of the timeline to the year 2000
	12. Push the play button
	13. The economist wants to download the map generated in the year 2007 [Use Case – 8]

Test case id	3
Title	A journalist wants to get a map that shows the richer zones in Europe.
Actors	Journalist – Basic user
Assumptions	1. Access to the MAPPING TOOL URL [Use Case - 1] 2. Basic expertise of the platform
Steps to be executed	1. Selection of Study Area to EU27 area [Use Case - 5] 2. Selection of NUTS2 [User Case - 6] 3. Selection of the indicator through the path: Social Affairs – Disposable income per inhabitant [Use Case - 3] 4. Slide the arrow of the timeline to the year 2011 [Use case - 4] 5. Set the number of Classes Number to 8 [User Case - 2] 6. Download the map generated [Use Case – 8]

Test case id	4
Title	A Member of EU Commision wants to know the multimodal accessibility covering France and Germany
Actors	Member of EU Commision
Assumptions	1. Access to the MAPPING TOOL URL [Use Case - 1] 2. Basic expertise of the platform
Steps to be executed	1. Selection of NUTS level (in this case NUTS0). [User Case - 6] 2. Selection of the geographical areas (France and Germany) [Use case - 9] 3. Selection of NUTS level (in this case NUTS2) [User Case - 6] 4. Selection of the indicator through the path: Transport –> Accesbility –> Multimodal Potencial Accesibility [Use Case - 3] 5. Slide the arrow of the timeline to the year 2011 [Use case - 4] 7. Set the number of Classes Number to 10 [User Case - 2] 6. Download the map generated [Use Case – 8] 7. Unlink the graph and chart generator [User Case - 10] 8. Selection of another indicator on the chart through: Transport –> Accesbility –> Multimodal Potencial Relative Change [Use Case - 11] 9. Download the graph [Use Case – 15]:

3.2.4. Analysis Results

As long as the user requirements are defined, some topics should be documented. For example, identification of the range of relevant users and other stakeholders, a clear statement of design goals, the requirements with an indicator of their priority levels, measurable benchmarks against which the emerging design can be tested, etc. It is important to remark that some requirements can be changed as the system is developed if necessary.

A requirement for an IT system specifies what is expected from it. There are many types of these requirements as, for example, a business advantage or spreading information more easily. But all of them can be categorized in four topics:

- Functional Requirements - These are the type of behaviour you want the system to perform. Here is important to point "What" is wanted and not "How" it will be.
- Non-functional requirements - They are the restrictions or constraints to be placed on the system and how to build it. Their purpose is to restrict the number of solutions that will meet a set of requirements. Non-functional requirements can be split into two types: performance and development.
- Design Objectives. Design objectives help in selecting a solution from different options when a problem is found. These constraints are more about the interface and they are focused on helping the users using the system.
- Delivery Objectives. Describe any constraints or requirements that have been specified relating to how the system should be delivered.

Requirements have been firstly grouped in these four topics. In addition, we have categorized the requirement with a priority level, that are explained in the next table:

M	Mandatory requirement. This feature must be built into the final system.
D	Desirable requirement. This feature should be built into the final system unless its cost is too high.
O	Optional requirement. This feature can be built into the final system at the Project Manager's discretion.
E	Possible future enhancement. This feature is recorded here so that the idea is not lost. The decision on whether to include it in the system will depend on progress on the mandatory requirements.

Functional

These are the type of behaviour you want the system to perform. Here is important to point "What" is wanted and not "How" it will be.

1	M	RIMAP should establish a link with the latest version of ESPON 2013 Database
2	O	RIMAP may consider the use of ESPON query functionality for selecting data
3	M	RIMAP will allow users to create visualizations via maps, graphs and time series from ESPON 2013 Database
4	M	RIMAP should be able to visualize the data in the categories: Regional data, urban data, neighborhood data and world data.
5	M	RIMAP should include the geometries and layers: NUTS0 to NUTS3 geometries, geometries for the urban data, geometries for the neighborhood and world data, the capital layer.
6	M	All maps made using RIMAP should follow the ESPON map design
7	M	The user should be able to receive output from the options print, print

		preview, save/save as, open, export
8	M	The tool should respect the accessibility criteria standards (W3C)
9	O	RIMAP will be accessible in different devices: computers, tablets, mobiles
10	O	RIMAP will be based in Rich Internet Applications (RIA)

Non-Functional

They are the restrictions or constraints to be placed on the system and how to build it. Their purpose is to restrict the number of solutions that will meet a set of requirements. Non-functional requirements can be split into two types: performance and development.

1	M	RIMAP will be hosted on one of the ESPON available serves and should be available via all the commonly used internet browsers.
2	M	The choice for COTS or Open Source applications should be made in function of the detailed requirements and of technical and financial boundary conditions in order to identify which is the best solution for such a project.
3	D	RIMAP will not be developed in Adobe Flash

Design

Design objectives help in selecting a solution from different options when a problem is found. These constraints are more about the interface and they are focused on helping the users using the system.

1	M	A default map will be displayed that fits the data selected
2	M	The users should have the option of changing the map view zooming in/out
3	M	A restore option should be available
4	M	The representation and naming countries and regions approved by the ESPON MC shall be used
5	M	The user should have the opportunity to edit the title of the generated map and change the font type, size and color of all the texts.
6	M	As a default classification for the data displayed in the map, equal interval classification should be used with 6 classes ranging from the minimum to the maximum value available in the data and "no data" should be indicated.
7	M	The default color scheme depends of the kind of values available and should follow the ESPON Mapping guidelines to be made available by ESPON CU.
8	M	The user should have the chance to make changes in the color scheme from a set of at least 10 different color schemes to be defined in cooperation with the ESPON CU.
9	M	As a default the capitals should be indicated in the map displayed by their names and a symbol.
10	M	The user should have the opportunity to make some changes in the capitals with at least changes in the font type, font size, color, symbol, symbol size and color.
11	M	Restore option should be available.
12	M	As a default the borders should have a fixed setting on thickness and colour of the lines.
13	M	The users should have the opportunity to make some changes in the visualization of the borders changing the thickness and color
14	M	The user should be able to retrieve information from the map by hovering over it

15	M	The users should be able to make a number of graphs that visualize the data selected in different ways (Distribution of the values including an indication of average value and variation, frequency diagram of the values, scatter diagram of two indicators to be selected including the possibility to add an indicator for the size of the circles in the scatter diagram, bar charts, sectorial diagrams and curves)
16	M	The users should have the possibility to view the changes over time in a map and also graphically when an indicator is available for a time series.
17	M	Redefined study areas, such as the Danube region, NW Europe, Baltic Sea and Mediterranean regions should be able for the users and will be provided by the ESPON CU
18	M	Additional methods for analyzing the data should be included (Comparison between two indicators, Comparison of changes between two years, Comparison between various NUTS Systems)
19	M	The interface should be user friendly
20	M	An interactive help function should be available in the Mapping tool to give guidance to the user.
21	M	A separate document explaining the tool and including practical examples should also be available for the users.
22	O	Other file formats for Output may be considered like csv, txt or gif
23	O	RIMAP should always keep users informed about what's going on.
24	O	RIMAP should speak the users' language with words, phrases and concepts familiar to the users.
25	O	RIMAP dialogues should not contain information which is irrelevant or rarely needed.
26	O	RIMAP should help users recognize, diagnose and recover from errors
27	M	RIMAP main language should be English
28	D	RIMAP should have a timeline at the bottom of the map
29	D	RIMAP should be divided in two main sections "Chart" and "Map" generator
30	O	A "full-size" option should be provided
31	O	An option for viewing Data tables of the selected indicators should be displayed
32	M	A "Help" section should be included
33	D	Selecting different types of charts should be included

Delivery

Describe any constraints or requirements that have been specified relating to how the system should be delivered.

1	M	RIMAP will be complimentary to the ESPON Online Mapfinder allowing users to access to a fixed set of most relevant ESPON maps
2	M	RIMAP should be developed as a web application.
3	O	The user's target group is mainly policy makers and practitioners, but the tool might be interesting for advanced users like scientist, students and experts.

3.2.5. Online Mapping Tool Final Requirements

Once analysed existing web mapping tools and defined scenarios and use cases, we have defined the Online Mapping Tool requirements for the seven domains.

I. Data Storage

The indicators wouldn't be stored in the online map tool itself, the software would query the ESPON Database 2013, structure the data and represent it as dataset or map.

The Mapping Tool will handle database transparently regardless of database server. There will be no difference between the two data models that will coexist in the tool: the one used for programming (object oriented) and used in the database (relational model). This will help us in the object-relational mapping tool (ORM) that facilitates the Hibernate mapping attributes from a relational database model and application objects through declarative files (XML) or annotations in the beans of the entities that establish these relationships.

II. Data Visualization

Taking account than Internet bandwidth has increased considerably in recent years (this allows them to offer real-time multimedia content) RIMAP would consider different ways for displaying the information using maps, graphs and time series.
- o Maps: All maps should follow the ESPON Map design, giving visibility to ESPON. The user should be able to make selections for specific items, such as the dataset, scale, geographical coverage, data classification, colour scheme, capitals and borders.
- o Graphs: Data selected can be visualised in different kind of graphs: Values distribution with average and variation, frequency diagram, scatter diagram, bar charts, pie charts, etc.
- o Time series: It keeps analysing the changes over time of one or some indicators.

III. Data Analysis

The Online Mapping tool should also include some simple possibilities to analyze and interpret data. Some methods are already mentioned in the data visualization paragraph above. Additional methods, most commonly used to analyze data, should be included among which the possibility to compare two or even more indicator sets using, for example using a scatter diagram, overlays and indicating the correlation coefficient, but also the possibility to show the changes between two years for one selected indicator.

IV. Output

The user should be able to save or open a map in RIMAP with two options:
- o Save/Save as: One map would be saved into a file.
- o Open: One map should be able to be opened.

On the other hand, a Report tool is needed in order to offer a way to take the information shown in the Mapping Tool. That information would be obtained in different ways:
- o Direct to printer.
- o Export to different file formats: pdf, jpg, png, svg csv, .txt or .gif.

V. User Interface

Users need a friendly interface adaptable to these devices, enhancing the capacities of each.

VI. User Support

An interactive help function should be available in order to support Mapping Tool users with user manual, practical examples and a glossary.

Some video tours will be developed in order to guide the user in each step showing all the possibilities.

VII.   Web Application

The Mapping Tool should be developed as a web application. It has many advantages:

- o End-users can access the tool through their favourite Web Browser without installing the application itself on their computer.
- o End-users will always have access to the most updated issued version of the software and as such to possible new functionalities in the tool.
- o End-users will always have access to the most updated data and indicator sets available.

The Online Mapping Tool will be a RIA tool, with more advantages tan traditional web applications because of this technology combines web and desktop applications.

A RIA tool allows the user to push the boundaries of a traditional Web application interactions as double click, drag & drop, multi-touch gestures, and perform operations only on the client side.

3.3. Architecture Design

The software architecture of a program or computing system is the structure or structures of the system, which comprise software elements, relations among them, and properties of both. The term also refers to documentation of a system's "software architecture". Documenting software architecture facilitates communication between stakeholders, documents early decisions about high-level design, and allows reuse of design components and patterns between projects.

Taking account the user needs and requirements, the Mapping Tool Architecture has been designed based on client-server computing model, more exactly, on 3-Tier Architecture. In these systems, the server component provides a function or service to one or many clients, which initiate requests for such services.

3-Tier client-server architecture involves three layers: Client, Business Logic and Database.

- Client (or Presentation) Tier is the top-most level of the application: is the user interface.
- Business Logic (or Application) Tier coordinates the application, processes commands, make logical decisions and evaluations, and performs calculations. It also moves and processes data between the two surrounding layers.
- Database Tier store and retrieve information, which is passed back to the logic tier for processing.

This type of architecture is also known as Model – View – Controller architecture (MVC architecture). The main aim of the MVC architecture is to separate the business logic and application data from the presentation data to the user.

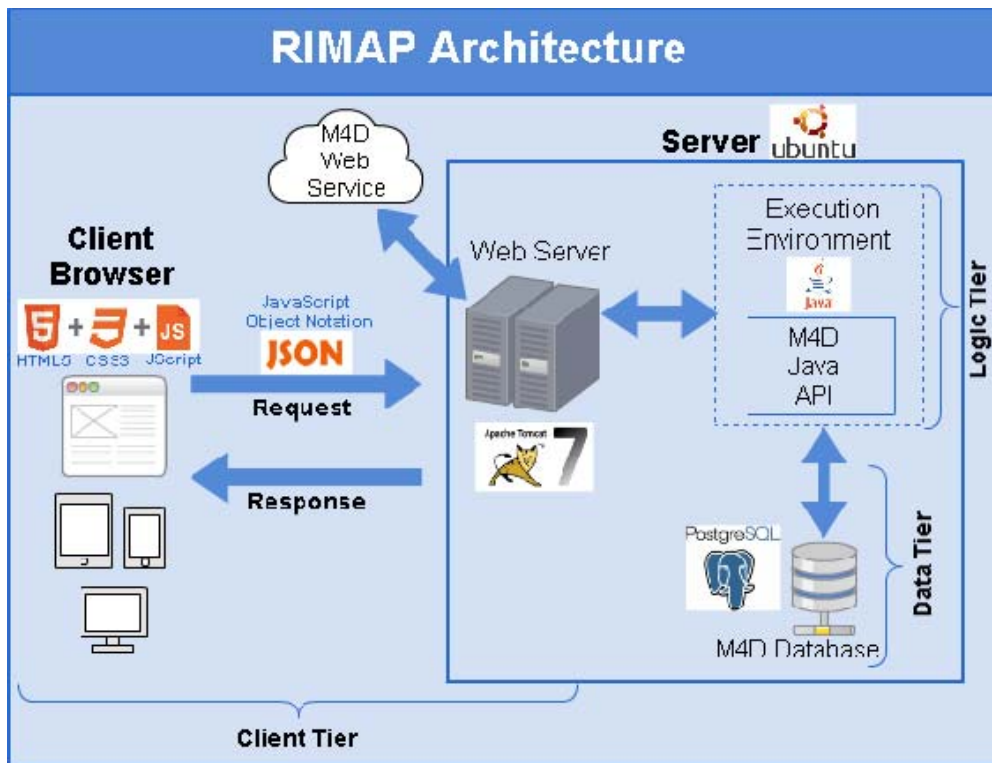As already mentioned, Mapping Tool is based on 3-Tier Architecture (Figure 8).

Figure 8 – RIMAP Architecture

3.3.1. RIMAP Client (or Presentation) Tier

The user interface will be developed with HTML5/CSS3/Javascript technology. In late 2011 Adobe advised that they were leaving the Flash Player plugin development for mobile browsers. Moreover, this plugin is still incompatible with certain Apple devices. In order to make RIMAP as accessible as possible, the RIMAP development team decided to change the presentation layer technology, switching Adobe Flex with HTML5. Cross-browser HTML5 functionality guarantees the future of the tool.

HTML5 is a markup language for structuring and presenting content for the World Wide Web, and is a core technology of the Internet. It is the fifth revision of the HTML standard. CSS3 is the third level of Cascading Style Sheets (CSS), that is a style sheet language used to apply the formatting and page layout in a document written in a markup language. These previous versions of HTML and CSS lack the tools needed to design rich pages that can be found on the web today and every time are more like desktop applications that we use normally.

Other specifications:
- Ext JS 4.1 JavaScript Framework for Rich Apps in Every Browser

3.3.2. RIMAP Logic Tier

The Business Logic layer will use the Java API developed in 'ESPON Database 2013 Phase II' project to obtain all necessary information about indicators and communicate it to the client layer.

Other specifications:
- Runtime Environment: Java(TM) SE Runtime Environment
- Web Server: Apache Tomcat 7.0

3.3.3. RIMAP Data Tier

The Data Layer is responsible for hosting the database and keeps it always accessible for RIMAP.

Other specifications:
- Database Engine: PostgreSQL 8.3.8

3.4. Dissemination Activities

First result regarding WP5 Dissemination Activities is the elaboration of the first version of RIMAP Dissemination Plan. The purpose is to ensure a good communication and dissemination of project results

RIMAP Communication and Dissemination Plan is structured in the following elements:

- Objectives and stakeholders

- Strategy, Activities and tools selected

- Main expected results

- EC and ESPON Requirements

The main objective is focused on optimizing internal information flow and ensuring an efficient communication between the departments involved in the project, as well as diffusing information and raising awareness about the RIMAP project to the stakeholders.

Main target stakeholders of RIMAP to be addressed are:

- Local Authorities & National//Regional Bodies are key players as policy makers, favourable legislative framework creation, public procurements, owners and promoters of their buildings.
- Public and private Promoters.
- Infrastructures maintenance and Energy agencies.
- Universities and Economic and/or Urban Research Institutions
- EU Development Agencies
- Press and Communication
- Society in general

Internal Communication deals with the efficiency of the information flow between people involved in the project. It is also important to ensure a fluently communication with ESPON CU.
Several tools are used in order to obtain these objectives:

> **- A shared folder** where working documents are exchanged between people involved in the project.
> **- Internal working meetings** will take place during the implementation of the project.
> - Telecommunication tools: e-mail, phone, skype, post, etc.

The purpose of external Communication includes the dissemination of RIMAP to the stakeholders. The main diffusion lines are:

- Creation of RIMAP Logo.
- RIMAP webpage (ttp://rimap.aidico.es/)
- Brochures, articles, press media
- ESPON Seminars, congress and events related to the thematic of RIMAP
- RIMAP final conference
- User's RIMAP Guide
- Networking: Contact and exchange of information with other European programmes or initiatives.

Every communication and dissemination activity will be done following the ESPON Requirements.

At this moment, we have contacted with project M4D in relation to the ESPON Database.

Regarding ESPON Open Seminars, RIMAP assisted at **Aalborg, Denmark 13 and 14 June 2012.** "European Territorial Evidence for EU Cohesion Policy and Programming"

RIMAP webpage is also created in order to facilitate the internal and external communication of the project (http://rimap.aidico.es/). The website will serve to invite stakeholders to several events, to disseminate RIMAP tool, share news or like a tool to help in executing some tasks of the project (the on-line survey is available in the website)
On the other hand, due to the intranet, internal communication between technicians is available. This internet site is secured. The ESPON representative will be able to access on-line the official documents through this website and will be able to follow more easily the project progress.
AIDICO will ensure the updated and maintenance of the website, even after the project's ending

In the next months it is envisaged to identify and contact with other related initiatives and programmes in order to promote the exchange of information and synergies.

4 Orientation of the project previewed towards the Interim report

Next period of the project will be focused mainly in the WP1 and WP2.

4.1. Work Package 1 - Mapping-Tool Analysis: Needs and Requirements

Following the work developed during the first project period, some tasks will be finished:

Task 1.1. Data Visualization Analysis.

The most suitable data visualization techniques will be chosen taking account user and data requirements and device limitations and possibilities.

Task 1.2. Description of methods for data analysis

The most suitable analysis methods will be chosen taking account user and data requirements.

Task 1.4 Interface Design

Different Graphic Interfaces will be designed depending of the device (computers, tablets and mobiles), where size screen and other kind of limitations and possibilities will be taken account (such as touch screen, etc.).

4.2. Work Package 2 – Mapping-Tool Beta Development.

As have been explained in the Section 2 of report, the aim of this work package is to develop a Mapping Tool prototype which can be used to verify the understanding about user needs and requirements. This work package will be developed in full until the Interim Report.

Task 2.1 Mapping-Tool Core Development

Attributes and relationship between the two data model (Mapping-Tool and Database) will be mapped: the model used for programming (object oriented programming) and database model (relational model), to manipulate data stored in database. It's very important to work closely with database TPG 2013, in order to make a good connection.

Task 2.2 Prototypes development.

Development of a Mapping-Tool functional prototype for each device (computer, tablet, mobile).

A limited representation of the final tool will be developed, allowing test real situations and explore the user experience.

It will be useful to refine the software requirements.

Task 2.3 Guide Design.

Design of Interactive User Guide contents based in the prototype.

Two main results are expected:

- First beta-version of the Online Mapping tool.
- Table of Content for the user guidelines.

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