**SMart URBan Solutions for air quality, disasters and city growth**

**Deliverable D7.2: SMURBS Website**

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Executive Summary

This document, entitled “D7.2 – SMURBS Website”, imprints the website structure and content as well as the architecture adopted, and serves the information of the visitors, including the partners of the project, about the objectives and concept of the project, scheduled activities, dissemination and communication, as well as the overall progress and foreseen actions. It also provides a common working platform for the SMURBS/ERA-PLANET partners for document sharing.

The overall target is to allow the different types of users to navigate smoothly and accurately across the various sections. The design and development of the website was scheduled to be implemented within the first four months of the project. This deliverable presents the main motivation and ideas behind the visual design and functionality of the website, as well as a brief description of the website content in its current form.

Taking these into account, this report is structured as follows:

**Chapter 1** consists of a General Overview of the Website

**Chapter 2** where the Main Menu Sections are elaborated

**Chapter 3** provides the detailed overview of the Architecture of the Website

**Chapter 5** provides the Foreseen Updates & Interoperability facilities
Project Information

This document is part of a research project funded under the ERA PLANET - European Union Horizon 2020 Programme.

Call Identifier: 2nd Joint Transnational Call of ERA-PLANET (SC5-15-2015 - Strengthening the European Research Area in the domain of Earth Observation).

Project GA number: 689443 (ERA-PLANET)

Transnational Project Title: SMURBS - SMart URBan Solutions for air quality, disasters and city growth

Project Beneficiaries:

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1. General Overview of the Website

The SMURBS/ERA-PLANET website will be hosted in the selected domain: [http://smurbs.eu](http://smurbs.eu). The design and navigation architecture of the SMURBS website has taken into account the needs of the consortium members and the different dissemination/engagement targets. The SMURBS website front-end consists of a number of distinctive and dynamic content blocks which are positioned accordingly to accommodate the content of each section. As a general principle, the SMURBS website will be designed in an attractive and informative way, strongly emphasizing on user experience aspects, and will be dynamically enriched during the progress of the project. The main elements included are:

**Logo and Header:** It is designed in order to depict the connection of SMURBS project with ERA-PLANET.

**Main Menu:** It is a horizontal multi-level menu, consisting of the following Main Menu entries: *the project, the team, activities, documentation, outreach, news*. Each of these entries leads to the corresponding sub-content. More tabs will be added during the project implementation according to the needs (see section 4.1).

**Modules:** These are blocks, which are positioned in different areas of each page, dedicated on enhancing the usability of the SMURBS site in terms of special content access (e.g. project progress), information briefing on renewed and updated project material, the project news and the secured content sharing facilities.

**Main Content:** The main content area has been designed to allow the flow of the web content in a user friendly manner via a single or multi-column frame template. It should be noted that in order to assist users in accessing the various web sections (e.g. Project Partners), specific modules inline to the content are used. The navigation architecture is presented in the next chapter, together with a brief description of the content for each webpage.
2. Main Menu Sections

2.1. Home page

The home page hosts a number of horizontal blocks (modules) that present in a nutshell some basic element of the project philosophy and implementation. These include:

- **Graphical slides**: slides and relevant quotes illustrating the smart city approach, the EO platforms to be exploited and the networking envisaged throughout the project
- **Themes**: description of the 6 different theme priorities covered by the project
- **Interactive graphics**: the concept of the project in a story telling approach
- **Progress dashboard**: infographics on the progress of the project with respect to deliverables, milestones, workshops/meetings and other weighted indicators
- **Latest news**: compilation of the latest news retrieved through the “news” main menu item
- **Social media feedback**: SMURBS interaction with social media and relevant feeds under key-word selection criteria
- **Smart events**: SMURBS calendar with information about scheduled activities as well as about other relevant events collected from EC, GEOSS and other sources

2.2. The project

The Main Menu item "the project" is designed to act as the main information gateway informing the user community (incl. the public) and stakeholders about project basic information, its objectives, the main methodological steps to be followed and a brief motivation and project summary. The following items are envisaged:

- **Project id**: consists of basic information about the project like the funding platform, start date, duration etc.
- **Summary**: delivers a short summary of the project including the basic motivation, the inspiration and the main key steps of the implementation.
- **Objectives**: the objectives of the project are mentioned in this section, with further separation into Overarching and Interoperability objectives.
2.3. The team
The Main Menu item “the team” provides information concerning the partnership of the project, providing links to the partners’ individual websites. It is also foreseen that the special roles assigned in the project’s organisational structure will be given appropriate visibility to allow for more efficient communication of external stakeholders with the project team. The main buttons under the menu item “the team” are:

- **Consortium**: includes a general description of the consortium as a whole highlighting collective expertise and special assets brought in
- **Partners**: lists each partner by its logo, providing a brief description a link to its website and a description of its role in the project

2.4. Activities
The Main Menu item “activities” illustrates detailed information on SMURBS activities. Under this, several submenus (buttons) are available that depict more detailed information about project. By following this structure, the stakeholders will be allowed to follow the project’s activities, as well as understand the expected outputs and the points they may be engaged to. As the project progresses, additional material (text, pictures and graphs) will be made available under the “activities” menu. Indicatively, the submenus will enclose:

- **Pilots**: a map with active content and a foreseen activities dossier for each pilot city, test bed, case study or follower city
- **Needs and gaps**: a synthesis of the methodology followed to identify relevant to the project needs and gaps and the main outcomes that drive the project implementation
- **EO platforms**: the utilisation of the different EO components within the project, their refocusing for the needs of city scale applications and synergies built for the delivery of services and tools
- **GEOSS and Copernicus**: the contribution of the project to GEOSS and Copernicus vision for the urban component, including both the uptake/scale up of existing services and the provision of data to GEOSS and Copernicus with emphasis on in situ data
- **Portfolio**: the collection of services, tools and applications adopted, developed, tested and implemented within SMURBS
2.5. Documentation

This section will provide access to the publically available deliverables of the project, its scientific publications and a list of useful links to relevant activities, initiatives, projects/programmes and organisations (e.g. GEO, other projects, Copernicus, etc). The submenus are:

- deliverables
- publications
- other

2.6. Outreach

Outreach activities are central for the success and impact maximisation of SMURBS. Through this dedicated section on the website, the various stakeholders will obtain information on the dissemination activities (conferences, workshops, press releases etc.) carried out by the project. Furthermore, this section will provide access to communication materials produced by the project including the project brochure/leaflet and newsletters. Press releases and articles appearing in specialised magazines/journals and/or national media will be also included. Finally, a dedicated media gallery will allow external stakeholders to be informed about the project’s activities and access photos or videos produced in the framework of the events organised or attended by the project. The main submenus of this section are:

- communication material
- events
- videos
- photogallery
- press

Overall, this section is expected to maximise the visibility and impact of the project, through the efficient communication of the project’s progress to the stakeholder community.

2.7. News

A timeline of project related information will be provided through this sector, focusing on the latest dissemination activities and other related information. Additionally, all highlights of the project (e.g. upcoming events, news, activities) will be announced through this section and projected onto a calendar (in the home page). The “news” section will act as a mirror, as well as the archive of all activities of the project.
3. Architecture of the website

The structure of the Main Menu of SMURBS website described in Chapter 2 is based on the concrete architecture that is elaborated hereupon.

The key features of the technological approach are as follows:

● The applications will be implemented in open development tools with the use of open templates and open source tools. The use of open source tools gives the advantage of independence from software manufacturers, as well as any developer – integrator. For this reason, an established - “state of the art” - open source software, Wordpress (wordpress.org), is used as a base.

● Operational and technological complexity, and specific technological requirements

● Adoption of a multichannel approach for providing data and content – Access to the portal through mobile devices

3.1. Web hosting

SMURBS website will be hosted at the dedicated web servers that belong to the Wide Area Network of the National Observatory of Athens (NOANET). NOANET is a part of the Greek Research and Technology Network (GRNET). The NOANET WAN is registered as an autonomous system at European Registrar RIPE. NOANET hosting service guarantees uninterrupted 24/7 system availability, while fiber optic Gigabit Ethernet WAN infrastructure guarantees high-bandwidth communication facilities to the project’s website.

The hosting services need to support the following:

● **PHP** version 5.6 or greater

● **MySQL** version 5.6 or greater OR **MariaDB** version 10.0 or greater

We recommend Apache or Nginx as the most robust and feature-full server for running WordPress, but any server that supports PHP and MySQL will do.

**Note:** If in a legacy environment where only older PHP or MySQL versions are available, WordPress also works with PHP 5.2.4+ and MySQL 5.0+, but these versions have reached official End Of Life and as such may expose SMURBS platform/portal to security vulnerabilities.
3.2. **Design and architecture of the Website template**

The proposed design, that will support projects goals and strategic objectives is presented (in its current form) below:

**Figure 3-1: SMURBS Homepage - top sliders**

![SMURBS Homepage - top sliders](image1)

**Figure 3-2: SMURBS Homepage - networking graphic**

![SMURBS Homepage - networking graphic](image2)
**Figure 3-3: SMURBS Homepage - themes**

- **AIR QUALITY:** Limit the full range of technologically available methods for the next generation of urban monitoring services, pollutants of emerging importance and high-resolution city-scale modeling, adjusted to modern needs of AQ management.
- **DISASTERS:** Address natural and anthropogenic disasters affecting cities and human neighborhoods, covering all phases of the disaster management cycle, from preparedness and planning, early warning, emergency response and post-assessment.
- **URBAN GROWTH:** Model the capacity of the Copernicus satellite to identify and evaluate urban development trends and indicators and to address urban growth, urban density and sprawl, to develop novel city management methods.
- **MIGRATION:** Identify patterns and processes in support of decision-makers to prepare for in Ireland and beyond.
- **HEALTH:** Help to address health-related monitoring needs, in order to facilitate the potential.
- **SOCIAL INEQUALITY:** Tackle with multiple aspects of social inequalities in human settlements.

**Figure 3-4: SMURBS Homepage - EO platforms graph**
Figure 3-5: SMURBS Homepage – latest news

Figure 3-6: SMURBS Homepage - calendar
3.3. CMS platform (Wordpress)

The implementation of the entire project and its services is based on the functional and technical extension of the specifications described in this section.

The proposed solution offers all services and covers the requirements of the project. In order to implement the project, Free Software/Open Source Software (FS/OSS) technologies will be selected and utilised, and the FS/OSS tool Wordpress will be appropriately customized (http://wordpress.org).

Wordpress is a modern web based tool for content management (CMS – Content Management System) with modular architecture, which is supported by a big community of users. Moreover, it can support a large number of combinations of computing system, operating system (cross platform) and database management system architecture.

It is selected to be the base for the structure of the information system because it allows future extension as well as various improvements and interventions to all the levels of a modern CMS. According to the needs that might arise during the study of the system, any intervention can be done in an easier and more structured way in order to achieve the required functionality. All the above concern the user management, the public interface of the system and the addition of extra functionality at all levels.

It can easily be extended through special functional modules called plugins, which allows a developer to add extra functionality by re-using libraries of the application without interfering with its core libraries. At the same time, it can choose a plugin from a variety of ready FS/OSS ones in order to meet new requirements that might arise in the course of the system’s operation. The open source identity of Wordpress succeeds in avoiding dependency on specific and costly user licenses, while the fact that it is easily extensible allows that the management and maintenance be handled even by less qualified staff.

The public interface of the systems implemented in Wordpress is based on the functionality of the themes that it provides. The themes are extensions of the software and aim to properly display the managed information. Through the themes it is possible to change the appearance of the publicly displayed information. In order to meet the needs of the themes, modern Internet technologies, such as xHTML, CSS (CSS2), Javascript (jQuery or simple code) and XSLT, are used. Furthermore, embedding mechanisms and third party services is possible (e.g. embeddable video players, RSS feeds etc.).

By taking advantage of the themes' mechanism, the system administrators may easily change the external appearance of the portal constituting the public interface of the system. Such functions are useful in thematic or seasonal interventions.

In addition, it has a powerful management mechanism (backend) which embeds a full graphic environment accessible by any modern web browser. The management environment itself can be extended through the mechanism of the plugins provided.
Indicative functions of the management environment:

- Adding/Removing and editing content items.
- Adding/Removing and editing users and their details.
- Adding/Removing, enabling and disabling plugins (according to the role they belong to).
- Upgrading plugins and the overall system.
- Overall management and customization of the system in operation.

The Wordpress mechanism supports a classified access of users. There are predefined roles and the one that has the highest authority is that of the Administrator. At the same time, it is possible to add new roles with differentiated rights.

Wordpress is based on open software infrastructures (apache web server and MySQL database), as well as on the popular programming language PHP and it supports even its latest version (PHP 5.X).

The proposed system will be autonomous and able to be hosted in its own independent infrastructure or virtual machine infrastructures with the possibility of further escalation.

In conclusion, the proposed solution is based on the adjustment and extension of the popular Open Source Software platform Wordpress for the implementation of the complete application. This technical option ensures that all the subsystems will inherit its benefits. Briefly, some indicative benefits will be the following: High level of security, innovative features, quick resolution of future problems, stability. In order for the system to meet its goals, it will embed the following functions:

**3.3.1. Support of plugins**

Wordpress can easily be extended through special functional modules called Plugins (http://codex.wordpress.org/Plugins), which allows a developer to add extra functionality by re-using libraries of Wordpress without interfering with its core libraries. At the same time, it can choose a plugin from a variety of ready FS/OSS ones in order to meet new requirements that might arise in the course of the operation of the application and its subsystems. The plugins are developed independently of the system interface, as well as the system itself, by utilising the APIs provided by Wordpress.
3.3.2. Themes and Modules

The software **Wordpress** supports templates and equivalent “styles” (styles based on css). The public interface of the systems implemented is based on the functionality of the Themes (http://codex.wordpress.org/Themes) it provides. The themes are extensions of the software and aim to proper display the managed information. Through the themes it is possible to change the appearance of the publicly displayed information, as defined by the creator, independently of the rest of the functionality and independently of the contained information. Secondly, the theme may embed specific areas for small extensions **Wordpress** provides. They are called Widgets (http://codex.wordpress.org/WordPress_Widgets). Widgets are small functional modules having a specific functionality and autonomous settings, and are enabled or disabled in a simple way through the management environment. Their use is quite simple and it usually concerns the addition of small functionality to areas of the portal, such as sidebars and secondary areas.

3.3.3. Users, Roles and Capabilities

The mechanism supports a classified access of users. There are predefined roles and the one that has the biggest capabilities is that of the Administrator. Each user is assigned a role and each role has a set of capabilities (http://codex.wordpress.org/Roles_and_Capabilities). The capabilities concern functions that one can perform on the portal (e.g. writing content, publishing content, editing content, enabling plugins, editing users etc.). Capabilities, other than those predefined by the system, can be added to each role, or accordingly removed from each role.

The initial roles provided by the system are the following:

- **Administrator** – He is in full control of the site.
- **Editor** – He may, other than add and edit content items, edit content items posted by other users.
- **Author** – He may post and edit content items posted by himself, as well as publish them.
- **Contributor** - He may post and edit content items posted by himself, but not publish them.
- **Subscriber** – The simplest type of user who may just edit his profile.

It is possible though to add new roles with differentiated capabilities. The creation of a new role can be based on another role or it can be a role that has no capabilities to which a developer can add anything he wishes to. For instance, he can create the role
“wiki_author”, which has all the capabilities of the role “author”, and additionally give it the capability to edit others’ posts, which the author normally does not have.

It should be noted that the tool **Wordpress** will be used as a base for providing Wiki functionality to the subscribed users. This property will also be used for implementing the subsystem of collaborative text shaping.

In addition to the capabilities defined by the system and utilised by its mechanisms, a developer may add new capabilities to the system in order for them to be utilised in its own extensions or be embedded in the existing system. So, for example, the capability “manage_video_gallery” may be created and assigned to an existing role (e.g. author) or a new role may be defined (e.g. gallery manager) and assigned. This would allow the development of video collections management functionality, through an autonomous functional extension with new roles and capabilities, without being affected by the existing capabilities and roles. This property will be used for implementing the subsystem of collaborative production of multimedia material and repositories.

Moreover, **Wordpress** has the capability of adding extra fields characterising the users. These fields can be metadata and can be added dynamically. This capability gives **Wordpress** the property of enriched user profile with details such as:

- Contact details
- User’s location on the map
- Accounts the user has on social media platforms (e.g Facebook, Twitter, Linkedin).

In general, the careful selection of roles and capabilities (and the creation of new ones if required) may offer solutions to the management and classification of users in complex projects and communities as that of SMURBS.

### 3.3.4. Content management functionalities

The basic functionality of **Wordpress** is content management (CMS – Content Management System). It defines the concept of Post (http://codex.wordpress.org/Posts) to characterise a classifiable content item, and the concept of Page (http://codex.wordpress.org/Pages) to define a static content item. The most interesting items are the dynamic ones, as they can be classified in multiple ways (see below) and bear large amounts of information. The Pages and Posts as content items do not differ significantly from each other, except for the fact that Pages do not bear any type of taxonomy (other than the use of tags).

The main information a content item bears is:
• Title – The title of the item.

• Content – The main content of the item.

• Attached files – Files added as attached to the content item (images, files, compressed folders etc.)

• Brief description – Short extract or summary of the item.

• Date/Time of Publication – It is set either automatically or by the user.

• State – Published, Draft, Pending Review (if required by the user's role).

• Owner – The author of the item.

• Tags – Key words accompanying the text.

• Previous versions - Record of versions with every change made, with the possibility of comparing and restoring a previous version.

• Category (or other Taxonomy).

• Custom Fields – Specific structure hosting extra fields for the item, with great flexibility in their use.

In the case of Pages (static items), the concept of Category does not exist, even though in terms of programming any taxonomy regarding this type of items can easily be achieved. In addition, pages have the capability of being hierarchically structured (e.g. one page is the father or ancestor of another page) with multiple hierarchy levels (n-level).

One of the most important features of the architecture is that additional types of contents items, other than the existing ones, can be created. In this way, custom post types can be created (http://codex.wordpress.org/Post_Types) to cover specific functions. Such post types may be video post types which bear, in a structured and easily editable way, all the metadata of a video, “event” post types for displaying events and seminars, “book” post types for displaying details of a book etc.

Moreover, Wordpress provides for every post type the capability of enabling the entry in given time periods or enabling it to appear on future dates. This property is based on the combination of the states pending, draft, published or adapted states that the user can specify for the items. This property will exist for all the items of the application.

The above allows the existence of lots of differentiated post types, each with its properties and taxonomies, in a Wordpress installation. In this way, it becomes possible to support all the known post types, such as formatted text, files, links, photographs, sound, video, Flash, google maps.
All content items are constantly accessible through the display system of Wordpress (Themes and Plugins) either autonomously or as a flow of content items, through a combination of filters and navigation techniques. A typical example is the Flow of News (or Announcements) of a portal where the user can read the news, view “related news”, view all the news in a paged file etc. The number of the content items that will appear by the display mechanism is easily adjustable by the Management Mechanism (e.g. 10 pieces of news / items / themes per page), while many ways of navigation can be specified (e.g. date of publication, publication category, user who posted etc).

### 3.3.5. Embedding files in every type of item

The application will allow, through “What you see is what you get editor”, to embed multiple files in every type of item for all the platform subsystems. In this direction, the software Wordpress supports the uploading of every type of file, as well as embedding it in the related posts or pages.

The administrator can allow the uploading and display of unpopular types of file to the visitor, through the capability of customizing permitted types of file. Given the above feature, the application that will be implemented will support embedding and displaying various material according to the most widespread formats. As mentioned above, the user of the application will be able to embed these files in every post. Initially, the application will support the following types:

- Text, table and presentation files: pdf, doc, docx, xls, xlsx, rtf, txt, odp, ods, odt, ppt, pptx.
- Image files: jpeg, tiff, bmp, png, gif.
- Sound files: mp3, wav.
- Video files: mpeg4, avi, flv, wmv.

All the above can be enriched in case it is required.

### 3.3.6. Content Taxonomy and Classification Functions

Wordpress is one of the most powerful CMS in terms of taxonomy. Initially, two taxonomy types (http://codex.wordpress.org/Taxonomies) are provided, Categories and Tags. The Categories are hierarchical structures of multiple levels (n-levels) which allow content taxonomy in multiple points. Every content item (Posts or Adjusted Content Items) can be classified in more than one category, thus allowing a complex taxonomy and organization. In addition, due to the hierarchical structure of the Categories, if a content item is classified in a child Category, then it is automatically considered to be classified in the parent category.
3.3.7. Management functions through web interface

Wordpress has a powerful management mechanism (Dashboard - http://codex.wordpress.org/Dashboard_Screen) which embeds a full graphic environment accessible by any modern web browser. The management environment itself can be extended through the mechanism of plugins that is provided and can bear a large number of settings and capabilities beyond the standard ones that are provided. The access to the management system is allowed after the user has been identified through username and password. This is a very important element for the maintenance and enrichment of the site from SMURBS communication and dissemination team.

Indicative functions of the management environment:

- Adding/Removing and editing content items
- Adding/Removing and editing users and their details
- Adding/Removing, enabling and disabling plugins (according to the role they belong to)
- Upgrading plugins and the overall system
- Overall management and customization of the system in operation.

The management of the content and the metadata it may contain is performed with the use of a text editor (WYSIWYG), while with the use of custom libraries, it supports basic capabilities of composing a web text with hyperlinks, images or icons, tooltip pop-ups, text formatting and other similar capabilities broadly available in similar tools.

3.3.8. Commenting Mechanism – Protection from bot and moderation

Wordpress provides a powerful embedded mechanism for submitting comments to the content items it manages. Commenting is enabled at will by the administrator for the portal as a whole or for each content item separately. In its standard form, the user is asked to fill in his name, email, website (optional) and the comment.

The commenting mechanism can be improved and extended in many ways. For instance, additional fields can be added, the users can follow the replies to the comments through email, the capability of commenting may be available only for subscribed users, a captcha form can be added in order to prevent bot, the capabilities of reporting or rating comments can be added etc.

The captcha mechanism is an automatic test which today’s software fails, while people pass it easily. The user is asked to recognize and certify information provided by the test, usually by filling in a form. The captcha mechanism can be used in all the forms that will
be created and used by users, thus avoiding spamming and unsolicited emails. Based on this, the capability of using communication and subscription forms is supported with the use of “captcha” mechanism provided by the application.

The submitted comments may be published directly or after they have been moderated by the system administrator (moderator). In addition, mechanisms for identifying spam messages and reporting them are provided so that they are not published automatically.

In addition to the above, the moderation mechanism (approval of posts) applies for every Wordpres item. The visitor will be able to store / enter content into the system, but it will be published by predefined users of the system. This is performed by Wordpres, by the role “subscriber” or through an external form which creates a “draft post” approved by a higher role.

The commenting mechanism strengthens the social character of Wordpres and the portals structured on it, thus fostering openness and ensuring interaction with the user/visitor.

### 3.3.9. Sitemap Function

Wordpres provides a set of plugins for the “sitemap” functionality. The purpose of the sitemap is to give a tour in the overall structure of the application. The plugin that will be used is Page-List which provides the capability of dynamically creating the map for the application subsystems. At the same time, it provides the capability of tree presentation of the pages belonging to a category. The sitemap will be part of the proposed solution.

### 3.3.10. Search function

Wordpres provides the capability of extensive search in all the content items it manages. The search is performed with a free text (key-words) in all the fields constituting a content item (title, content, custom fields etc.). In the meantime, it can utilize the taxonomies to which a content item and elements belong, such as publication date, in order to restrict and filter the results. As a result, the search mechanism that exists in the application will be able to extend in all of it and for all its items.
3.3.11. Support of Content Optimization in search engines (SEO)

Wordpress provides all those functionalities that are driven by the widespread techniques of Search Engine Optimization (SEO) for the broad recognizability of the Portal.

For this reason, all optimization techniques for search engines (SEO) will be provided. Indicative techniques:

- Use of permalinks (links with readable structure, e.g. site.com/about instead of site.com/?page_id=34).
- Use of all the appropriate meta tags (keywords, description, author etc.).
- Full formatting and use of all the necessary html elements (h1,h2,h3 etc.), especially in the selection of design template and the structure of the application pages.
- Capability of producing Google XML Sitemap.
- Capability of sharing the page content with the well-known social media channels (twitter, facebook etc.).

3.3.12. Communication - Proposal Submission forms – Interactivity

Wordpress provides the capability of embedding a communication form for each item. The association of a form with a published item can be performed automatically or by the user’s option. The submitted messages can be forwarded to one or more emails and they can also be recorded in the system. The users may, according to their role, have access to the messages and perform functions for classifying or searching them. The interactivity function will be provided horizontally for all the subsystems.

3.3.13. Menu and connections management

In order to display the items, the software Wordpress, on which the implementation of the application will be based, will provide the capability of creating option menu structures. It will be possible to associate each option of the menu with a post / item (e.g. product), a subcategory or a category. Depending on what the specific option is associated with, the item or all of the posts will be displayed. In addition to the technical description of the features above, the software provides the Menu Management capability (http://codex.wordpress.org/Appearance_Menus_Screen) through which it is made possible to support the following functions:

- Create – Edit – Delete - Save an option menu.
- Display of the menu in an automated way in the public interface.
- Display of hierarchy between the options set in each menu.
- Interconnection of options with destinations, such as:
o Static page of the **Wordpress** mechanism.

o Item (e.g. post or product).

o Category based on which all related items appear in the public interface.

o Tag (keyword) based on which all related items appear in the public interface.

o Adapted post types (content items) and adapted taxonomy types (wordpress taxonomies).

A detailed description regarding option menus can be viewed at [http://codex.wordpress.org/Appearance_Menus_Screen](http://codex.wordpress.org/Appearance_Menus_Screen).

Based on the above, regarding option menus, the alternative presentation ways, when the menu option has been associated with a section or category, are:

- List of the post titles, so that the user selects the post he wishes to read.
- Presentation of posts in blog form.
- Display of the whole item, given that the menu option has been associated with a single post.

### 3.3.14. Statistics functionality

**Wordpress** can provide functionality for access to statistics. The administrator, as well as selected users, may have access to the dashboard, or the access may depend on the role. The functionality of the **Wordpress Wassup** Plugin ([http://wordpress.org/plugins/wassup/](http://wordpress.org/plugins/wassup/)) extension will be customized for the presentation of statistics according to the needs of the application individual subsystems. This functionality provides the capability of receiving statistics and has the following features:

- Display of statistics by using time period criteria as a reference (daily, weekly, monthly, yearly or a specific time period selected by the user)
- Display of user statistics on a whole application level or on its subsystems level
- Display of statistics associated with key words used by users to get to the main page or a subpage
- Display of statistics according to the visitors' origin
3.3.15. Newsletter – Informing subscribed users

Through a custom functionality, Wordpress provides the capability of sending newsletters (http://wordpress.org/plugins/newsletter/). This property will exist in the whole application. The basic functional features it will support are the following:

- Unified management mechanism with the Wordpress users
- Display of subscription form with the use of widget mechanisms
- Interface of mass message sending by the users to subscribed email accounts
- Newsletter in text form.
- Complementary Use or integration with external systems such as mailchimp

These mechanisms will be extended and customized so that the subscription services for informing the users are fully implemented.

3.3.16. Georeferencing mechanism

For all its subsystems, the application will embed a georeferencing mechanism for its content. Each content will be able to embed features and geographical coordinates in a user-friendly way (search on a map). Accordingly, the visitor will be able to use the maps displayed in the application in order to search for information using geographical criteria. Similarly, for the item display it will be possible to display related geographical information on a map. This requirement is covered by a custom functionality of Wordpress (plugin), which will be customized and utilized for the whole application. In order to meet this requirement, the Geo Mashup will be utilized (http://wordpress.org/plugins/geo-mashup/). This plugin can support both geographical backgrounds of Google and open ones (Google Maps v3 or OpenStreetMap, respectively). Thus, the georeferencing mechanism will be embedded in every type of content hosted by the application as a whole.

3.3.17. Electronic voting

The electronic voting will allow the expression of views. In order to implement this requirement, it is necessary to functionally extend the custom functionality of the software Wordpress Wp-Polls (http://wordpress.org/plugins/wp-polls/), which is fully unified with the proposed solution and provides the following capabilities:

- Addition of poll by the administrator
- Submission of issue for voting
- Definition of questions
- Definition of answer types (Open/ close answers)
- Export and presentation of results
3.4. **Non-Functional Requirements - web portal**

3.4.1. **Performance - Architecture Requirements**

The minimal WordPress server requirements are listed below:

- PHP 5.6.x or above - http://php.net
- MySQL 5.6 or above - http://mysql.org
- The mod_rewrite Apache module

You can find more comprehensive information about this in the official WordPress documentation at: [http://wordpress.org/about/requirements/](http://wordpress.org/about/requirements/).

3.4.2. **Interface Requirements**

The proposed solution, as analyzed above, will allow all the users who have access to the Internet, to use it easily without needing any specialized material or/and software, through a modern web browser. In particular, the system interface will be governed by all modern trends (web2.0) and it will be compatible with all modern templates (CSS2.0+, Javascript, xHTML etc.). For the application, a specific theme will be implemented and used, which will support most mobile devices.

A widely known solution, which we will also use for this proposal, is responsive web design. Responsive web design is a relatively new term and constitutes a prevailing trend in the design field. The word “responsive” means response, so it could be said that this
technique is based on the detection of some variables, and the level of response depends on the values of those variables.

It constitutes the design and page building process of the application, which detect different variables from the external and internal environment and respond to the visitor accordingly. The goal is to create a “smart” page of the information system, which will adjust its size and basic features (menu, images, text) according to the screen dimensions of the user's device.

By using the responsive web design technique, the building of a page presenting an application aims to avoid adjustment issues in different devices and offers visitors the best possible navigation experience, as well as the capabilities offered by each medium they use.

In this way, an application will be built which will behave as 2 applications in 1. The users will be able to visit the information system without any problem, either from a personal computer or a mobile device, and they will have the best possible navigation experience.

All the above, in combination with the interoperability capabilities (see previous unit) of the system, bring added value to it and make it particularly appealing both to the average user and bodies and companies wishing to use the supplied data. In this way, numerous capabilities for even more multichannel approaches (e.g. Android and iPhone Apps) are provided.

Based on this approach, the whole application of the portal will be designed in a way so as to give the capability of viewing and using it through multiple channels providing the information. In particular, the access to the application will be possible exclusively from a Web Browser through the Internet. The devices that should grant access are at least the following:

- Personal computer or laptop
- Mobile phone
- Tablet
- Smart TV

3.4.3. Security Requirements

Security in WordPress is taken very seriously, but as with any other system there are potential security issues that may arise if some basic security precautions aren’t taken. This article will go through some common forms of vulnerabilities, and the things that can help keep the WordPress based installation secure. More information about the security strategy can be found here http://codex.wordpress.org/Hardening_WordPress.
3.4.4. Storage and Persistence Requirements

- Initial hosting plan provided 1GB hard disk
- Backup module (on demand) and on schedule (data base and files)

*Figure 3-7: Multiple schedule management tools*
4. Foreseen Updates & Interoperability facilities

4.1. Content updates

At present, several of the planned functionalities have been implemented into the website. Thus, several of the pages are already available with content that is primarily stemming from the Technical Annexes or material provided by the PMST. However, as the project progresses and more activities kick off, several updates are foreseen. This will concern first and foremost upgrading the text to make it more attractive and user-friendly for the different types of users. In addition, as concrete outputs are produced, the website will progressively “transform” into the SMURBS portal, where more interactive and advanced items will be accessible (e.g. SMURBS network, Smart Urban Solution Portfolio, infographics, etc.). Other than such content upgrades, SMURBS website will be an environment that is dynamically refreshed and curated so that all external stakeholders can stay up to date with the latest developments, news, events, milestones, etc. of SMURBS. A team, consisting of the communication manager (CM), the dissemination manager (DM) and members of the PMST will be responsible for regular content updates, further facilitated by augmented functionalities as the website becomes a portal.

4.2. Interoperability

Furthermore, the capability of transferring data to third applications, through open and internationally recognized templates for the exchange of data with other information systems, should be provided. It is possible to use the following open template technologies (or other equal ones, following relevant documentation):

- XML, which includes basic XML, XML schemas and XML parsers, for the structure/formatting of exchanged data and/ using WordPress mechanism (XML –RPC or Wordpress API)